FACILITIES MANAGEMENT

OPEN CALL FOR BIDS

FOR

QEII Library Level 2
Washroom Renovations

Request for Open Call Number: **TFM-026-24**

Issued: **June 7, 2024**

Submission Deadline: **Thursday, July 4, 2024**
@ 3:00PM NDT

REQUEST FOR OPEN CALL FOR BIDS INFORMATION SHEET

Request for Open Call			
Title:	**Level 2 Washroom Renovations**		
Open Call #:	**TFM-026-24**	Issue Date:	**June 7, 2024**
Non-Mandatory Site Visit:	**Location: QEII Library L-2021**		**June 19, 2024 @ 11:00 AM**
Questions Deadline:	**Eight (8) days prior to closing time, at 3:00pm (NDT).**	Closing Date & Time: Bid Submission Format: Opening Date, Time & Location:	**Thursday, July 4, 2024 @ 3:00 pm NDT** **opencalls@mun.ca** **Thursday, July 4, 2024 @ 3:30 pm NDT** **Via Conference line: 1-416-915-6530 (toll free) Access Code: *2771 702 8987* Attendee ID: Please press Pound(#)**
Bids Irrevocable Period after Submission Deadline:			**45 days (See section 1.6)**
Bid Submission: Responses to this solicitation must be submitted by email to opencalls@mun.ca Email subject line must read: BID SUBMISSION: TFM-026-24 LEVEL 2 WASHROOM RENOVATIONS			
Inquiries and Communication			

Inquiries and communication: Strategic Procurement Office, Memorial University of Newfoundland, opencalls@mun.ca. Inquiries accepted only via email. No phone calls will be accepted. **Please reference open call Title and Open Call # from above, ie: TFM-026-24 Level 2 Washroom Renovations in subject line. Emails not containing this requirement information in the subject line will NOT receive a response.**

Bids submitted by fax, mail, courier, drop off or by any other means of delivery other than by email stated above shall not be accepted.

ABOUT MEMORIAL UNIVERSITY

As Newfoundland and Labrador's only university, Memorial has a special obligation to the people of this province. Established as a memorial to the Newfoundlanders who lost their lives on active service during the First and Second World Wars, Memorial University draws inspiration from these shattering sacrifices of the past as we help to build a better future for our province, our country and our world.

We are a multi-campus, multi-disciplinary, public university committed to excellence in teaching and learning, research and scholarship, and to public engagement and service. We strive to have national and global impact, while fulfilling our social mandate to provide access to university education for the people of the province and to contribute to the social, cultural, scientific and economic development of Newfoundland and Labrador and beyond.

The Memorial experience goes beyond academics; it invites a discovery of self, community and place. At Memorial, we celebrate our unique identity through the stories of our people – the work of scholars and educators, the ingenuity of students, the achievements of alumni – and the impact we collectively make in the province, the country and the world. Memorial is the natural place where people and ideas become.

Memorial University has more than 18,500 students and 3,600 faculty and staff spread across four campuses and nearly 100,000 alumni active throughout the world. From local endeavors to research projects of national importance, Memorial's impact is felt far and wide.

Mission, Vision and Values

Vision

Memorial University will be one of the most distinguished public universities in Canada and beyond, and will fulfill its special obligation to the people of Newfoundland and Labrador.

Mission

Memorial University is an inclusive community dedicated to innovation and excellence in teaching and learning, research, scholarship, creative activity, service and public engagement.
Memorial welcomes and supports students and scholars from all over the world and contributes knowledge and expertise locally, nationally and internationally.

Values

Excellence: Encouraging and promoting excellence through innovation and creativity, rigor and pragmatism.

Integrity: Being honest and ethical in all interactions, maintaining the highest ethical standards in teaching, research, public engagement and service.

Collegiality: Engaging others with respect, openness and trust in pursuit of a common purpose, having regard for individuals, ideals and the institution as a whole.

Inclusiveness and diversity: Embracing and acting on responsibility to guarantee diversity and equity.

Responsiveness: Being receptive to individuals and communities.

Accountability: Accepting responsibility for achievement of common goals and objectives.

Freedom and Discovery: Supporting the freedom to pursue knowledge that is based on individual and collective intelligence, curiosity, ingenuity and creativity.

Recognition: Acknowledging, tangibly, all aspects of university enterprise including teaching and learning, research, scholarship, creative activity and public engagement.

Responsibility to place: Valuing and fulfilling the special obligation to the people of Newfoundland and Labrador by supporting and building capacity for excellence that:

- addresses needs and opportunities for Newfoundland and Labrador;
- engages the university community on matters of national and international significance;
- produces and delivers academic programs of national and international calibre; and,
- Recognizes the dynamic opportunities presented by a multi-campus institution.

Responsibility to learners: Recognizing students as a first priority and providing the environment and support to ensure their academic and personal success.

Interdisciplinary collaboration: Supporting overarching themes in all pursuits that cut across academic units and address significant opportunities and challenges for which Memorial is particularly well positioned to build nationally and internationally recognized capacity.

Sustainability: Acting in a manner that is environmentally, economically and socially sustainable in administration, academic and research programs.

Memorial's exceptional staff and students contribute to the vitality and positive environment of the university through active community engagement. Memorial University has always been a publicly engaged institution. Since the founding of the University in 1949, the work of many of Memorial's students, faculty and staff has emphasized the importance of strong, sustained partnerships with members of the public of Newfoundland and Labrador and beyond.

Faculty and Staff

Memorial is one of the largest employers in the province, with approximately 3,600 faculty and staff. Memorial has been recognized as an Employer of Distinction by the Newfoundland and Labrador Employers' Council, which is reflective of its investment in comprehensive benefits, services such as childcare and recreation facilities, emphasis on work-life balance, and its vibrant work environment.

Governance and Administration

The management, administration and control of the property, revenue, business and affairs of the University are vested in a Board of Regents. The Board is appointed under the *Memorial University Act* and is responsible for the management, administration, and control of the property, revenue, business and affairs of the university. Matters of an academic character are in general charge of the Senate of the University.

For more information on Memorial University of Newfoundland, please visit:
Memorial's home page: http://www.mun.ca/

Territory Acknowledgements at Memorial:

We acknowledge that the lands on which Memorial University's Campus are situated are in the traditional territories of diverse Indigenous groups and we acknowledge with respect the diverse histories and cultures of the Beothuk, *Mi'kmaq, Innu, and Inuit of this province.*

PROCUREMENT AND CONTRACTING DOCUMENTS GROUP

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

Open Call for Bids Strategic Procurement Sections

General Conditions and Agreement between Owner and Contractor for the Stipulated Price Contract

SPECIFICATIONS GROUP

General Requirements Subgroup

DIVISION 01 - GENERAL REQUIREMENTS

Facility Construction Subgroup

DIVISION 02 - EXISTING CONDITIONS

DIVISION 03 - CONCRETE

DIVISION 04 - MASONRY

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

DIVISION 08 - OPENINGS

DIVISION 09 - FINISHES

DIVISION 10 - SPECIALTIES

Facility Services Subgroup

DIVISION 22 - PLUMBING

DIVISION 23 - HEATING VENTILATING AND AIR CONDITIONING

DIVISION 26 - ELECTRICAL

END OF SECTION

PART 1 - GENERAL

1.1 A SERIES DRAWINGS - ARCHITECTURAL

.1 A-0.1 General Notes and Submittals

.2 A-1.0 Location and Hoarding Plans

.3 A-2.0 Demolition Floor Plan

.4 A-2.1 New Floor Plan

.5 A-2.2 Accessibility Clearances

.6 A-2.3 Ceiling Plans and Details

.7 A-2.4 New Finish Plan and Schedule

.8 A-3.0 Door and Window Schedule

.9 A-4.0 Washroom Accessories

.10 A-4.1 Washroom Elevations L-2021A

.11 A-4.2 Washroom Elevations L-2021

.12 A-4.3 Washroom Elevations L-2021

.13 A-4.4 Washroom Elevations L-2020

.14 A-5.0 Millwork Details

1.2 M SERIES DRAWINGS - MECHANICAL

.1 M-0.1 Mechanical Symbol Legend

.2 MP-1.0 Domestic Water Plan

.3 MP-1.1 Demolition D.W.V Plumbing Plan

.4 MP-1.2 New D.W.V Plumbing Plan

.5 MP-1.3 Sprinkler Plan

.6 MV-1.0 Ventilation Plan

1.3 E SERIES DRAWINGS - ELECTRICAL

.1 E-0.1 Electrical Symbol Legend

.2 E-1.0 Electrical Power Plans

.3 E-2.0 Electrical Ceiling Plan

.4 E-3.0 Existing Panel Schedule

.5 E-3.1 New Panel Schedule

END OF SECTION

PART 1 – SUBMISSION INSTRUCTIONS

1.1 Bids to be Submitted on Time

Bids must be submitted as set out above on or before the Submission Deadline. Bids submitted after the Submission Deadline will be rejected. Onus and responsibility rest solely with the bidder to submit its bid to the email indicated in the Open Call for Bids on or before the Submission Deadline. The Owner does not accept any responsibility for any bids submitted by means other than the email listed above. Bidders making submissions near the deadline do so at their own risk due server availability. The time for the closing will be determined according to the inbox, time stamp on opencalls@mun.ca.

Bids received after the closing time based on this time stamp, will NOT be considered.

1.2 Bids to be Submitted in Prescribed Format

- Bidders should submit **one (1)** email submission in PDF format.
- Please note: File size cannot exceed 15 MB. Otherwise server may reject bid submission due to size.
- **Bids submitted by fax, mail, courier, drop off or by any other means of delivery other than by email stated above shall not be accepted.**

1.3 Amendment of Bids

Bidders may amend their bids after they have been submitted if, and only if, the amendment is emailed prior to the Submission Deadline marked **BID SUBMISSION AMENDMENT** followed by open call number and name.

Bidders may revise their bid by email: opencalls@mun.ca

The Owner does not accept any responsibility for amendments submitted by means other than the email listed above. Bidders making submission near the deadline do so at their own rick due to service availability. The time for the closing will be determined according to the inbox, time stamp on opencalls@mun.ca. Amendments to bids received after the closing time base on this times stamp, will NOT be considered.

Email inquiries and requests for clarification shall be accepted up to eight (**8) days (3:00pm NST)** prior to the closing time. Inquiries and requests for clarification received after this date shall not be addressed. The Strategic Procurement Office will be the only official source of information regarding this Open Call for Bids and information from any other source shall be considered unofficial and may not be correct.

1.4 Amendment of Open Call for Bid Documents

To ensure consistency and quality in the information provided to bidders the Owner shall provide, by way of amendment to this Open Call for Bids, in the form of an addendum, any relevant information with respect to the Open Call inquiries received in writing without revealing the source of those inquiries. Bidders are cautioned that it is their responsibility to ensure that they receive all information relevant to this Open Call. The Owner shall not be

responsible for bidders who fail to inform themselves regarding the scope and nature of the work. The Owner shall publish all amendments on Memorial University's current service providers: MERX: www.merx.com, BIDS: www.bids.ca and PODS: www.pods.net. In addition, all amendments will be published on https://www.mun.ca/finance/strategic_procurement/. Bidders should check on a regular basis for Open Call updates. Bidders are solely responsible for ensuring they are aware of and have complied with all amendments by tender closing time. In the event there is a discrepancy between MERX, BIDS, and PODS and the official website https://www.mun.ca/finance/strategic_procurement/ website, the https://www.mun.ca/finance/strategic_procurement/ is the official website. Bidders are welcome to register their email address through opencalls@mun.ca to receive addendum notifications from Open Calls as a matter of courtesy. This does not relieve any Bidder of their responsibility to ensure all addenda has been received.

1.5 Withdrawal of Bids

Bidders may withdraw their bids prior to the Submission Deadline. To withdraw a bid, a notice of withdrawal must be sent to the opencalls@mun.ca email address prior to the Submission Deadline. The Owner is under no obligation to return withdrawn bids.

1.6 Bids Irrevocable after Submission Deadline

Bids shall be irrevocable for a period of **45** days running from the moment that the Submission Deadline passes.

1.7 Delivery

Time is of the essence and delivery schedule(s) are legally binding. Memorial University reserves the right to assess penalties or cancel awards to Bidders who fail to meet the stated delivery or completion dates. Delivery of all materials and services must be DAP (delivered at place) or DDP (delivered duty paid (all locations) and local environs.

1.8 Signature

Memorial University, in consideration of section 11 of the Electronic Commerce Act, confirms its acceptance of electronic signatures, or other acceptable form of electronic consent, in satisfaction of the signature requirement for bid submissions. The electronic form of signature or consent must be directly related to the relevant bid submission at issue and must be reliable, in a manner as determined by Memorial University, for the purpose of identifying the person submitting the bid response. By submitting a bid under this process, the bidder confirms that the signatory has the appropriate and proper authority to bind the bidder to its submission, a confirmation upon which Memorial University relies in the processing of the bid submission.

Bidders must complete Appendix B –Submission Form. Any bids received without Appendix B completed will be deemed non-complaint.

1.9 Closure

In the event that the University is closed earlier than normally expected prior to a scheduled open calls closing for that day, or for the full day, the closing date for those open calls will be extended to the next business day for the University at the same time as listed originally.

1.10 Corporations Act

The Corporations Act of Newfoundland and Labrador requires that an extra-provincial company be registered before it begins or carries on business in the Province. If your company is not registered, please apply for the appropriate forms and procedures to:

Commercial Registrations Division
Dept of Government Services, PO Box 8700 St John's, NL Canada A1B 4J6
Phone: 709-729-3317, Fax: 709-729-0232
Website: http://www.gs.gov.nl.ca/registries/companies/corp_art_inc.html

[End of Part 1]

PART 2 – EVALUATION AND AWARD

2.0 Stages of Evaluation

The Owner will conduct the evaluation of bids in the following stages:

2.1.0 Stage I – Mandatory Submission Requirements

Stage I will consist of a review to determine which bids comply with all of the mandatory submission requirements. Bids that do not comply with all of the mandatory submission requirements as of the Submission Deadline will, subject to the express and implied rights of the Owner, be disqualified and not evaluated further.

2.1.1 Stage II – Mandatory Technical Requirements

Stage II will consist of a review to determine which bids comply with all of the mandatory technical requirements. Bids that do not comply with all of the mandatory technical requirements as of the Submission Deadline will, subject to the express and implied rights of the Owner, be disqualified and not evaluated further. The mandatory technical requirements are listed in Appendix A - Specifications.

2.1.2 Stage III – Pricing

Stage III will consist of a scoring of the submitted pricing of each compliant bid in accordance with the evaluation method set out in the Pricing Form (Appendix C). The evaluation of price will be undertaken after the evaluation of mandatory requirements has been completed.

2.2 No Amendment to Forms

Other than inserting the information requested on the mandatory submission forms set out in the Open Call, a bidder may not make any changes to any of the forms. Any bid containing any such changes, whether on the face of the form or elsewhere in the bid, shall be disqualified.

2.3 Selection of Lowest Compliant Bidder as Preferred Supplier

Subject to the Owner's reserved rights, the compliant bidder with the lowest pricing will be the preferred supplier, and will be selected to enter into the Agreement in accordance with the following section. In the event of a tie, the preferred supplier will be determined by way of a coin toss, in accordance with the Public Procurement Policy. Provincial suppliers, suppliers with a place of business in Newfoundland and Labrador, will be given provincial supplier preference provision. This mandates an allowance of ten percent for provincial suppliers for all procurement below trade agreement thresholds.

Please note, the supplier preference does not apply when the estimated value of the commodity is above the trade agreement threshold shown in the following table.

Public Body	Thresholds			
	Goods	Services	Public Works	Lease of Space
Memorial University	$133,800	$133,800	$334,400	$100,000

2.4 Notice to Bidder and Execution of Agreement

Notice of selection by the Owner to the preferred supplier shall be in writing. The preferred supplier shall execute the Agreement, the form and content of which will be mutually agreed upon between the parties and satisfy any other applicable conditions of this open call within fifteen (15) days of notice of selection. This provision is solely for the benefit of the Owner and may be waived by the Owner.

2.5 Failure to Enter into Agreement

If a selected bidder fails to execute the Agreement or satisfy the pre-conditions of award listed in the Open Call Particulars within fifteen (15) days of notice of selection the Owner may, without incurring any liability, proceed with the selection of another bidder and pursue all remedies available to the Owner.

2.6 Payment Terms

The University's standard payment terms are net 30 days after delivery of goods, or net 15 days after successful completion of installation as applicable. In the case of services, payment terms are also net 30 days after successful completion of the service. These terms shall also apply in the case of sub-contracted items. Prepayments will not be considered unless the supplier provides an irrevocable standby letter of credit, or the supplier provides a credit reference from its banker (in conjunction with a 50% materials and labour bond and a 50% performance bond) satisfactory to the Director of Financial and Administrative Services.

[End of Part 2]

PART 3 – TERMS AND CONDITIONS OF THE OCB PROCESS

3.1 Open Call Incorporated into Bid

All of the provisions of this Open call are deemed to be accepted by each bidder and incorporated into each bidder's bid. A bidder who submits conditions, options, variations or contingent statements to the terms as set out in this Open call, either as part of its bid or after receiving notice of selection, unless otherwise indicated, shall be disqualified.

3.2 Bidders to Follow Instructions

Bidders should structure their bids in accordance with the instructions in this Open call. Where information is requested in this Open Call, any response made in a bid should reference the applicable section numbers of this Open Call.

3.3 Bids in English

All bids are to be in English only.

3.4 No Incorporation by Reference

The entire content of the bidder's bid should be submitted in a fixed form, and links to the content of websites or other external documents referred to in the bidder's bid but not attached will not be considered to form part of its bid.

3.5 References and Past Performance

In the evaluation process, the Owner may consider information provided by the bidder's references and may also consider the bidder's past performance or conduct on previous contracts with the Owner or other institutions.

3.6 Information in Open Call Only an Estimate

The Owner and its advisors make no representation, warranty or guarantee as to the accuracy of the information contained in this Open Call or issued by way of addenda. Any quantities shown or data contained in this Open Call or provided by way of addenda are estimates only, and are for the sole purpose of indicating to bidders the general scale and scope of the Deliverables. It is the bidder's responsibility to obtain all the information necessary to prepare a bid in response to this Open Call.

3.7 Bidders to Bear Their Own Costs

The bidder will bear all costs associated with or incurred in the preparation and presentation of its bid, including, if applicable, costs incurred for interviews or demonstrations.

3.8 Bid to be Retained by the Owner

The Owner will not return the bid or any accompanying documentation or samples submitted by a bidder.

3.9 Trade Agreements

Bidders should note that procurements falling within the scope of the Canadian Free Trade Agreement, and/or the Canada-European Union Comprehensive Economic Trade Agreement are subject to those trade agreements but that the rights and obligations of the parties will be governed by the specific terms of this Open Call.

3.10 No Guarantee of Volume of Work or Exclusivity of Contract

The Owner makes no guarantee of the value or volume of work to be assigned to the preferred supplier. The Agreement will not be an exclusive contract for the provision of the described Deliverables. The Owner may contract with others for goods and services the same as or similar to the Deliverables or may obtain such goods and services internally.

3.11 Communication After Issuance of Open Call

Bidders shall promptly examine all of the documents comprising this Open Call, and

(a) shall report any errors, omissions or ambiguities; and
(b) may direct questions or seek additional information in writing by email to opencalls@mun.ca on or before the Deadline for Questions. All questions or comments submitted by bidders by email to the Open Call Contact shall be deemed to be received once the email has entered into the Open Call Contact's email inbox. No such communications are to be directed to anyone other than the Open Call Contact, and the Owner shall not be responsible for any information provided by or obtained from any source other than the Strategic Procurement Office. The Owner is under no obligation to provide additional information. It is the responsibility of the bidder to seek clarification from the Open Call Contact on any matter it considers to be unclear. The Owner shall not be responsible for any misunderstanding on the part of the bidder concerning this Open Call or its process.

3.12 All New Information to Bidders by Way of Addenda

This Open Call may be amended only by addendum in accordance with this section. If the Owner, for any reason, determines that it is necessary to provide additional information relating to this Open Call, such information will be communicated to all bidders by addenda. Each addendum forms an integral part of this Open Call and may contain important information, including significant changes to this Open Call. Bidders are responsible for obtaining all addenda issued by the Owner. In the Submission Form (Appendix B), bidders MUST confirm their receipt of all addenda by setting out the number of each addendum in the space provided.

3.13 Addenda and Extension of Submission Deadline

Any addendum issued within four (4) calendar days of the Open Call for Bids closing (Including on closing day) will extend closing by a reasonable period to be determined by Memorial University.

When evaluating bids, the Owner may request further information from the bidder or third parties in order to verify, clarify or supplement the information provided in the bidder's bid. The response received by the Owner shall, if accepted by the Owner, form an integral part of the bidder's bid.

3.14 Notification to Other Bidders

In accordance with section 30 of the *Public Procurement Regulations*, once the Agreement is awarded by the Owner, the outcome of the Open Call will be publicly posted at https://www.mun.ca/finance/strategic_procurement/. There will be no issuing of regret letters.

3.15 Debriefing

In accordance with the Public Procurement Act and Regulations, unsuccessful bidders may request a debriefing within ten (10) business days after the award has been posted. The request must be sent in writing to the Open call contact. The intent of the debriefing information session is to provide the bidder an overview of their bid and why it was unsuccessful and to help the bidder in presenting a better bid in subsequent procurement opportunities. The debriefing process is not for the purpose of providing an opportunity to challenge the procurement process or its outcome. A debriefing shall not disclose information regarding another bidder's bid.

3.16 Supplier Complaint Process

If a bidder wishes to register a complaint with respect to the Open Call process, the complaint should be provided in writing and within the parameters established by section 25 of the Public Procurement Regulations, as amended. The notice must provide a detailed explanation of the bidder's concerns with the procurement process or its outcome, in addition to such other information as may be required by the *Regulations*. Bidders should note that these complaint procedures are separate and distinct from any dispute resolution processes that may be provided for under applicable trade agreements. If a bidder wishes to dispute a matter under an applicable trade agreement, the bidder must follow the process set out in the trade agreement.

3.17 Conflict of Interest and Prohibited Conduct

The Owner may disqualify a bidder for any conduct, situation or circumstances, determined by the Owner, in its sole and absolute discretion, that constitutes a conflict of interest.

The Owner reserves the right to disqualify any bidder that in the Owner's sole opinion has an actual or potential conflict of interest or an unfair advantage.

For the purposes of this Open Call, the term "Conflict of Interest" includes, but is not limited to, any situation or circumstance where in relation to the Open Call process, the bidder has an unfair advantage or engages in conduct, directly or indirectly, that may give it an unfair advantage, including but not limited to: (i) having, or having access to, confidential information of the Owner in the preparation of its bid that is not available to other bidders, (ii) communicating with any person with a view to influencing preferred treatment in the Open Call process (including but not limited to the lobbying of decision makers involved in the Open Call process), or (iii) engaging in conduct that compromises, or could be seen to compromise, the integrity of the open and competitive Open Call process or render that process non-competitive or unfair.

Bidders are required to disclose, to the Open Call Contact, any potential or perceived conflict of interest issues prior to Open Call closing date and time.

3.18 Disqualification for Prohibited Conduct

The Owner may disqualify a bidder, rescind a notification of selection or terminate a contract subsequently entered into if the Owner determines that the bidder has engaged in any conduct prohibited by this Open Call.

3.19 Bidder Not to Communicate with Media

Bidders must not at any time directly or indirectly communicate with the media in relation to this Open Call or any agreement entered into pursuant to this Open Call without first obtaining the written permission of the Open Call Contact.

3.20 No Lobbying

Bidders must not, in relation to this Open Call or the evaluation and selection process, engage directly or indirectly in any form of political or other lobbying whatsoever to influence the selection of the successful bidder(s).

3.21 Illegal or Unethical Conduct

Bidders must not engage in any illegal business practices, including activities such as bid-rigging, price-fixing, bribery, fraud, coercion or collusion. Bidders must not engage in any unethical conduct, including lobbying, as described above, or other inappropriate communications; offering gifts to any employees, officers, agents, elected or appointed officials or other representatives of the Owner; deceitfulness; submitting bids containing misrepresentations or other misleading or inaccurate information; or any other conduct that compromises or may be seen to compromise the competitive process provided for in this Open Call.

3.22 Past Performance or Past Conduct

The Owner may prohibit a supplier from participating in a procurement process based on past performance or based on inappropriate conduct in a prior procurement process, including but not limited to the following:

(a) illegal or unethical conduct as described above;

(b) the refusal of the supplier to honor submitted pricing or other commitments; or

(c) any conduct, situation or circumstance determined by the Owner, in its sole and absolute discretion, to have constituted a Conflict of Interest.

(d) performance on other contracts, including the efficiency and workmanship as well as the extent to which the Bidders performed the Work in accordance with the contractual clauses and conditions, is sufficiently poor to jeopardize the successful completion of the project being bid on, by way of previous contractor performance evaluations.

In addition, the Owner may suspend the bidding privileges of a supplier with regard to non-compliant or substandard performance in accordance with section 26 of the *Public Procurement Regulations*.

3.23 Confidential Information of the Owner

All information provided by or obtained from the Owner in any form in connection with this Open Call either before or after the issuance of this Open Call:

(a) is the sole property of the Owner and must be treated as confidential;

(b) is not to be used for any purpose other than replying to this Open Call and the performance of the Agreement;

(c) must not be disclosed without prior written authorization from the Owner; and

(d) must be returned by the bidder to the Owner immediately upon the request of the Owner.

3.24 Confidential Information of Bidder

This procurement process is subject to the *Access to Information and Protection of Privacy Act, 2015* (*ATIPPA, 2015*). A bidder must identify any information in its bid or any accompanying documentation supplied in confidence for which confidentiality is requested to be maintained by the Owner. The confidentiality of such information will be maintained by the Owner, except as otherwise required by law or by order of a court or tribunal. Bidders are advised that their bids will, as necessary, be disclosed, on a confidential basis, to advisers retained by the Owner to advise or assist with the Open Call process, including the evaluation of bids.

The Bidder agrees that any specific information in its submission that may qualify for an exemption from disclosure under subsection 39(1) of the *ATIPPA, 2015* has been identified in its submission. If no specific information has been identified it is assumed that, in the opinion of the proponent, there is no specific information that qualifies for an exemption under the subsection 39(1) of the *ATIPPA, 2015*. The Bidder acknowledges that contracting with the Owner is a public process and any information provided through this process and any records the Bidder supplies to the Owner, including the terms and conditions of any Agreement entered into, may be subject to requests under the *ATIPPA, 2015*. In the event of a request to Memorial for third party business information in its custody and control, information can be withheld only if it meets all parts of the 3-part harms test for non-disclosure as stated in section 39 of the *ATIPPA, 2015*.

Information, including the financial value of a contract resulting from this procurement process, will be publicly released as part of the award notification process, in accordance with section 30 of the *Public Procurement Regulations*.

If a bidder has any questions about the collection and use of personal information pursuant to this Open Call, questions are to be submitted to the Open Call Contact. Further information relating to subsection 39(1) of the *ATIPPA, 2015* is provided in guidance documents available through the Office of the Information and Privacy Commissioner at https://oipc.nl.ca/guidance/documents.

3.25 Reserved Rights of the Owner

The Owner reserves the right to:

(a) make public the names of any or all bidders as well as bid price and value of contract;

(b) make changes, including substantial changes, to this Open Call provided that those changes are issued by way of addendum in the manner set out in this Open Call; request written clarification or the submission of supplementary written information in relation to the clarification request from any bidder and incorporate a bidder's response to that request for clarification into the bidder's bid. This shall not be an opportunity for bid repair;

(c) assess a bidder's bid on the basis of: (i) a financial analysis determining the actual cost of the bid when considering factors including quality, service, price and transition costs arising from the replacement of existing goods, services, practices, methodologies and infrastructure (howsoever originally established); and (ii) in addition to any other evaluation criteria or considerations set out in this Open Call consider any other relevant information that arises during this Open call process; and (iii) Unbalanced bids, as determined by the Owner, will be rejected (i.e. prices must fairly represent proper compensation for various items of work to be done).

(d) waive minor irregularities and formalities and accept bids that substantially comply with the requirements of this Open Call ;

(e) verify with any bidder or with a third party any information set out in a bid;

(f) check references other than those provided by any bidder;

(g) disqualify a bidder, rescind a notice of selection or terminate a contract subsequently entered into if the bidder has engaged in any conduct that breaches the process rules or otherwise compromises or may be seen to compromise the competitive process;

(h) cancel this Open Call process at any stage;

(i) cancel this Open Call process at any stage and issue a new Open Call for the same or similar deliverables;

(j) accept any bid in whole or in part; or

(k) reject any or all bids;

(l) not necessarily select the lowest or any bidder;

And these reserved rights are in addition to any other express rights or any other rights that may be implied in the circumstances.

3.26 Limitation of Liability

By submitting a bid, each bidder agrees that:

(a) neither the Owner nor any of it employees, officers, agents, elected or appointed officials,

advisors or representatives will be liable, under any circumstances, for any claim arising out of this Open Call process including but not limited to costs of preparation of the bid, loss of profits, loss of opportunity or for any other claim; and

(b) the bidder waives any right to or claim for any compensation of any kind whatsoever, including claims for costs of preparation of the bid, loss of profit or loss of opportunity by reason of the Owner's decision not to accept the bid submitted by the bidder for any reason, the Owner's decision to enter into an agreement with any other bidder or to cancel this bidding process, and the bidder shall be deemed to have agreed to waive such right or claim.

3.31 Governing Law and Interpretation

These Terms and Conditions of the Open Call Process:

(a) are intended to be interpreted broadly and independently (with no particular provision intended to limit the scope of any other provision);

(b) are non-exhaustive and shall not be construed as intending to limit the pre-existing rights of the Owner; and

(c) are to be governed by and construed in accordance with the laws of the Province of Newfoundland & Labrador and the federal laws of Canada applicable therein.

3.32 Facility Compliance Requirement

(a) Equipment, power tools, instruments and appliances intended for use within Memorial University's facilities must comply with all regulatory requirements related to use and/or installation in University facilities. This includes but is not limited to certification/listing by recognized agencies, Pressure Vessel Act of Newfoundland and Labrador and similar.

(b) Items provided related to this open call that receive power from the University's electrical system must be certified or listed for use within Canada by a recognized agency such as Canadian Standards Association (CSA) or Underwriter Laboratories Canada (ULC). A full list of agencies recognized by Memorial University is available upon request.

(c) Equipment, tools, instruments and appliances that generate pressure may require registration as a pressure system with the Province of Newfoundland and Labrador. Compliance with the Boiler, Pressure Vessel and Compressed Gas Regulations under the Public Safety Act of Newfoundland and Labrador and the Boiler, Pressure Vessel, and Pressure Piping Code CSA B51:19 shall be demonstrated.

(d) The vendor is responsible for all costs associated with ensuring the system is compliant with legislative requirements and for the application and registration processes. Field certifications may be considered but all costs and efforts for such scenarios are the responsibility of the vendor.

[End of Part 3]

PART 4 – ENVIRONMENTAL HEALTH AND SAFETY REQUIREMENTS

4.1 Maintaining a healthy and safe environment for all members of the campus community, as well as visitors, is a priority with the University. This involves a commitment from all sectors of the campus community and extends to outside agencies having occasion to come on campus to conduct business.

The following requirements will apply to all work undertaken by contractors and service personnel on any University property or for any work undertaken on behalf of the Owner.

4.1.0 Regulations, Codes and Standards

Contractors shall be familiar with and abide by provisions of various safety codes and standards applicable to the work performed and should refer to:

The Contractor shall be completely responsible for the safety of the Work as it applies to protection of the public and property and construction of the Work.

The codes that must be followed and enforced for safety are:

(a) The National Building Code, Part 8, Safety Measures at Construction and Demolition Sites (Latest Edition);

(b) Canadian Code for Construction Safety (Latest Edition) as issued by the Associate Committee of the National Building Code;

(c) The Occupational Health and Safety Act of Newfoundland and Labrador (most current version) and Regulations.

In particular, strict adherence to the Provincial Occupational Health and Safety Act and Regulations and with the National Building Code of Canada, Part 8 is required.

4.2.0 General Health and Safety Regulations

(a) Contractors/service agencies shall ensure that members of the campus community are not endangered by any work or process in which they may be engaged. Work areas shall be adequately barricaded, and if dust or fumes are generated, suitable enclosures shall be installed to contain such emissions.

(b) No material shall be stored in such a way as to obstruct walkways or represent a danger to pedestrian or vehicular traffic.

(c) Adequate protection shall be provided to prevent the possibility of goods falling from scaffolding or elevated areas. Areas where goods are being loaded or off loaded shall be barricaded or otherwise protected to prevent unauthorized entry. Appropriate warning signs must be posted.

(d) The work areas must be kept reasonably clean and free from debris which could constitute a fire hazard. Care must be taken to ensure that the work process does not activate fire

alarm detection devices. (Generation of dust and fumes can activate smoke detectors causing a false alarm).

(e) Due consideration shall be given to fire safety in buildings. Flammable goods must be kept away from sources of ignition. No work involving the use of open flame devices must be undertaken around flammable solvents of gases.

(f) Some University buildings contain asbestos and other hazardous materials. Do not alter or disturb any goods believed to contain asbestos goods (unless this is a duly authorized part of the project). Consult with University officials before proceeding with any work.

(g) Safety Data Sheets shall be procured for any hazardous product used on campus. Such sheets shall be made readily available for consultation as required under the Workplace Hazardous Materials Information System (WHMIS).

(h) Contractors are required to complete the online training module for Memorials Zero Energy Isolation Program (ZEIP) before mobilizing on site. Training can be accessed via the link: https://ooc.citl.mun.ca/enrol/index.php?id=21 .

- First time users must create an account. Click **'Create new account'**. Enter required information and click **'Create my new account'**.
- A confirmation email will be sent to the email you entered when creating your account. Open that email and click the link it contains.
- Click **'Zero energy isolation Program for Contractors'**.
- To enroll in the training, enter the enrollment key: 7653. Click **'Enroll me'**.
- Complete the training according to the instructions provided in the course.
- Successful completion certificates shall be available during auditing by Environmental Health & Safety.

NOTE: The above requirements are not to be considered all-inclusive and are considered to be complementary to the safety requirements outlined in the agreement between the University and Supplier. Certain conditions and circumstances may require adherence to additional safety requirements.

As a general requirement, contract/service personnel are expected to conduct all work on campus in a professional and safe manner and to give priority to the safety and welfare of members of the campus community.

4.3.0 Contractor Safety Management

4.3.1 All Contractors and Subcontractors to be used by the Contractor in the execution of the Contract shall be required to submit confirmation of a current third party occupational health and safety program certification (Letter of Assurance). These may include, but not be limited to, Certificate of Recognition (COR), OHSAS 18001, and CSA Z.1000.

4.3.2 All Contractors and Subcontractors shall be required to review and follow all requirements of sections 4.4.5.2. below.

4.3.3 Prior to Contract award, the Contractor will be required to provide the Information requested in 4.4.5.2. below.

4.3.4 The University reserves the right to stop any work or portion of work where no documentation can be produced on site which identifies the hazards presented by a piece of work, safe work procedures for work or certification of employees performing work. The Contractor is liable for any costs incurred by affected parties associated with such a stoppage.

4.4.0 Contractor Safety Management Element

4.4.1 Purpose

This element establishes the requirements for the administration and monitoring of contractor health and safety programs and activities at Memorial University. These measures shall ensure that contractors understand their collective responsibility with respect to the Occupational Health & Safety Act and Regulations, Memorial University policy and this element.

4.4.2 Scope

This procedure shall apply to all work done for Memorial University of Newfoundland with respect to the provision of services as outlined below. Memorial University reserves the right to exempt a Contractor from this element, in whole or in part, based upon an evaluation of the risk of the work being conducted. This evaluation must comply with the hazard identification and risk management element.

4.4.3 Definitions

Act: Newfoundland & Labrador Occupational Health & Safety Act, latest edition.
Contract: A documented agreement between Memorial University and a contractor.
Contractor: The principal contractor, person, partnership, or corporation bound to execute the work under the contract and defined as such in the agreement is responsible for the supervision of the work so as to ensure the work is carried out in accordance with the contract.
Project Management Team: The group assigned by the University to act on behalf of the owner with respect to the execution of Contractor work.
Principal Contractor: The person primarily responsible for the carrying out of a contract.
Regulations: Newfoundland & Labrador Occupational Health & Safety Regulations, latest edition.
Subcontractor: A person, firm or corporation having a direct contract with the Contractor or subcontractor(s) to perform a part or parts of the work included in the contract, or to supply products worked to a special design according to the contract documents, but does not include one who merely supplies products not so worked.

Owner: The Owner, Engineer/Architect are the persons, firms or corporation identified as such in the Contract. The term Owner, Engineer/Architect means, respectively, each of the Owner, Engineer/Architect and their authorized representatives as designated by each such party in writing.
Work: The services and job procedure completion that is described in the contract.

4.4.4 Roles and Responsibilities

4.4.4.1 Project Management Team, including Environmental Health & Safety

Will monitor the Contractor's performance for health and safety compliance. Monitoring activities may include but are not limited to:

- planned and unplanned workplace inspections;
- attendance of meetings;
- communications of safety related issues and topics, as deemed necessary;
- review of contractor records, inspections, work practices and documentation; and
- complete audits to verify that contractors and subcontractors are meeting their legislative, procedural and contractual responsibilities.

4.4.4.2 Contractors

Will comply with applicable Federal and Provincial legislation and applicable MUN safety procedures. Contractor responsibilities include but not limited to:

- report all incidents immediately to the required University project team followed by a written incident report within 24 hours;
- be responsible for the safety of subcontractors including those not under their employ;
- stop work if the conditions are such that work cannot be performed safely;
- perform evaluation, monitoring of the workplace to identify potential hazards and associated risks and ensure corrective actions are implemented;
- ensure daily task specific hazard assessments are completed; and
- maintain the accountability of persons responsible for the reporting and correction of hazards.

4.4.5 Procedure

4.4.5.1 Considerations prior to signing of contract

Prior to signing of contract, the preferred General Contractor shall provide proof of compliance with 4.4.4.2. within seven (7) calendar days. After a pre-signing start up meeting, the General Contractor shall provide proof of compliance of themselves and their subcontractors with 4.4.4.2. as well as the information requested in Section 4.4.4.2.(a)(b).

4.4.5.2 Requirements

All Contractors, and their Subcontractors, shall be required to submit confirmation of a current third party occupational health and safety program certification (Letter of Assurance). These may include, but not be limited to, Certificate of Recognition (COR), OHSAS 18001, and CSA Z.1000.

Contractors shall also provide the following:

(a) health and safety policy statement;

(b) safety program table of contents; and

(c) site hazard assessment;

The hazard assessment shall be updated by the General Contractor and re-submitted whenever the conditions, work practices or work forces change to the extent that new hazards can be identified.

In lieu of a Subcontractors 3rd party program, Contractors shall be required to integrate the Subcontractor(s) into the Contractors program and provide proof of same.

Memorial reserves the right to request and audit the full safety program of Contractors and Subcontractors and their associated documentation. This documentation may include, but not be limited to the following:

(a) safety program and/or manual

(b) applicable documented safe work practices;

(c) inspection reports and schedules;

(d) required employee safety training certifications and qualifications; and

(e) updated list of OHS Committee and/or a worker health and safety representative, or workplace health and safety designate.

Request for submission shall be complied with within 7 calendar days of a written request from Memorial’s Environmental Health and Safety unit.

Memorial reserves the right to:

(a) Reject any Contractor that fails to meet the requirements or schedules outlined herein;

(b) The University reserves the right to stop any work or portion of work where the risk presents an immediate danger.

4.4.5.3 Schedule of Submissions

General Contractors and their sub-contractors who have complied with 5.1.1 will be permitted to commence physical work on the site however no work shall be performed by the General Contractor, their sub-contractors until such a time as they comply with 5.1.1.

4.4.6 Post-Contract Evaluation

Environmental Health & Safety will determine the extent of the evaluation of the Contractor's safety performance at the completion of the contract. This evaluation will be conducted by way of a standard contractor safety evaluation form and will be supported by objective evidence documented during the term of the Contract. The records of the evaluation must be retained with the project owner.

4.5 Access To Site

4.5.1 All Contractors and Subcontractors to be used in the execution of the Contract shall give advance notification of when they will be on site. Any work to be performed outside of Regular Time must have advance approval of the Owner.

Any discontinuation of the Work which causes a Contractor or their Subcontractors to suspend operations onsite will require the following:

- Contractor/Subcontractors shall notify the Owner of the stop work date.
- Contractor/Subcontractors shall ensure the site is left in a safe and secure condition.
- Contractor/Subcontractors shall ensure that locks and tags on mechanical and/or electrical systems are removed and, where necessary, replaced by the University.
- Contractor/Subcontractors shall not return to site without expressed prior permission from the Owner.

[End of Part 4]

PART 5– GENERAL CONDITIONS

5.1 I/We hereby authorize the Owner to release names of Subcontractors, Suppliers and Manufacturers used in my/our Bid including those as listed in Appendix "D", where such information is requested from the Owner.

5.2 I/We understand that Bids that do not list major Subcontractors and Suppliers and Manufacturers where required in Appendix “D” may be rejected.

5.3 I/We reserve the right to substitute other Subcontractors and/or Suppliers and/or Manufacturers for any Subcontractor or Suppliers or Manufacturer withdrawing their Bid or becoming bankrupt after the date hereof. Any such substitutes shall be subject to the approval of the Owner and contingent upon evidence of withdrawal or bankruptcy satisfactory to the Owner.

5.4 I/We agree that upon approval by the Engineer/Architect, the Owner shall have the right to take possession of any part of the work upon its completion, except for minor deficiency items, and that such possession shall not necessarily constitute acceptance of that part of the work.

5.5 I/We understand and agree that the Owner may order changes to the work in the form of additions or deletions in accordance with the General Conditions, Supplementary General Conditions and the intent of the Contract Documents.

5.6 I/We understand and agree that the Unit Price Table in Appendix "C2" must be completed where indicated and the total amount included in my/our stipulated price for the total performance of the work under Part 4 of the Bid and Acceptance form. I/We understand that the Unit Prices include all costs and charges of every kind, including overhead and profit, to perform the items of work listed in Appendix "A". I/We also understand that these same Unit Prices will be used for additions or deletions to the actual measured quantities.

5.7 When Appendix “E” is included in the Open Call, I/we understand that bids which do not list project references, where required in Appendix “E”, will be rejected.

5.8 Corporations Act

The Corporations Act of Newfoundland and Labrador requires that an extra-provincial company be registered before it begins or carries on business in the Province. If your company is not registered, please apply for the appropriate forms and procedures to:

Commercial Registrations Division
Dept. of Government Services, PO Box 8700
St John’s, NL Canada A1B 4J6
Phone: 709-729-3317, Fax: 709-729-0232
Website: http://www.gs.gov.nl.ca/registries/companies/corp_art_inc.html

[End of Part 5]

Part 6 – Supplementary Terms and Conditions

6.1 The open call document consist of the Open Call and Acceptance Form, General Conditions of Contract, Supplementary General Conditions of Contract, Special Conditions, Campus Safety and Health Regulations, Contractors Performance Evaluation, Drawings, Specifications and any Addenda to the Contract Documents issued before the open call closing period.

6.2 Surety

6.2.1 Bid Surety

Bids shall be accompanied by a copy of a bid security by way of a Bid Bond from a surety company acceptable to the Owner and which is licensed to do business in the Province of Newfoundland and Labrador or a copy of a cheque in the amount of 10 percent of the bid price. Originals to be delivered to Memorial University post tender closing. Bid security will not be required for a total contract value of $100,000 or less (HST Excluded), unless specifically called for in the contract documents. The bid security will be returned to the bidder upon receipt of the required Performance Bond and Labour and Materials Payment Bond as per 6.2.2 below.

The terms of the bid security will be invoked and the amount retained by the Owner if: the Tenderer fails to enter into a formal agreement, where one is specified, when notified of the award of the Contract within the tender validity period; or fails to provide the required Performance Bond and Labour and Materials Payment Bond within the time specified

6.2.2 Public Work's Surety

Within seven (7) days of the issuance of the letter of acceptance, the preferred Bidder shall obtain and deliver to the Owner a Performance Bond in the amount of 50 percent of the bid price (HST Excluded) which guarantees the successful and complete performance of the Work. The Performance Bond is required as a condition of bid award. In lieu of a Performance Bond an approved certified cheque in the amount of 10 percent of the bid price may, at their option, be accepted for retention by the Owner until the successful completion of the Contract. The certified cheque will be retained until satisfactory completion of the Work including the warranty period after which it will be returned to the Contractor. Performance Bond or other such security will not be required for a contract value of $100,000 or less. No Work is to be undertaken while the above performance security remains outstanding.

Within seven (7) days of issuance of the letter of acceptance, the preferred Bidder shall obtain and deliver to the Owner a Labour and Materials Payment Bond in the amount of 50 percent of the bid price (HST Excluded). The Labour and Materials Payment Bond is required as a condition of the bid award. In lieu of a Labour and Materials Payment Bond, an approved certified cheque in the amount 10 percent of the bid price may, at their option, be accepted for retention by the Owner until successful completion of the Contract. The certified cheque will be retained until substantial completion of the Work as defined by the Mechanics Lien Act and upon receipt of an acceptable statutory declaration form stating that all labour and material obligations due and payable under the Work have been discharged, after which it will then be returned to the Contractor. Labour and Materials

Payment Bond or other such security will not be required for a contract value of $100,000 or less. No Work is to be undertaken while the above labour and materials security remains outstanding.

No interest will be paid to the preferred Bidder for any certified cheques on deposit during the period of retention.

The cost of all bid, performance and labour and materials security shall be included in the bid price

6.3 Site Visit

A site visit may occur at the time and location identified on the Request for Open Calls for Bids Information Sheet.

Questions will not be answered at the site visit.

Before submitting a bid, Bidders may carefully examine the site of the Proposed Work and fully inform themselves of the existing condition and limitations. It is the responsibility of the Bidder to report any unsatisfactory conditions in writing which may adversely affect the proper completion of the work, to opencalls@mun.ca, at least **eight (8)** days before the open call closing date. Submission of a bid shall imply acceptance of previously completed Work and the conditions of the site, and the Contractor shall, therefore, be fully responsible for executing the Work in accordance with the Contract Documents.

6.4 Substitution of Materials

6.4.1 The open call shall be based upon using the materials or products as specified without substitution, unless there is an "or approved alternate" clause. Where two or more brand names are specified, the choice shall be left to the bidder. Where only one brand name is stated, there shall be no substitution.

6.4.2 Where the Specifications include the "or approved alternate" clause, substitutions may be proposed provided that the request for a substitution is received in writing at least eight (8) days (3:00pm NST) prior to the open call closing date and shall clearly define and describe the product for which the substitution is requested. Submissions shall compare in tabular form, to the characteristics and performance criteria of the specified material.

6.4.3 It is the Bidder's responsibility to ensure that the substituted article is equivalent to the specified article with regard to design, function, appearance, durability, operation and quality.

6.4.4 Request for substitutions made after the award of the contract will be subject to the requirements of Clause 2.37.0 MATERIALS AND SUBSTITUTIONS in the General Conditions of the Contract and will only be considered under special circumstances or where it is clear, at the Engineer's/Architect's discretion, that proposed substitution will provide a substantial benefit to the Owner.

6.4.5 Approval of the substitution shall be in the form of an addendum to the Specifications.

The decision on substitutions will be final.

6.5 Completion date

6.5.1 Bidders shall state the time required to complete the Contract from time of open call award. The bidder shall, within seven (7) days after the Contract is award submit a preliminary construction schedule indicating as closely as possible the starting and completion date for the major sections of the Work.

[End of Part 6]

APPENDIX A – SPECIFICATIONS AND DRAWINGS

SPECIFICATIONS AND DRAWINGS
LOCATED AT THE END OF THIS DOCUMENT

APPENDIX B – SUBMISSION FORM

1. Bidder Information

Please fill out the following form, naming one person to be the bidder's contact for the Open Call process and for any clarifications or communication that might be necessary.	
Full Legal Name of Bidder:	
Any Other Relevant Name under which Bidder Carries on Business:	
Street Address:	
City, Province/State:	
Postal Code:	
Phone Number:	
Fax Number:	
Company Website (if any):	
Bidder Contact Name and Title:	
Bidder Contact Phone:	
Bidder Contact Fax:	
Bidder Contact Email:	

2. Offer

The bidder has carefully examined the Open Call documents and has a clear and comprehensive knowledge of the Deliverables required under the Open Call. By submitting a bid, the bidder agrees and consents to the terms, conditions and provisions of the Open Call, including the Form of Agreement, and offers to provide the Deliverables in accordance therewith at the rates set out in the completed Pricing Form (Appendix C1 and/or C2 and/or C3).

3. Rates

The bidder has submitted its rates in accordance with the instructions in the Open Call and in the Pricing Form (Appendix C1 and/or C2 and/or C3). The bidder confirms that it has factored all of the provisions of Appendix A, including insurance and indemnity requirements, into its pricing assumptions and calculations.

4. Addenda

4.1 The bidder is deemed to have read and accepted all addenda issued by the Owner. The onus is on bidders to make any necessary amendments to their bids based on the addenda. The bidder is required to confirm that it has received all addenda by listing the addenda numbers in table below:(**Listing of individually the numbers of each Addendum received in the blank space)**

NOTE: FAILURE TO COMPLETE "TABLE: ADDENDA RECEIVED" LOCATED BELOW SHALL RESULT IN BID DISQUALIFICATION:

TABLE 1.10: ADDENDA RECEIVED

Bidders who fail to complete the above table will be deemed to have not received all posted addenda and shall be deemed **non- compliant.**

5. No Prohibited Conduct

The bidder declares that it has not engaged in any conduct prohibited by this Open Call.

6. Disclosure of Information

The bidder hereby agrees that any information provided in this bid, even if it is identified as being supplied in confidence, may be disclosed where required by law or by order of a court or tribunal. The bidder hereby consents to the disclosure, on a confidential basis, of this bid by the Owner to the advisers retained by the Owner to advise or assist with the Open Call process, including with respect to the evaluation of this bid.

7. Bid Irrevocable

The bidder agrees that its tender shall be irrevocable for a period of **45** days running from the moment that the Submission Deadline passes.

8. Execution of Agreement

The bidder agrees that in the event its bid is selected by the Owner, in whole or in part, it will finalize and execute the Agreement in the form set out in Appendix A (or in a form mutually acceptable to the parties) to this Open Call in accordance with the terms of this Open Call . Failure to submit this signature section will render the proposal NON-COMPLIANT and the proposal will be disqualified.

BIDDER SIGNATURE FORM:

BIDDERS MUST COMPLETE THE BIDDER SIGNATURE FORM. ANY BIDS RECEIVED WITHOUT THE BIDDER CONTACT FORM COMPLETED WILL BE DEEMED NON- COMPLIANT

(See Part 1 section 1.8 for Electronic Signature acceptance)

Signature of Witness	Signature of Bidder Representative
Name of Witness	Name of Bidder Representative
	Title of Bidder Representative
	Date

I have the authority to bind the bidder.

IN SIGNING THIS PAGE AND SUBMITTING YOUR PROPOSAL, THE PROPONENT ACKNOWLEDGES HAVING READ, UNDERSTOOD AND AGREED TO THE TERMS AND CONDITIONS OF THIS DOCUMENT

APPENDIX C1 – PRICING FORM

1. INSTRUCTIONS ON HOW TO COMPLETE THE PRICING FORM

- Rates must be provided in Canadian Dollars
- Rates quoted by the bidder must be all-inclusive and must include all labor and material costs, all travel and carriage costs, all insurance costs, all costs of delivery to the Owner, all costs of installation and set-up, including any pre-delivery inspection charges, and all other overhead, including any fees or other charges required by law
- Owner: Having carefully examined the site and all conditions affecting the proposed work as well as the Bid Documents including the Drawings and Specifications, all Addenda and the Instructions to bidders, I/We, the undersigned, hereby offer to furnish all necessary labour, materials, superintendence, plant, tools, equipment, etc., required to complete all work requisite and necessary for the proper execution of this Contract, expeditiously and in the satisfactory manner and accept in full payment therefore a stipulated sum of:

The scope of work for Price A, Price B and Price C is outlined in the contract documents - see specification section 01 11 00 Summary of Works. The Owner reserves the right to delete any or all parts of this tender and award individual and/or combined parts.		
	Contract Bid (HST Excluded)	
Price A: Subtotal		HST EXCLUDED
Price B: Sum of Allowances (Section 01 21 00)	$7000	HST EXCLUDED
Price C: Total: [$(A+B)]		HST EXCLUDED

I/We agree to commence work within two (2) weeks after the acceptance of my/our Bid and complete the work in _____weeks from the acceptance of the Bid and to coordinate the scheduling of our work with that of all Subcontractors working on the Project. The time of completion indicated herein is required and will be a significant factor in assessing bids.

2. THE DELIVERABLES:

Level 2 Washroom Renovations
as per specifications listed in Appendix A

3. MANDATORY SUBMISSION REQUIREMENTS

(a) Submission Form (Appendix B)
Each bid must include a Submission Form (Appendix B) completed and signed by an authorized representative of the bidder.

(b) Each bid must include Pricing Form (Appendix C1) as per instructions on form.

(c) Where Appendix C2 and C3 are required, they must be included in bid submission.

APPENDIX C2 – UNIT RATES

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APPENDIX C3 - FURNITURE BIDDING TABLE

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APPENDIX D - LIST OF SUBCONTRACTORS

Herewith is the list of Subcontractors, Suppliers and/or Manufacturers referred to in Section no. **5.1 of Part 5 of the Open Call and Acceptance Form**. The Subcontractors and Suppliers whose bids have been used in the preparation of this Bid must be listed in full including work to be done by own forces (B.O.F.). By Own Forces will be considered valid and satisfactory only if, prior to award, the supplier provides three (3) current (< 3 years) references of satisfactory completion of trade work of similar ***scale, scope and complexity*** as that described within the Bid documents. Trade certifications may be requested in addition to the references above. The determination of suitability is entirely at the discretion of the owner and shall be based on submitted documentation. The owner may use their knowledge and understanding of experience and performance of the Contractor on past work in lieu of this submission. The list will be subject to the approval of the Owner.

NOTE: FAILURE TO COMPLETE THIS PORTION OF THE BID SUBMISSION SHALL RESULT IN DISQUALIFICATION.

The trades below, if listed, have been identified by the owner, however it is the Bidder's responsibility to identify all applicable subtrades.

TRADE/DIVISION	SUBCONTRACTOR - SUPPLIER - MANUFACTURER
Hazardous Materials Abatement	
Demolition	
Masonry	
Architectural	
Millwork	
Doors & Frames	
Windows	
Flooring	
Plaster & Paint	
Specialties	
HVAC	
Plumbing	
Electrical	

DEPARTMENT OF FACILITIES MANAGEMENT

GENERAL CONDITIONS

AND

AGREEMENT BETWEEN OWNER AND CONTRACTOR

FOR

THE STIPULATED PRICE CONTRACT

May 2023

GENERAL CONDITIONS AND AGREEMENT
BETWEEN OWNER AND CONTRACTOR FOR THE STIPULATED PRICE CONTRACT

INDEX

1.0 GENERAL CONDITIONS

1.1.0 DEFINITIONS

1.1.1 Contract Documents

The Contract Documents consist of the Instructions to bidders, Executed Agreement between the Owner and the Contractor, General Conditions of Contract, Supplementary General Conditions of Contract, Special Conditions, Campus Safety and Health Regulation, Contractor Performance Evaluations, Specifications, Drawings and such other documents forming part of the open call, including all amendments thereto incorporated before their execution and subsequent amendments thereto made pursuant to the provisions of the Contract or agreed upon between the parties. The successful bid and any Addenda to the Specifications issued during the bidding period shall also form part of the Contract Documents.

1.1.2 Owner, Engineer/Architect, Contractor

The Owner, Engineer/Architect and Contractor are the persons, firms or corporation identified as such in the Agreement. The term Owner, Engineer/Architect and Contractor means the Owner, Engineer/Architect and Contractor or their authorized representatives as designated by each party in writing.

1.1.3 Subcontractors

A Subcontractor is a person, firm or corporation having a direct contract with the Contractor to perform a part or parts of the Work included in the Contract, or to supply products worked to a special design according to the Contract Documents, but does not include one who merely supplies products not so worked.

1.1.4 The Project

The Project is the total construction contemplated of which the Work performed under the Contract Documents may be the whole or a part.

1.1.5 The Work

The Work means the total construction and related services required by the Contract Documents.

1.1.6 Place of Work

The Place of Work is the designated site or location of the project of which the Work may be the whole or a part.

1.1.7 Products/Materials/Equipment

The term Products/Materials/Equipment means all materials, machinery, equipment and fixtures forming the Work as required by the Contract Documents but does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work and normally referred to as construction machinery and equipment.

1.1.8 Other Contractor

The term Other Contractor means any persons, firm or corporation employed by or having a separate contract directly or indirectly with the Owner for Work other than that required by the Contract Documents.

1.1.9 Time

a) The Contract Time is the time stated in the Open Call for Bid and Acceptance Form for substantial performance of the Work.

b) The date of substantial performance of the Work is the date certified by the Engineer/Architect.

c) The term day, as used in the Contract Documents, shall mean the calendar day.

d) The term working day means any day observed by the construction industry in the area of the place of the Work.

1.1.10 Substantial Performance of the Work

A Contract shall be deemed to be substantially performed:

a) When the Work or a substantial part thereof is ready for use or is being used for the purpose intended; and

b) When the Work to be done under the Contract is capable of completion or correction at a cost of not more than:

(i) 3% (Three per centum) of the first two hundred and fifty thousand dollars ($250,000) of the Contract Price;

(ii) 2% (Two per centum) of the next two hundred and fifty thousand dollars ($250,000) of the Contract Price; and

(iii) 1% (One per centum) of the balance of the Contract Price.

c) When the Work or a substantial part thereof is ready for use or is being used for the purpose intended and where the Work cannot be completed expeditiously for

reasons beyond the control of the Contractor, the value of the remaining Work to be completed shall be deducted from the Contract Price in determining substantial performance.

1.1.11 Total Performance of the Work

Total Performance of the Work shall mean when the entire Work except those items arising from the provision **2.26.0 WARRANTY** has been performed to the requirements of the Contract Documents and is so certified by the Engineer/Architect.

1.1.12 Changes in the Work

Changes in the Work means additions, deletions or other revisions to the Work within the general scope of Work as contemplated by the Contract Documents.

1.1.13 Extra Work

Extra Work means any additional work or service, the performance of which is beyond the scope of Work as contemplated by the Contract Documents.

2.2.0 DOCUMENTS

2.2.1 The Contract Documents shall be signed in triplicate by the Owner and the Contractor.

2.2.2 Words and abbreviations which have well-known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings.

2.2.3 In the event of conflicts between Contract Documents, the following shall apply:

a) Documents of later date shall govern;

b) Figured dimensions shown on the drawings shall govern even though they may differ from scaled dimensions on the same drawing;

c) Drawings of larger scale shall govern over those of smaller scale of the same date;

d) Specifications shall govern over drawings;

e) Special Conditions shall govern over Specifications;

f) The General Conditions of Contract shall govern over Specifications;

g) Supplementary General Conditions shall govern over the General Conditions of the Contract;

h) The Executed Agreement between the Owner and the Contractor shall govern over all documents.

2.2.4 The Contractor will be provided, without charge, up to twelve (12) sets of Contract Documents or parts thereof as are reasonably necessary for the performance of the Work.

2.2.5 The Contractor shall keep a copy of all current Contract Documents and shop drawings on the site, in good order and available to the Engineer/Architect and or their representatives. This requirement shall not be deemed to include the executed Contract Documents.

2.2.6 Drawings, specifications, models and copies thereof furnished to the Contractor are to be used only with respect to the Work. Such documents and models are not to be otherwise used or revised in any manner without the written authorization of the Owner.

2.2.7 Models furnished by the Contractor at the Owner's expense are the property of the Owner.

2.3.0 ADDITIONAL INSTRUCTIONS AND SCHEDULE OF WORK

2.3.1 During the progress of the Work, the Engineer/Architect shall furnish to the Contractor such additional instructions as may be necessary to supplement the Contract Documents. All such instructions shall be consistent with the intent of the Contract Documents.

2.3.2 Additional instructions may include minor changes to the Work which affect neither the Contract Price nor the Contract Time.

2.3.3 Additional instructions may be in the form of drawings, samples, models or written instructions.

2.3.4 Additional instructions will be issued by the Engineer/Architect with reasonable promptness and in accordance with any schedule agreed upon for such instructions.

2.3.5 The Contractor shall prepare and update, as required, a construction schedule indicating the timing of major activities of the Work. The schedule shall be designed to conform with the Contract Time. The schedule shall be submitted to the Engineer/Architect within seven (7) days of the date of the Owner's letter of award. The contractor shall monitor the progress of the Work relative to the schedule and advise the Engineer/Architect of any revisions required as a result of delays, as provided for in **2.5.0 DELAYS**, and indicating what action will be taken to complete the Work within the Contract Time.

2.4.0 ENGINEER/ARCHITECT'S DECISIONS

2.4.1 The Engineer/Architect, in the first instance, shall decide on questions arising under the contract Documents and interpret the requirements therein. Such decisions shall be given in writing.

2.4.2 The Contractor shall notify the Engineer/Architect in writing within fourteen (14) days of receipt of a decision of the Engineer/Architect referred to in 2.4.1, should they hold that a decision by the Engineer/Architect is in error and/or at variance with the Contract Documents. Unless the Contractor fulfils this requirement, subsequent claims by them for extra compensation arising out of the decision will not be accepted.

2.4.3 If the question of error and/or variance is not resolved immediately, and the Engineer/Architect decides that the disputed work shall be carried out, the Contractor shall act according to the Engineer/Architect's written decision.

Any questions of change in Contract Price and/or extension of Contract Time due to such error and/or variance shall be decided as provided in **2.11.0 DISPUTES**.

2.5.0 DELAYS

2.5.1 If it can be clearly shown that the Contractor is delayed in the performance of the Work by any act or fault of the Owner, Engineer/Architect, then the Contract Time shall be extended for such reasonable time as the Engineer/Architect may decide in consultation with the Owner and the Contractor. The Contractor shall be entitled to be reimbursed for any costs incurred by them as a result of such a delay occasioned by the act or fault, provided that it can be clearly shown that the Contractor's forces cannot work efficiently elsewhere on the project and that the incurred cost is limited to that which could not reasonably have been avoided.

2.5.2 If the Contractor is delayed in the performance of the Work by a Stop Work Order issued by any court or other public authority and providing that such order was not issued as the result of any act or fault of the Contractor or of anyone employed by them directly or indirectly then the Contract Time shall be extended for such reasonable time as the Engineer/Architect may decide in consultation with the Contractor.

2.5.3 If the Contractor is delayed in the performance of the Work by civil disorders, labour disputes, strikes, lockouts, (including lockouts decreed or recommended for its members by a recognized Contractor's Association, of which the Contractor is a member) fire, unusual delay by common carriers or unavoidable casualties, or without limit to any of the foregoing, by any cause of any kind whatsoever beyond the Contractor's control, then the Contract Time shall be extended for such reasonable time as may be decided by the Engineer/Architect in consultation with the Owner and the Contractor, but in no case shall the extension of time be less than the time lost as the result of the event causing the delay, unless such shorter extension of time be agreed to by the Contractor.

2.5.4 No extension shall be made for delays unless written notice of claims is given to the Engineer/Architect within fourteen (14) days of its commencement, providing that in the case of the continuing cause of delay one notice shall be necessary.

2.5.5 If no schedule is provided under **2.3.0 ADDITIONAL INSTRUCTIONS AND SCHEDULE OF WORK**, no claim for delay will be considered because of failure to furnish instructions until fourteen (14) days after a demand for such instructions had been made and not then unless such claim is reasonable.

2.6.0 OWNER'S RIGHT TO PERFORM WORK, STOP WORK AND/OR TERMINATE CONTRACT

2.6.1 If the Contractor should be adjudged bankrupt or makes a general assignment for the benefit of creditors because of their insolvency or if a Receiver is appointed on account of their insolvency, the Owner may, without prejudice to any other right or remedy they may have, by giving the Contractor or Receiver or Trustee in Bankruptcy written notice, terminate the Contract. If a Performance Bond has been provided by the Contractor guaranteeing faithful performance of the Work, the Owner shall give written notice to the Surety invoking the terms of the bond.

2.6.2 The Owner may notify the Contractor in writing that they are in default of their contractual obligations, if the Contractor:

a) Fails to proceed regularly and diligently with the Work; or

b) Without reasonable cause wholly suspends the carrying out of the Work before the completion thereof; or

c) Refuses or fails to supply sufficient, properly skilled workmen for proper workmanship, products or construction machinery and equipment for the scheduled performance of the Work within five (5) working days of receiving written notice from the Engineer/Architect except in those cases provided in **2.5.0 DELAYS**; or

d) Fails to make payments due to their Subcontractors, their Suppliers for their workmen; or

e) Persistently disregards laws or ordinances, or the Engineer/Architect's instructions; or

f) Otherwise violates the provisions of their Contract to a substantial degree.

Such written notice by the Owner shall instruct the Contractor to correct the default within five (5) working days from the receipt of the written notice. If a Performance Bond has been provided by the Contractor, a copy of such written notice will be provided to the Surety.

2.6.3 If the correction of the default cannot be completed within the five (5) working days specified, the Contractor shall be considered to be in compliance with the Owner's instruction if they:

a) Commence the correction of the default within the specified time; and

b) Provide the Owner with an acceptable schedule for such correction; and

c) Complete the correction in accordance with such schedule.

2.6.4 If the Contractor fails to correct the default within the time specified or subsequently agreed upon, the Owner may, without prejudice to any other right or remedy they may have:

a) Correct such default and deduct the cost thereof as certified by the Engineer/Architect from any payment due under the Contract; or

b) Terminate the Contract by written notice to the Contractor. If a Performance Bond has been provided by the Contractor, the Owner will provide the Surety with a copy of such notice.

2.6.5 If the Owner terminates the Contract under the conditions set out above, they are entitled to:

a) Take possession of the premises and products and utilize the temporary buildings, plants, tools, construction machinery and equipment, goods and materials, intended for, delivered to and placed on or adjacent to the Work and may complete the Work by whatever method they may deem expedient but without undue delay or expense;

b) Withhold any further payments to the Contractor until the Work is finished;

c) Upon total performance of the Work, charge the Contractor the amount by which the full cost of finishing the Work as certified by the Engineer/Architect including compensation to the Engineer/Architect for their additional services and a reasonable allowance to cover the cost of any corrections required by **2.26.0 WARRANTY** exceeds the unpaid balance of the Contract Price; or if such cost of finishing the Work is less than the unpaid balance of the Contract Price, pay the Contractor the difference;

d) On expiry of the warranty period, charge the Contractor the amount by which the cost of corrections under **2.26.0 WARRANTY** exceeds the allowance provided for such corrections, or if the cost of such corrections is less than the allowance, pay the Contractor the difference;

e) Invoke the terms of the Performance Bond if such Bond has been provided under the Contract.

2.6.6 The Contractor's obligation under the Contract as to the performance of the Work up to the time of termination will remain in force after such termination.

2.7.0 CONTRACTOR'S RIGHT TO STOP WORK AND/OR TERMINATE CONTRACT

2.7.1 If the Owner should be adjudged bankrupt or makes a general assignment for the benefit of creditors or if a Receiver is appointed on account of their insolvency, the Contractor may, without prejudice to any other right or remedy they may have, by giving the Owner written notice, terminate the Contract.

2.7.2 If the Work should be stopped or otherwise delayed for a period of thirty (30) days or more under an order of any court or other public authority and providing that such order was not issued as the result of any act or fault of the Contractor or of anyone directly or indirectly employed by him, the Contractor may, without prejudice to any other right or remedy they may have, by giving the Owner fifteen (15) days' written notice, terminate the Contract.

2.7.3 The Contractor may notify the Owner in writing that the Owner is in default of their contractual obligations if:

a) The Engineer/Architect fails to issue a certificate in accordance with **2.16.0 CERTIFICATES AND PAYMENTS;**

b) The Owner fails to pay the Contractor when due any amount certified by the Engineer/Architect and verified by the audit of the Owner;

c) The Owner violates the provisions of the Contract to a substantial degree.

Such written notice shall advise the Owner that if such default is not corrected within fifteen (15) days from the receipt of the written notice, the Contractor may, without prejudice to any other right or remedy they may have, stop the Work and/or terminate the Contract.

2.7.4 If the Contractor terminates the Contract under the conditions set out above, they shall be entitled to be paid for all work performed including reasonable overhead and profit and for any loss sustained upon products, construction machinery and equipment and other damages as the Contractor may have sustained as a result of the termination of the Contract.

2.8.0 OTHER CONTRACTORS

2.8.1 The Owner reserves the right to let separate contracts in connection with the project of which the Work is part or do certain work by their own forces.

2.8.2 The Owner shall, in such cases, coordinate the Work and insurance coverage of other Contractors as it affects the Work of this Contract.

2.8.3 The Contractor shall coordinate their work with that of other Contractors and connect as specified or shown in the Contract Documents. Any change in the costs incurred by the Contractor in the planning and performance of such work which was not shown or included in the Contract Documents as of the date of signing the Contract, shall be evaluated as provided under **2.14.0 VALUATION AND CERTIFICATION OF CHANGES IN THE WORK** and authorized as provided in **2.13.0 CHANGES IN THE WORK AND EXTRA WORK**.

2.8.4 The Contractor shall report to the Engineer/Architect any apparent deficiencies in other Contractor's work which would affect this Contract immediately as they come to their attention and shall confirm such report in writing. Failure by the Contractor to so report shall invalidate any claims against the Owner by reason of the deficiencies of other Contractor's work except as to those of which they were not reasonably aware.

2.9.0 ASSIGNMENT

2.9.1 The Contractor shall not assign the Contract or any part thereof or any benefit or interest therein or thereunder without the written consent of the Owner.

2.10.0 SUBCONTRACTORS

2.10.1 The Contractor agrees to preserve and protect the rights of the Owner under the Contract with respect to any work to be performed under subcontract. The Contractor shall:

a) Require their Subcontractors to perform their work in accordance with and subject to the terms and conditions of the Contract Documents; and

b) Be fully responsible to the Owner for acts and omissions of their Subcontractors and of persons directly or indirectly employed by them as for acts and omissions of persons directly employed by them.

The Contractor, therefore, agrees that they will incorporate all the terms and conditions of the Contract Documents into all Subcontractor Agreements they enter into with their Subcontractors.

2.10.2 The Contractor shall employ those Subcontractors proposed by them in writing and accepted by the Owner prior to the signing of the Contract for such portions of the Work as may be designated in the bidding requirements.

2.10.3 The Owner may, for reasonable cause, object to the use of a proposed Subcontractor and require the Contractor to employ one of the other Subcontractors.

2.10.4 In the event that the Owner requires a change from any proposed Subcontractor, the Contract price shall be adjusted by the difference in cost occasioned by such required change.

2.10.5 The Contractor shall not be required to employ as a Subcontractor any person or firm to whom they may reasonably object.

2.10.6 The Engineer/Architect may, upon reasonable request and at their discretion, provide to a Subcontractor information as to the percentage of the Subcontractor's work which has been certified for payment.

2.10.7 Nothing contained in the Contract Documents shall create any contractual relationship between any Subcontractor and the Owner.

2.11.0 DISPUTES

2.11.1 Differences between the parties to the Contract as to the interpretation, application or administration of this Contract or any failure to agree where agreement between the parties is called for, herein collectively called disputes, which are not resolved in the first instances by decision of the Engineer/Architect pursuant to the provisions of **2.4.0 ENGINEER/ARCHITECT'S DECISIONS** shall be settled in accordance with the requirement of the General Conditions.

2.11.2 The Claimant shall give written notice of such dispute to the other party no later than fourteen (14) days after the receipt of the Engineer/Architect's decisions given under **2.4.0 ENGINEER/ARCHITECT'S DECISIONS**. Such notice shall set forth particulars of the matters in dispute, the probable scope, extent and value of the dispute and relevant provisions of the Contract Documents. The other party shall reply to such notice no later than fourteen (14) days after they receive or are considered to have received it, setting out in such reply their grounds and other relevant provisions of the Contract Documents.

2.11.3 Pending settlement of the dispute, the Engineer/Architect will give such instructions as, in their opinion, are necessary for the proper performance of the Work or to prevent delays pending settlement of the dispute. The parties shall act immediately according to such instructions, it being understood that by so doing neither party will jeopardize any claim they may have. If it is subsequently determined that such instructions were in error or at variance with the Contract Documents, the Owner shall pay the Contractor cost incurred by the Contractor in carrying out such instructions which they were

required to do beyond what the Contract Documents correctly understood and interpreted would have required them to do, including costs resulting from interruption of the Work.

2.11.4 It is agreed that no act by either party shall be construed as a renunciation or waiver of any of their rights or recourse, provided they have given the notices in accordance with Paragraph 2.11.2 and have carried out the instructions as provided in Paragraph 2.11.3.

2.11.5 If the dispute or claim cannot be resolved to the satisfaction of both parties, either party may refer the matter to such judicial tribunal as the circumstances require.

2.11.6 In recognition of the obligation of the Contractor to perform the disputed work as provided in Paragraph 2.11.3, it is agreed that settlement of dispute proceedings may be commenced immediately following the dispute in accordance with the aforegoing settlement of dispute procedures.

2.12.0 INDEMNIFICATION

2.12.1 Except as provided in Paragraph 2.10.2, the Contractor shall be liable for and shall indemnify and hold harmless the Owner and the Engineer/Architect, their agents and employees from and against all claims, demands, losses, costs, damages, actions, suits or proceedings whatsoever arising under any statute or Common law.

a) In respect of personal injury to or the death of any person whomsoever arising out of or in the course of or caused by the carrying out of the Work; and

b) In respect of any injury or damage whatsoever to any property, real or personal or any chattel real, insofar as such injury or damage arises out of or in the course of or by reason of the carrying out of the Work.

2.12.2 The Contractor shall not be liable under Paragraph 2.12.1 if the injury, death, loss or damage is due to any act or neglect of the Owner or Engineer/Architect, their agents or employees.

2.13.0 CHANGES IN THE WORK AND EXTRA WORK

2.13.1 The Owner may, without invalidating the Contract, make changes by altering, adding to or deducting from the Work, with the Contract Price and the Contract Time being adjusted accordingly; and

2.13.2 No change in the Work shall be made without prior written order from the Owner, and no claim for an addition or deduction to the Contract Price or change in the Contract Time shall be valid unless so ordered and at the same time valued or agreed to be valued as provided in **2.14.0 VALUATION AND CERTIFICATION OF CHANGES IN THE WORK.** Signed faxed copies are acceptable at the discretion of the Owner.

2.14.0 VALUATION AND CERTIFICATION OF CHANGES IN THE WORK

2.14.1 The value of any change shall be determined in one or more of the following methods:

a) By estimate and acceptance in a lump sum;

b) By unit prices subsequently agreed upon;

c) By cost and a fixed or percentage fee.

In the case of changes in the Work valued as outlined in Paragraph 2.14.1(a) (as will be the usual case), the Contractor will submit an itemized estimate of all materials and labour (including Subcontractor's work) to complete the change.

In the case of changes in the Work as valued in Paragraph 2.14.1 (c), the Contractor shall submit detailed invoices, vouchers and time sheets for all materials and labour to complete the change.

The submissions in both cases shall be in the manner acceptable to the Engineer/Architect and will show separately the following percentages for overhead and profit:

(i) Subcontractors shall include, in the breakdown, their 15 percent mark-up (10 percent of the estimated cost for the overhead and 5 percent for profit).

(ii) The Contractor shall include, in the breakdown, the percentages as outlined in (i) for the overhead and profit on their portion of the Work.

(iii) The Contractor shall add 10 percent to the Subcontractor's pricing for their own profit and overhead combined.

2.14.2 Notwithstanding the provisions of Paragraph 2.14.1, in case of changes in the Work, the amount charged for equipment rentals shall be that provided in the rental Contract, and no additional amount shall be paid as markup for overhead or profit for the Contractor or Subcontractor.

2.14.3 When a change in the Work is proposed or required, the Contractor shall present to the Engineer/Architect for approval their claim for the change in the Contract Price and/or change in the Contract Time in a form acceptable to the Engineer/Architect and including the appropriate documentation. The Engineer/Architect shall satisfy themselves as to the correctness of such claim, and when approved by the Owner, a change order will be issued to the Contractor to proceed with the change. The value of Work performed in the change shall be included for payment with the regular certificates for payment.

2.14.4 In the case of changes in the Work to be paid for under methods (b) and (c) of Paragraph 2.14.1, the form of presentation of costs and methods of measurement shall be agreed to by the Engineer/Architect and Contractor before proceeding with the change. The Contractor shall keep accurate records, as agreed upon, of quantities or costs and present an account of the cost of the change in the Work, together with vouchers where applicable.

2.14.5 If the method of valuation, measurement and the change in Contract Price and/or change in Contract Time cannot be promptly agreed upon, and the change is required to be proceeded with, then the valuation, measurement and the change in Contract Price and/or Contract Time will be subject to final determination in the manner set out in **2.11.0 DISPUTES**. In this case, the Engineer/Architect shall, with the consent of the Owner, issue a written authorization for the change setting out the method of valuation and, if by lump sum, their valuation of the change in Contract Price and/or Contract Time.

2.14.6 In the case of a dispute in the valuation of a change authorized in the Work and pending final determination of such value, the Engineer/Architect shall certify the value of the Work performed in accordance with their own evaluation of the change and include the amount with the regular certificates for payment. The Contractor shall keep accurate records of quantities and cost of such work.

2.14.7 It is intended in all matters referred to above that both the Engineer/Architect and Contractor shall act promptly.

2.14.8 Should the Owner direct the Contractor not to correct work that has been damaged or that was not performed in accordance with the Contract Document, an equitable deduction from the Contract amount by the Architect/Engineer shall be made to compensate the Owner for the uncorrected or uncompleted work.

2.14.9 Credits will be based on the net cost of material and labour or the net difference in the unit price quantities.

2.15.0 APPLICATION FOR PAYMENT

2.15.1 Applications for payment on account may be made monthly as the Work progresses.

2.15.2 Applications for payment shall be made monthly on a date to be agreed upon between the Owner and the Contractor, and the amount claimed shall be for the value proportionate to the amount of the Contract, of the Work performed and products delivered to the site at that date.

2.15.3 The Contractor shall submit to the Engineer/Architect, before the first application for payment, a schedule of values of the various parts of the Work aggregating the total amount of the Contract Price and divided so as to facilitate evaluation of applications for payment.

2.15.4 This schedule shall be made out in such form and supported by such evidence as to its correctness as the Engineer/Architect may reasonably direct and, when approved by the Engineer/Architect, shall be used as the basis for application for payment.

2.15.5 When making application for payment, the Contractor shall submit a statement based upon this schedule. Claims for products delivered to the site but not yet incorporated into the Work shall be supported by such evidence as the Engineer/Architect may reasonably require to establish the value and delivery of the products.

2.15.6 With each monthly claim for payment, except the first, the Contractor shall submit a Statutory Declaration attesting that they have made all payments to Subcontractors, Suppliers, and workmen on behalf of whom amounts were included in the previous claim for payment.

2.15.7 Applications for release of holdback monies following the substantial performance of the Work and the application for final payment shall be made at the time in the manner set forth in **2.16.0 CERTIFICATES AND PAYMENTS**.

2.15.8 For **all** projects, it should be clearly understood that the University's policy is as follows:

a) Each Progress Claim must be accompanied by a breakdown indicating amounts included for each Subcontractor;

b) When the University makes a Progress Payment, it is made in prorated amounts on behalf of those Subcontractors for whom amounts have been included in the corresponding Progress Claim;

c) The Contractor submitting the Progress Claim **must** make payment of the amounts included for the various Subcontractors to the various Subcontractors within ten (10) working days of issuance of the Progress Payment by the University.

d) Monthly payment amounts are not final or conclusive as to their value or quality of work performed and are subject to reopening and readjustment

2.15.9 Contractors not following the above procedures will be considered to be in default of their Contract, and the University may proceed in accordance with **Article 2.6.0 OWNER'S RIGHT TO PERFORM WORK, STOP WORK AND/OR TERMINATE CONTRACT** Subsection **2.6.2 (d)** of the General Conditions.

2.16.0 CERTIFICATES AND PAYMENTS

2.16.1 The Engineer/Architect shall, within ten (10) days of receipt of an application for payment from the Contractor submitted in accordance with **2.15.0 APPLICATION FOR PAYMENT**, issue a certificate for payment in the amount applied for or such amount as they shall determine to be properly due. If the Engineer/Architect amends the application, they shall promptly notify the Contractor in writing, giving their reason(s) for the amendment.

2.16.2 The Owner shall, within thirty (30) days of receipt and approval by the Owner of a certificate for payment from the Engineer/Architect, make payment to the Contractor on account.

2.16.3 Notwithstanding any other provisions of the Contract:

a) Where legislation permits and where, upon application by the Contractor, the Engineer/Architect has certified that a Subcontract has been totally performed to their satisfaction prior to the Substantial Performance of this Contract, the Owner may, at their discretion, pay the Contractor the holdback retained for such Subcontractor on the day following the expiration of the Statutory Limitations Period stipulated in the Mechanic's Lien Act applicable to the place of the Work and subject to the following conditions:

(i) A copy of the Contract between the Subcontractor and the General Contractor must be submitted.

(ii) The Subcontract is completed without deficiencies.

(iii) The warranty for the Subcontract will not start until Substantial Performance of the General Contract.

(iv) The General Contractor provides an approved Statutory Declaration that all monies have been paid to the said Subcontractor.

(v) The General Contractor provides an approved Waiver of Lien from this Subcontractor.

(vi) The Contractor and the Subcontractor provide an approved Waiver of Claim for all work associated with this Subcontractor.

(vii) A certificate is issued by the Engineer/Architect indicating that the Subcontract has been totally completed to their satisfaction.

(viii) The Owner will, at that time, release the total amount specified on the Subcontractor's Contract.

2.16.4 Notwithstanding the provisions of Paragraph 16.3 (a) and notwithstanding the wording of such certificate, the Contractor shall ensure that such work is protected pending the Total Performance of the Contract and be responsible for the correction of any defects in it regardless of whether or not they were apparent when such certificates were issued.

2.16.5 The Engineer/Architect shall within ten (10) days of receipt of an application from the Contractor for a Certificate of Substantial Performance make an inspection and assessment of the Work to verify the validity of the application. The Engineer/Architect shall within seven (7) days of their inspection notify the Contractor of their approval or the reasons for their disapproval of the application. When the Engineer/Architect finds the Work to be substantially performed, they shall issue such a certificate. The date of this certificate shall be the date of Substantial Performance of the Contract. Immediately following the issuance of the Certificate of Substantial Performance, the Engineer/Architect, in consultation with the Contractor, shall establish a reasonable date for the Total Performance of the Contract.

2.16.6 Following the issuance of the Certificate of Substantial Performance and upon receipt from the Contractor of all documentation called for in the Contract Documents, the Engineer/Architect shall issue a Certificate for Payment of holdback monies, providing that no lien or privilege claims against the Work exists, that the Contractor has submitted to the Owner a sworn statement that all accounts for labour, Subcontracts, products, construction machinery and equipment and any other indebtedness which may have been incurred by the Contractor in the Substantial Performance of the Work and for which the Owner might in any way be held responsible, have been paid in full and that the Contractor has submitted to the Owner a waiver of all claims associated with this project except holdback monies properly retained. The holdback monies will become due and payable on the day following the expiration of the Statutory Limitation Period stipulated in the Mechanic's Lien Act applicable to the place of buildings. The Owner may retain out of such holdback monies any sum required by law to satisfy any liens against the Work or other monetary claims against the Contractor which may be enforceable against the Owner.

2.16.7 The Engineer/Architect shall, within ten (10) days of receipt of an application from the Contractor for payment upon Total Performance of the Contract, make an inspection and assessment of the Work to verify the validity of the application. The Engineer/Architect shall, within seven (7) days of their inspection, notify the Contractor of their approval or the reasons for their disapproval of the application. When the Engineer/Architect finds the Work to be totally performed to their satisfaction, they shall issue a Certificate of Total Performance and certify for payment the remaining monies due to the Contractor under the Contract, less any holdback monies which are required to be retained. The date of this certificate shall be the date of Total Performance of the Contract. The Owner shall, within thirty (30) days of issuance of such certificate, make payment to the Contractor in accordance with the provisions of the Contract.

2.16.8 The release of any remaining holdback monies shall become due and payable on the day following the expiration of the Statutory Limitation period stipulated in the

Mechanics' Lien Act of the place of building provided that no claims against the Work exists and that the Contractor has submitted to the Owner a sworn statement that all accounts for labour, Subcontractors, products, construction machinery and equipment and any other indebtedness which may have been incurred by the Contractor in the Total Performance of the Work and for which the Owner might in any way be held responsible have been paid in full, except holdback monies properly retained.

2.16.9 No certificate for payment, any payment made thereunder or any partial or entire use of occupancy of the Work by the Owner shall constitute an acceptance of any work or products not in accordance with the Contract Documents.

2.16.10 As of the date of Total Performance of the Work as set out in the Certificate of Total Performance of the Work, the Owner expressly waives and releases the Contractor from all claims against the Contractor including, without limitation, those that might arise from the negligence or breach of Contract by the Contractor except one or more of the following:

a) Those made in writing prior to the date of the Total Performance of the Work and still unsettled;

b) Those arising from the provisions of **2.12.0 INDEMNIFICATION** or **2.26.0 WARRANTY**;

c) Those made in writing within a period of six (6) years from the date of Substantial Performance of the Work, as set out in the Certificate of Substantial Performance of the Work or within such shorter period as may be prescribed by any Limitation Statute of the Province of Newfoundland and Labrador and arising from any liability of the Contractor for damages resulting from their performance of the Contract with respect to substantial defects or deficiencies in the Work for which the Contractor is proven responsible.

As used herein, "substantial defects or deficiencies" means those defects or deficiencies in the Work which affect the Work to such an extent or in such manner that a significant part or the whole of the Work is unfit for the purpose intended by the Contract Documents.

2.16.11 As of the date of Total Performance of the Work, as set out in the Certificate of Total Performance of Work, the Contractor expressly waives and releases the Owner from all claims against the Owner including, without limitation, those that might arise from the negligence or breach of Contract by the Owner except those made in writing prior to the Contractor's application for payment upon Total Performance of the Work and still unsettled.

2.16.12 In the event of conflict between the provisions of the General Conditions and **2.24.0 DAMAGES AND MUTUAL RESPONSIBILITY**, the provisions of this General Condition shall govern.

2.16.13 The holdback to be used by the Engineer/Architect when issuing certificates of payment will be ten (10) percent of the value of the Work completed at the date of Contractor's claim.

2.16.14 Notwithstanding any other provision of this Contract, the Owner may:

a) In the event of a claim by the Owner against the Contractor for damages arising out of the performance or non-performance of the Contract, withhold payment of any amount equal to the alleged damages until the liability for damages is established, and no amount of interest will be paid on amounts held under this Clause;

b) Set-off amounts owing by the Contractor to the Owner;

c) Following the issuance of the Certificate of Substantial Performance, withhold payment of an amount equal to twice the cost as estimated by the Engineer/Architect of remedying deficiencies until the issuance of a Certificate of Total Performance, and no amount of interest will be paid on amounts held under this Clause.

2.17.0 TAXES AND DUTIES

2.17.1 Unless otherwise stated in the Supplementary General Conditions, the Contractor shall pay all applicable government sales taxes, goods and services taxes, customs duties and excise taxes with respect to the Contract.

2.17.2 Any increase or decrease in costs to the Contractor due to changes in such taxes and duties after the date of the Agreement and up to the agreed date of completion shall increase or decrease the Contract Price accordingly. If the Owner so desires, the Contractor is to cooperate with the Engineer/Architect and Owner and permit access to books and records in order to establish the amount of such taxes involved.

2.17.3 The Contractor shall maintain full records of their estimates and of actual costs to them of the Work, together with all proper open calls, quotations, contracts, correspondence, invoices, receipts, payments to Subcontractors and Suppliers and vouchers relating thereto and shall make them available to audit and inspection by the Owner, the Auditor General for Newfoundland and Labrador or by persons acting on their behalf and shall furnish them with any information which they may require from time to time in connection with such records.

2.18.0 LAWS, NOTICES, PERMITS AND FEES

2.18.1 The laws of the Province of Newfoundland and Labrador shall govern the Work.

2.18.2 The Contractor shall obtain all permits, licenses and certificates and pay all fees required for the performance of the Work which are in force at the date of open call closing with the following exceptions:

a) The Contractor shall obtain building permits for the Work but are not required to pay for said permits.
b) The Contractor shall not include the obtaining of permanent easements or rights of servitude.

2.18.3 The Contractor shall give all required notices and comply with all laws, ordinances, rules, regulations, codes and order of all authorities having jurisdiction relating to the Work, to the preservation of the public health and construction safety which are or become in force during the performance of the Work.

2.18.4 The Contractor shall not be responsible for verifying that the Contract Documents are in compliance with the applicable laws, ordinances, rules, regulations and codes relating to the Work. If the Contract Documents are a variance therewith or changes which necessitate modifications to the Contract Documents are required by the authorities having jurisdiction subsequent to the Open call closing date, the Contractor shall notify the Engineer/Architect in writing requesting direction immediately when any such variance or change is observed by them. The Engineer/Architect will make the changes required to the Contract Documents, and the Contract Price and/or Contract Time shall be adjusted in accordance with **2.13.0 CHANGES IN THE WORK AND EXTRA WORK** and evaluated in accordance with **2.14.0 VALUATION AND CERTIFICATION OF CHANGES IN THE WORK**.

2.18.5 If the Contractor fails to notify the Engineer/Architect in writing and obtain their direction as required in 2.18.4 and performs any work knowing it to be contrary to any laws, ordinances, rules, regulation, codes and orders of any authority having jurisdiction, they shall be responsible for and shall correct any violations thereof and shall bear all costs, expense and damages, attributable to their failure to comply with the provisions of such laws, ordinances, rules, regulations, codes and orders.

2.19.0 PATENT FEES

2.19.1 The Contractor shall pay all royalties and patent license fees required for the performance of the Contract and such royalties or fees shall be deemed to have been included in the Contract Price. They shall hold the Owner harmless from and against all claims, demands, losses, costs, damages, actions, suits or proceedings arising out of the Contractor's performance of the Contract which are attributable to an infringement or an alleged infringement of any patent or invention by the Contractor or anyone for whose acts they may be liable.

2.19.2 The Owner shall hold the Contractor harmless against all claims, demands, losses, costs, damages, actions, suits or proceedings arising out of the Contractor's performance of the Contract which are attributable to an infringement or an alleged

infringement of any patent or invention in executing anything for the purpose of the Contract, the model, plan or design of which was supplied to the Contractor by the Owner.

2.20.0 WORKERS' COMPENSATION

2.20.1 The Contractor shall be registered with and shall remain in good standing with the Workplace Health and Safety Compensation Commission during the term of their Contract.

2.20.2 At any time during the term of the Contract when requested by the Owner, the Contractor shall provide evidence of compliance by themselves and any or all of their Subcontractors.

2.21.0 LIABILITY INSURANCE

2.21.1 Comprehensive General Liability Insurance

a) Without restricting the generality of **2.12.0 INDEMNIFICATION**, the Contractor shall provide and maintain, either by way of a separate policy or by an endorsement to their existing policy, Comprehensive General Liability Insurance acceptable to the Owner and subject to limits set out in detail below, inclusive per occurrence for bodily injury, death and damage to property including loss of use thereof.

b) The insurance shall be in the joint names of the Contractor and the Owner. It shall also cover as named Insureds all Subcontractors and anyone employed directly or indirectly by the Contractor or their Subcontractors to perform a part or parts of the Work but excluding Suppliers whose only function is to supply and/or transport products to the project site.

c) The insurance shall also include as Named Insureds the architectural and engineering consultants of the Owner and Engineer/Architect.

d) The insurance shall preclude subrogation claims by the Insurer against anyone insured thereunder.

e) The Comprehensive General Liability Insurance will not be limited to, but shall include coverage for:

(i) Premises and Operations Liability

(ii) Products or Completed Operations Liability

(iii) Blanket Contractual Liability

(iv) Cross Liability

(v) Elevator and Hoist Liability

(vi) Contingent Employer's Liability

(vii) Personal Injury Liability arising out of false arrest, detention or imprisonment or malicious prosecution, libel, slander or defamation of character, invasion of privacy or wrongful entry

(viii) Shoring, blasting, excavating, underpinning, demolition, pile driving and caisson work, work below ground surface, tunnelling and grading, as applicable

(ix) Liability with respect to non-owned, licensed vehicles.

2.21.2 The Contractor shall provide and maintain liability insurance in respect of owned licensed vehicles subject to limits set out in detail in Article **2.21.0 LIABILITY INSURANCE** subsection **2.21.6.**

2.21.3 All liability insurance shall be maintained continuously until twelve (12) months after the date the Engineer/Architect issues a Certificate of Substantial Performance.

2.21.4 The Contractor shall provide the Owner with evidence of all liability insurance prior to the commencement of the Work and shall promptly provide the Owner with a certified true copy of each insurance policy.

2.21.5 All liability insurance policies shall contain an endorsement to provide all Named Insureds with prior notice of changes and cancellations. Such endorsements shall be in the following form:

"It is understood and agreed that the coverage provided by this policy will not be changed or amended in any way nor cancelled until thirty (30) days after written notice of such change or cancellation shall have been given to all Named Insureds."

2.21.6 The Contractor shall protect themselves and indemnify and save the Owner harmless from any and all claims which may arise from the Contractor's performance or failure of performance of the Contract and for this purpose shall, without restricting the generality of the foregoing, maintain insurance acceptable to the Owner to the following limits:

a) Where the contract value exceed $100,000 (inclusive of HST)
   - Comprehensive General Liability = $3,000,000.00;
   - Standard Automobile Policy Liability = $3,000,000.00.

b) Where the contract value is less than $100,000 (inclusive of HST)
   - Comprehensive General Liability = $2,000,000.00;
   - Standard Automobile Policy Liability = $2,000,000.00.

Prior to the commencement of any work hereunder, the Contractor shall file with the Owner a copy of each insurance policy and certificate required.

2.22.0 PROPERTY INSURANCE

2.22.1 The Contractor shall provide and maintain property insurance acceptable to the Owner insuring the full value of the Work in the amount of the replacement cost or the Contract value, whichever is greater, and the full value as stated of products for incorporation into the Work. The insurance shall be in the joint names of the Contractor, the Owner, the Subcontractors as Unnamed Insured or, if they specifically request, as Named Insured. The policies shall preclude subrogation claims by the Insurer against anyone insured thereunder.

2.22.2 Such coverage shall be provided by EITHER an ALL RISKS Builders' Risk Policy OR by a combination of a Coverage and Malicious Damage Endorsements and a Builder's Risk Difference in Conditions Policy providing equivalent coverage of Piers, Wharves and Docks, Government Structures Policy.

2.22.3 The policies shall insure against all risks of direct loss or damage. Such coverage shall apply to:

a) All products, labour and supplies of any nature whatsoever, the property of the Insureds or of others for which the Insureds may have assumed responsibility, to be used in or pertaining to the site preparations, demolition of existing structures, erections and/or fabrication and/or reconstruction and/or repair of the insured project, while on the site or in transit, subject to the exclusion of the property specified.

b) The installation, testing and any subsequent use of machinery and equipment including boilers, pressure vessels or vessels under vacuum.

c) Damage to the Work caused by an accident to and/or the explosion of any boiler(s) or pressure vessel(s) forming part of the Work.

Such coverage shall exclude construction machinery, equipment, temporary structural and other temporary facilities, tools and supplies used in the construction of the Work and which are not expendable under the Contract.

2.22.4 The Contractor shall provide the Owner with evidence of all insurance prior to the commencement of the Work and shall promptly provide the Owner with a certified true copy of each insurance policy.

Policies provided shall contain an endorsement to provide all Named Insureds with prior notice of changes and cancellations. Such endorsements shall be in the following form:

> **"It is understood and agreed that the coverage provided by this policy will not be changed or amended in any way or cancelled until thirty (30) days after written notice of such change or cancellation shall have been given to all Named Insureds."**

2.22.5 All such insurance shall be maintained continuously until ten (10) days after the date the Engineer/Architect issues a certificate of Total Performance. All such insurance shall provide for the Owner to take occupancy of the Work or any part thereof during the terms of this insurance. Any increase in the cost of this insurance arising out of such occupancy shall be at the Owner's expense.

2.22.6 The policies shall provide that, in the event of a loss, payment for damage to the Work shall be made to the Owner and the Contractor as their respective interests may appear. Damage shall not affect the rights and obligations of either party under the Contract except that the Contractor shall be entitled to such reasonable extension of time for Substantial and Total Performance of the Work as the Engineer/Architect may decide.

2.22.7 The Contractor and/or their Subcontractors, as may be applicable, shall be responsible for any deductible amounts under the policies and for providing such additional insurance as may be required to protect the Insureds against loss on items excluded from the policies.

2.22.8 When this Contract pertains to a new building or structure with a total bid amount greater than $25,000.00, the Contractor shall maintain All Risk Builder's Risk Insurance acceptable to the Owner in the joint names of the Owner and Contractor in the amount of 100 percent of the total value of the Work done and material delivered to the site and payable to the Owner and Contractor as their respective interest may appear.

2.23.0 PROTECTION OF WORK AND PROPERTY

2.23.1 The Contractor shall protect the property adjacent to the project site from damage as the result of their operations under the Contract.

2.23.2 The Contractor shall protect the Work and the Owner's property from damage and shall be responsible for any damage which may arise as the result of their operations under the Contract except damage which occurs as the result of:

a) Errors in the Contract documents; and/or

b) Acts or omissions by the Owner, their agents, employees or other Contractors.

2.23.3 Should the Contractor, in the performance of this Contract, damage the Work and/or Owner's property and/or property adjacent to the place of the Work, the Contractor shall be responsible for making good such damage at their own expense or pay all costs incurred by others in making good such damage.

2.23.4 Should any damage occur to the Work and/or Owner's property for which the Contractor is not responsible as provided in of **2.12.0 INDEMNIFICATION**, they shall make good such damage to the Work and, if the Owner so directs, to the Owner's property, and the contract Price and Contract Time shall be adjusted in accordance with in **2.13.0 CHANGES IN THE WORK AND EXTRA WORK** and evaluated in accordance with in **2.14.0 VALUATION AND CERTIFICATION OF CHANGES IN THE WORK**.

2.23.5 The Contractor shall be completely responsible for the safety of the Work as it applies to protection of the public and property and construction of the Work.

The codes that must be followed and enforced for safety are:

a) The National Building Code, Part 8, Safety Measures at Construction and Demolition Sites (Latest Edition);

b) Canadian Code for Construction Safety (Latest Edition) as issued by the Associate Committee of the National Building Code;

c) The Occupational Health and Safety Act (1979) and Regulations.

2.23.6 Any person not following stipulated safety regulations shall be dismissed.

2.24.0 DAMAGES AND MUTUAL RESPONSIBILITY

2.24.1 If either party to this Contract should suffer damage in any manner because of any wrongful act or neglect of the other party or anyone employed by them then they shall be reimbursed by the other party for such damages. The party reimbursing the other party shall be subrogated to the rights of the other party in respect of such wrongful act or neglect if it be that of a third party.

2.24.2 Claims under this Contract shall be made in writing to the party liable within two (2) weeks after the first observance of such damage and may be adjusted by agreement or in the manner set out in **2.11.0 DISPUTES**.

2.24.3 If the Contractor has caused damage to any other Contractor on the Work, the Contractor agrees upon due notice to settle with such other Contractor by agreement or arbitration, if they will so settle. If such other Contractor sues the Owner on account of any damage alleged to have been sustained, the Owner shall notify the Contractor and may require the Contractor to defend the action at the Contractor's expense. If

any final order or judgment against the Owner arises therefrom, the Contractor shall pay or satisfy it and pay all costs incurred by the Owner.

2.24.4 If the Contractor becomes liable to pay or satisfy any final order, judgment or award against the Owner then the Contractor, upon undertaking to indemnify the Owner against any and all liability for costs, shall have the right to appeal in the name of the Owner such final order or judgment to any and all courts of competent jurisdiction.

2.24.5 Should the Contractor fail to meet the date to substantially perform the Work, as indicated in the Agreement between the Owner and the Contractor, and is unable to provide justification acceptable to the Owner for the delay then the Contractor will be held liable for any liquidated damage amount indicated in **3.0 SUPPLEMENTARY GENERAL CONDITIONS** and may be held liable for payment to the Owner for other damages and losses suffered by the Owner as a result of the Contractor's delay including additional costs for Engineering/Architectural supervision.

2.25.0 BONDS

2.25.1 The Contractor shall promptly provide the Owner the surety bonds called for in the Open call Documents.

2.25.2 All such bonds shall be issued by a duly incorporated surety company approved by the Owner and authorized to transact a business or surety-ship in the Province of Newfoundland and Labrador.

2.25.3 If bonds are called for in the and Acceptance form, Instructions to Bidders or Supplementary General Conditions, the costs attributable to providing such bonds shall be included in the bid price.

2.25.4 Should the Owner require the provision of a bond or bonds by the Contractor other than those provided for under 2.25.3, the Contract Price shall be increased by all costs attributable to providing such bonds.

2.26.0 WARRANTY

2.26.1 The Contractor shall be responsible for the proper performance of the Work to the extend that the design and specifications permit such performance.

2.26.2 Subject to Paragraph 2.26.1, the Contractor agrees to correct promptly, at their own expense, defects or deficiencies in the Work which appear prior to and during the period of one (1) year from the date of Substantial Performance of the Work or such longer periods as may be specified for certain products or work.

2.26.3 The Contractor shall correct and/or pay for any damage to other work resulting from any corrections required under the conditions of Paragraph 2.26.2.

2.26.4 Neither the Engineer/Architect's final certificate nor payment thereunder shall relieve the Contractor from their responsibility hereunder.

2.26.5 The Owner and/or Engineer/Architect shall give the Contractor written notice of observed defects promptly.

2.27.0 CONTRACTOR'S RESPONSIBILITIES AND CONTROL OF THE WORK

2.27.1 The Contractor shall have complete control of the Work and shall effectively direct and supervise the Work so as to ensure conformance with the requirements of the Contract Documents. They shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all parts of the Work under the Contract.

2.27.2 The Contractor shall have the sole responsibility for the design, erection, operation, maintenance and removal of temporary structural and other temporary facilities and the design and execution of construction methods required in their use. The Contractor shall engage and pay for registered professional engineering personnel skilled in the appropriate disciplines to perform these functions where required by law or by the Contract Documents and, in all cases, where such temporary facilities and their method of construction are of such a nature that professional engineering skill is required to produce safe and satisfactory results.

2.27.3 Notwithstanding the provision of Paragraphs 2.27.1 and 2.27.2 above or any provisions to the contrary elsewhere in the Contract Documents where such Contract Documents include designs for temporary structural and other temporary facilities or specify a method of construction in whole or in part, such facilities and methods shall be deemed to comprise part of the overall design of the Work, and the Contractor shall not be held responsible for that part of the design or the specified method of construction. The Contractor shall, however, be responsible for the execution of such design or specified method of construction in the same manner that they are responsible for the execution of the Work.

2.27.4 The Contractor shall carefully examine the Contract Documents and shall promptly report to the Engineer/Architect any error, inconsistency or omission they may discover. The Contractor shall not be held liable for any damage resulting from any such errors, inconsistencies or omissions in the Contract Documents which they may discover, and they shall not proceed with the Work affected until they have received corrected or missing information from the Engineer/Architect.

2.28.0 PROJECT MANAGER ANDSUPERINTENDENCE

2.28.1 The Contractor shall employ a competent Project Manager and necessary assistants who shall be in attendance at the Work site at all times while the Work is being performed.

2.28.2 The Project Manager shall be satisfactory to the Engineer/Architect and shall not be changed except for good reason and only then after consultation with an agreement by the Engineer/Architect.

The Project Manager shall have a minimum of ten (10) years' experience on construction projects of similar scale, complexity, type and value.

The project manager shall submit a resume and cover letter.

2.28.3 The Superintendent shall represent the Contractor at the place of work and instructions given to them by the Engineer/Architect shall be held to have been given to the Contractor. Important instructions shall be confirmed to the Contractor in writing, other instructions will be so confirmed if requested.

The superintendent shall have a minimum of ten (10) years' experience on construction projects of similar scale, complexity, type and value.

2.29.0 LABOUR AND PRODUCTS

2.29.1 Unless otherwise stipulated elsewhere in the Contract Documents, the Contractor shall provide and pay for all labour, products, tools, construction equipment and machinery, water, heat, light, power, transportation and other facilities and services necessary for the requirements of the Contract Documents.

2.29.2 All products provided shall be new unless otherwise specified in the Contract Documents. Any products which are not specified shall be of a quality best suited to the purpose required, and their use shall be subject to the approval of the Engineer/Architect.

2.29.3 In carrying out their duties under this Contract, the Contractor shall comply with all Provincial and Federal legislation respecting labour and the employment of labour, where applicable, including the Labour Standards Code and shall not operate in conflict with the Human Rights legislation. In the employment of labour, preference should be given to persons normally residing in Newfoundland and Labrador.

2.29.4 The Contractor and Subcontractors shall maintain and keep available for inspection by the Owner, a record of the names and addresses of all persons employed on the project.

2.29.5 The Contractor shall maintain good order and discipline among their employees engaged on the Work and shall employ on the Work only employees skilled in their various trades.

2.29.6 There shall be no discrimination in the selection of workers for employment on the project in respect to race, religion, views or political affiliation, and the office of the Canada Manpower will be used in the recruitment of workers wherever possible.

2.29.7 The Contractor shall pay fair wages and shall pay rates of wages and allowances to the various classes of labour not less favourable than those prevailing in the area where the Work is being performed.

2.29.8 The Contractor shall be aware that the majority of hourly-paid and maintenance workers employed within the University are unionized. It is of utmost importance that

any labour force used by the Contractor neither disrupts or be disrupted by any labour conditions existing on the University campus. Failure by the Contractor to familiarize themselves with labour conditions on Campus or disruptions to the Contractor's own labour force because of labour conditions on Campus will not relieve them of their obligations to furnish all labour and materials necessary to carry out the requirements of the Contract.

2.30.0 SUBSURFACE CONDITIONS

2.30.1 The Contractor shall promptly notify the Engineer/Architect in writing if, in their opinion, the subsurface conditions at the project site differ materially from that indicated or reasonably inferred from the Contract Documents.

2.30.2 After prompt investigation, should the Engineer/Architect determine that conditions do differ materially, they shall issue appropriate instructions for changes in the Work as provided for in **2.13.0 CHANGES IN THE WORK AND EXTRA WORK**.

2.31.0 USE OF THE WORK

2.31.1 The Contractor shall confine their apparatus, the storage of products and the operations of their employees to limits indicated by laws, ordinances, permits or by instructions of the Engineer/Architect and shall not unreasonably encumber the premises with their products.

2.31.2 The Contractor shall not load or permit to be loaded any part of the Work with a weight or force that will endanger its safety.

2.31.3 Unless otherwise provided, the Contractor shall, at their own expense and without expense to the Owner, make suitable provision to accommodate all traffic, either pedestrian or vehicular, over or around the project upon which work is being performed in a manner satisfactory to the Engineer/Architect.

2.31.4 The Contractor shall provide and maintain at their own expense such fences, barriers, signs, lights and watchmen as may be necessary to prevent avoidable accidents to University Users or to the public generally.

2.31.5 All work shall be executed with the least possible interference with or disturbance to personnel and the Public. The Contractor shall cooperate with the person in charge of the premises. The Contractor shall ascertain from the Owner's representative the hours during which the work shall be performed, conform to the directions of the representative and to the directions of the said representative in determining the order in which the work shall be done.

2.31.6 The Contractor shall carry out all work required to maintain the building services and to provide necessary access for personnel and vehicles whenever new work affects occupied portions of the building.

2.31.7 Before final completion of the work, the Owner shall be entitled to make use of any portion of the work which is completed and fit for use for the installation of equipment, storage and furniture, supplies, etc., and for occupancy, if such can be arranged without interfering with the progress of the work.

2.32.0 CUTTING AND REMEDIAL WORK

2.32.1 The Contractor shall do all cutting and remedial work that may be required to make the several parts of the Work come together properly and shall coordinate the Work to ensure that this requirement is kept to a minimum.

2.32.2 Should the Owner, the Engineer/Architect, other contractors or anyone employed by them, be responsible for ill-timed work necessitating additional cutting and/or remedial work to be performed, it shall be valued as provided in **2.14.0 VALUATION AND CERTIFICATION OF CHANGES IN THE WORK** and added to the Contract Price.

2.32.3 Cutting and remedial work shall be performed by specialists familiar with the materials affected and shall be performed in a manner to neither damage nor endanger any work.

2.33.0 INSPECTION OF WORK

2.33.1 The Owner, the Engineer/Architect and their authorized representatives shall have access to the Work for inspection wherever it is in preparation or progress. The Contractor shall cooperate to provide reasonable facilities for such access.

2.33.2 If parts of the Work are designated for special tests, inspections or approvals in the Contract Documents or by the Engineer/Architect's instructions or the laws or ordinances of the place of the Work, the Contractor shall give the Engineer/Architect timely notice requesting inspection. Inspection by the Engineer/Architect shall be made promptly. The Contractor shall arrange for inspections by other authorities and shall notify the Engineer/Architect with timely notice of the date and time.

2.33.3 If the Contractor covers or permits to be covered any of the Work that is designated for special tests, inspections or approvals, before such special tests, the Contractor shall, if so instructed by the Engineer/Architect, uncover the Work, have the inspection satisfactorily completed and make good the Work at their own expense.

2.33.4 The Engineer/Architect may order any part of the Work to be specifically examined, should they believe such work not to be in accordance with the requirements of the Contract Documents. If upon examination such work is found not to be in accordance with the requirements of the Contract Documents, the Contractor shall correct such work and pay the cost of examination and correction. If such work is found to be in accordance with the requirements of the Contract Documents, the Owner will pay the cost of examination and replacement.

2.33.5 The Contractors shall furnish promptly to the Engineer/Architect two (2) copies of all certificates and inspection reports relating to the Work.

2.34.0 *REJECTED WORK*

2.34.1 Defective work, whether the result of poor workmanship, use of defective products or damage through carelessness or other act or omission of the Contractor and whether incorporated in the Work or not which has been rejected by the Engineer/Architect as failing to conform to the Contract Documents, shall be removed promptly from the premises by the Contractor and replaced and/or re-executed promptly in accordance with the Contract Documents at the Contractor's expense.

2.34.2 Other contractors' work destroyed or damaged by such removals or replacements shall be made good promptly at the Contractor's expense.

2.34.3 If, in the opinion of the Engineer/Architect, it is not expedient to correct defective work not done in accordance with the Contract Documents, the Owner may deduct from the Contract Price the difference in value between the Work as done and that called for by the Contract, the amount of which shall be determined in the first instance by the Engineer/Architect.

2.35.0 *SHOP DRAWINGS AND SAMPLES*

2.35.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of the Work.

2.35.2 The Contractor shall arrange for the preparation of clearly identified shop drawings as called for by the Contract Documents or as the Engineer/Architect may reasonably request.

2.35.3 Prior to submission to the Engineer/Architect, the Contractor shall review all shop drawings. By this review, the Contractor represents that they have determined and verified all field measurements, field construction criteria, materials, catalogue numbers and similar data, or will do so, and that they have checked and coordinated each shop drawing with the requirements of the Work and of the Contract Documents. The Contractor's review of each shop drawing shall be indicated by stamp, date and signature of a responsible person.

2.35.4 The Contractor shall submit shop drawings to the Engineer/Architect for their review with reasonable promptness and in orderly sequence so as to cause no delay in the Work or in the Work of other contractors. If either the Contractor or the Engineer/Architect so requests, they shall jointly prepare a schedule fixing the dates for submission and return of shop drawings. Shop drawings shall be submitted in the form

of reproducible transparencies or prints as the Engineer/Architect may direct. At the time of the submission, the Contractor shall notify the Engineer/Architect in writing of any deviations in the shop drawings from the requirements of the Contract Documents.

2.35.5 The Engineer/Architect will review and return shop drawings in accordance with any schedule agreed upon or otherwise with reasonable promptness so as to cause no delay. The Engineer/Architect's review will be for conformity to the design concept and for general arrangements only, and such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the Contract Documents unless a deviation on the shop drawings has been approved in writing by the Engineers/Architects.

2.35.6 The Contractor shall make any changes in shop drawings which the Engineer/ Architect may require consistent with the Contract Documents and resubmit, unless otherwise directed by the Engineer/Architect. When resubmitting, the Contractor shall notify the Engineer/Architect in writing of any deviations other than those requested by the Engineer/Architect.

2.35.7 The Contractor shall submit for the Engineer/Architect's approval such standard manufacturer's samples as the Engineer/Architect may reasonably require. Samples shall be labeled as to origin and intended use in the Work and shall conform to the requirements of the Contract Documents.

2.35.8 The Contractor shall provide samples of special products, assemblies or components when so specified. The cost of such samples not specified shall be authorized as an addition to the Contract Price as provided in **2.13.0 CHANGES IN THE WORK AND EXTRA WORK**.

2.36.0 TESTS AND MIX DESIGNS

2.36.1 The Contractor shall furnish to the Engineer/Architect test results and mix designs as may be requested. The testing company must first be approved by the Engineer/Architect.

2.36.2 The cost of tests and mix designs beyond those called for in the Contract Documents or beyond those required by law, ordinances, rules and regulations relating to the Work and the preservation of public health, shall be authorized as an addition to the Contract Price as provided in **2.13.0 CHANGES IN THE WORK AND EXTRA WORK.**

2.37.0 MATERIALS AND SUBSTITUTIONS

2.37.1 Materials described and named in the specifications with "or approved equal" clause after the Manufacturer's name are so described as to the establish quality only, and substitutions of a similar materials may be made before the award of the Contract provided the Engineer/Architect's approval is obtained. Substitutions after the award

may be considered under special circumstances as indicated in Subsection 1.7.4 in the **INSTRUCTIONS TO Bidders**

2.37.2 Requests for substitutions must be accompanied by sufficient information in the form of shop drawings, manufacturer's literature, samples and other data to permit proper investigation of the substitutes proposed, together with any increase or decrease in price.

2.37.3 Whenever a substitute is proposed for approval, the Contractor shall guarantee that such proposed substitute will not adversely affect the space requirements allocated on the drawings for the material specified, and they shall agree to bear any additional expense incurred due to their use of the proposed substitute.

2.37.4 The Engineer/Architect may accept or reject any or all of the proposed substitutions as they see fit, and their decision on a question of equality shall be final.

2.38.0 TIME OF ESSENCE AND SCHEDULE

2.38.1 Time is of the essence of the Contract.

2.39.0 CASH ALLOWANCE

2.39.1 The Contract Price includes cash allowances, if any, stated in the Contract Documents.

2.39.2 Cash allowances, unless otherwise specified, cover the entire cost to the Contractor of services, products, construction machinery and equipment, freight, unloading, handling, storage, installation and other authorized expenses incurred in performing the Work stipulated under the cash allowances. This also includes the Contractors overhead and profit in connection with such cash allowance.

2.39.3 The cash allowance shall not include HST.

2.39.4 Where costs under a cash allowance exceed the amount of the allowance, the Contractor shall be compensated for any excess incurred and substantiated plus an allowance for overhead and profit as set out in **2.14.0 VALUATION AND CERTIFICATION OF CHANGES IN THE WORK.**

2.39.5 The Contract Price shall be adjusted by written order to provide for any excess or deficit to each cash allowance.

2.39.6 Progress payments on account of Work authorized under cash allowance shall be included in the Engineer/Architect's monthly certificates for payment.

2.39.7 A schedule shall be prepared jointly by the Engineer/Architect and Contractor to show the items called for under Cash Allowances. They must be authorized by the Owner for ordering purposes so that the progress of the Work will not be delayed.

2.40.0 CLEANUP AND FINAL CLEANING OF THE WORK

2.40.1 The Contractor shall maintain the Work in a tidy condition and free from the accumulation of waste products and debris, other than that caused by the Owner, other contractors or their employees.

2.40.2 When the Work is substantially performed, the Contractor shall remove their surplus products, tools, construction machinery and equipment not required for the performance of the remaining Work. They shall also remove waste products and debris, other than that caused by the Owner, other contractors or their employees, and leave the Work clean and suitable for occupancy by the Owner, unless otherwise specified.

2.40.3 When the Work is totally performed, the Contractor shall remove their surplus products, tools, construction machinery and equipment. They shall also remove waste products and debris other than that caused by the Owner, other contractors or their employees.

3.0 SUPPLEMENTARY GENERAL CONDITIONS

SUPPLEMENTARY GENERAL CONDITIONS

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4.0 SPECIAL CONDITIONS

4.1.0 LAYOUT OF WORK

4.1.1 Other than the original lot lines and a bench mark, both shown on the drawings, establish and maintain all grades, lines, levels and well-built batter boards at all corners of the building. As work progresses, lay out on the forms or rough flooring the exact location of all partitions as a guide to all trades.

4.1.2 Verify all grades, lines, levels and dimensions as shown on the drawings and report any errors or inconsistencies in the above to the Engineer/Architect before commencing Work.

4.2.0 JOB SIGN

4.2.1 At the start of the job, erect two painted signs as detailed and where located by the Engineer/Architect. This will be the only sign or advertisement permitted on the site unless instructed otherwise by the Engineer/Architect.

4.2.2 The signs shall be 8'0" x 8'0" plywood, properly supported. It shall be painted and shall show the names of the building, Owner, Prime Consultant, Major Subconsultants, Contractor and Major Subcontractors. A drawing of the signs to be erected will be supplied by the Engineer/Architect.

4.3.0 TEMPORARY OFFICES AND SHEDS

4.3.1 Construct and maintain, until completion of the Contract temporary offices and storage sheds in approved locations on site for the use of staff.

4.3.2 Buildings shall be of weatherproof wood stud and plywood construction completely equipped with adequate lighting, heating and ventilation, and in addition, the Contractor's office shall be fully furnished with desks, plan tables, storage cabinets, file drawers, chairs, stools and plan racks.

4.3.3 Provide storage sheds for small tools, equipment, perishable materials, etc., as necessary. All buildings shall be equipped with windows for natural light and doors properly fitted and equipped with locks.

4.3.4 Maintain offices and storage sheds in good condition to the approval of the Engineer/Architect from start of Work until final completion of Work or, when directed by the Engineer/Architect, remove offices and sheds from the site and leave areas free of debris and waste materials and in a clean and tidy condition.

4.3.5 Offices and storage sheds required by Trade Contractors, such as mechanical and electrical, shall be provided by the trade requiring them.

4.3.6 Provide an office approximately 120 square feet for the absolute use of the Owner or their representative(s). It shall be properly fitted and furnished with light, heat, telephone, lock and key, shelving, table and chairs and plan rack. The building shall be removed from the site at the completion of the Work.

4.4.0 *TEMPORARY SERVICES*

4.4.1 Light and Power

Furnish all temporary light and power required to provide such intensity of light and sufficient power as necessary for the Work to be carried out under the best conditions. Obtain and pay for all permits and inspection tests required by Provincial and/or Municipal authorities. Pay all charges and maintain fixtures and equipment in good working order. This shall include electric heat.

4.4.2 Telephone

Install and pay for the operation of one job telephone and one telephone for the use of the Engineer/Architect for the duration of the Contract. Subcontractors requiring individual telephones shall have them installed at their expense. Long distance calls will be at the expense of the party making the calls.

4.4.3 Toilets

At the start of operations, provide and maintain in sanitary condition sufficient temporary toilets and washing facilities for the use of personnel on the job. Conform to requirements of the Department of Health and other authorities having jurisdiction. Supply adequate quantities of disinfectant and toilet paper. When building toilets and washing facilities are operable, they may be used under the same conditions as the temporary toilets with the latter being removed, leaving all surfaces and areas hygienically clean and in immaculate condition.

4.4.4 Heat

Provide and maintain in good condition a temporary heating system for use when the building is closed in until the project has been handed over to the Owner. Pay for fuel and maintenance of the system. Maintain temperatures at a minimum of 50^{o} F, (higher if required for special trades). Heating equipment not adequately protected or operated in conditions other than those intended by the manufacturer shall be regarded as temporary. Remove all such equipment and replace with new permanent equipment.

When ready for operation, the permanent heating equipment may be used for temporary heating purposes, subject to the conditions of the Mechanical Division of the specifications. Protect all permanent heating equipment used for temporary heating purposes. Provide satisfactory site conditions for the proper operation of this equipment.

4.4.5 Water Supply

Provide in two convenient locations outside the building line a fresh water supply for the use of all trades.

Where connection cannot be made to an existing water supply, provide adequate size tanks and keep them filled for use of all trades.

4.5.0 PLANT AND MACHINERY

4.5.1 Provide all framework, scaffolding, ladders, cranes, derricks, planks, screens, gantries, tarpaulins, tools, equipment and machinery for the proper execution of the Work. Scaffolding shall be erected without damage of the structure or the finishes, be removed to suit the installation of work of other trades and be promptly removed at completion.

4.5.2 Where it is the normal practice for the trade to provide its own scaffolding, it shall be included in the Subcontract.

4.6.0 PROTECTION OF PUBLIC AND WORKMEN

4.6.1 Part 8 of the National Building Code of Canada, latest edition, shall apply to this project in its entirety. This covers fencing, barricades, Fire protection, excavation, use of streets or public property, control of vehicular traffic and mechanical methods of demolition.

4.6.2 The latest edition of Canadian Construction Safety Code shall also apply to all phases of this project.

4.6.3 The Workers' Compensation Board Regulations shall also apply to all phases of this project.

4.7.0 CONSTRUCTION SCHEDULE

4.7.1 The Contractor shall, within seven (7) days after the Contract is awarded, prepare for the use of the Engineer/Architect and Owner, a construction schedule. It shall indicate as closely as possible the starting and completion dates for the major sections of the Work, together with the Subcontractors' names.

4.7.2 With each monthly progress claim, submit one (1) copy of the original construction schedule marked in red to show the actual construction progress on the date of the submission of the claim.

Weekly schedule updates shall be provided.

Provide updated construction schedule demoting the original.

4.8.0 *PROGRESS PHOTOGRAPHS*

4.8.1 Submit with monthly progress claim digital progress photographs taken from points designated by the Engineer/Architect. In the lower right-hand corner of the prints show the date and name of the project.

4.9.0 OPERATIONS AND MAINTENANCE DATA

4.9.1 On completion of the project, submit to the Engineer/Architect two (2) copies of Operations and Maintenance Data and one (1) electronic copy as original editable format.

a) Bind data in vinyl hard covered, 3-ring, loose-leaf binder for 215 x 280 mm size paper.

b) Enclose title sheet, labelled "Operation and Maintenance Data", project number, project name, date and list of contents.

c) Organize contents into applicable sections of work to parallel project specifications breakdown. Mark each section by labelled tabs protected with celluloid covers fastened to hard paper dividing sheets.

d) Provide electronic document in CD or DVD as original editable file format or, at the direction of the Owner, pdf format.

4.9.2 Include the following information plus data specified in Division 15 and 16:

a) Maintenance instruction for finished surface and materials.

b) Copy of hardware schedules.

c) Description, operation and maintenance instructions for equipment and systems, including complete list of equipment and parts list. Indicate nameplate information such as make, size capacity and serial number.

d) Names, addresses, phone and fax numbers of Subcontractors and Suppliers.

e) Guarantees, warranties and bonds showing:

(i) Name and address of project;

(ii) Guarantee commencement date (date of Final Certification of Completion).

(iii) Duration of guarantee.

(iv) Clear indication of what is being guaranteed and what remedial action will be taken under guarantee.

(v) Signature and Seal of Contractor.

f) Additional materials used in project listed under various sections showing name of manufacturer and source of supply.

4.9.3 Neatly type lists and notes. Use clear drawings, diagrams or manufacturer's literature.

4.9.4 The final certificate will not be issued until the data books have been received and approved by the Engineer/Architect.

4.10.0 COORDINATION OF WORK

4.10.1 The Contractor will coordinate the Work of their Subcontractors and provide necessary instructions and scheduling so as to permit continuous progress in the Work by all trades. They will coordinate work between the Subcontractors on the site to ensure that anchor bolts, plates, attachments, etc., are provided and set in place in a timely manner. They will lay out partitions and assist Subcontractors in establishing the actual location of the fixtures, pipes, outlets, duct conduit, etc., so as to limit the interference of one trade with another. Locations shown on the drawings are approximate. If interference problems are encountered which cannot be resolved on the site, advise the Engineer/Architect before proceeding with the Work. Conceal all mechanical and electrical work unless otherwise indicated.

4.11.0 TRAFFIC MAINTENANCE

4.11.1 Do not close or obstruct streets, sidewalks, driveways, etc., without permission from authorities having jurisdiction. Do not place or store materials in street, sidewalks, parking areas, etc., unless so authorized.

4.12.0 FIRE PROTECTION

4.12.1 Fire protection measures shall include:

a) An adequate fire alarm signal, the use of fire resistant tarpaulins, the daily inspection of temporary heating system by competent staff and regular fire patrol;

b) All temporary wiring shall be done by electricians qualified under the applicable local regulations;

c) Supply and maintenance of fifteen (15) pounds dry chemicals and/or five (5) gallons soda-acid fire extinguishers in such locations that no working crew has to

travel more than fifty (50) feet to an extinguisher station. In any case, there shall be not less than one (1) fully charged extinguisher(s) at the job at any time.

4.13.0 JOB MEETINGS

4.13.1 Where the value of the contract exceeds $100,000 (HST included) job meetings shall occur at definitely prescribed times (minimum once a month), which will be determined after commencement of work, the Contractor shall organize job meetings and send out notices stating time and place to the Owner's representative, the Engineer/Architect, Subconsultants, to all Subcontractors and to other persons whose presences are required at the meetings. They shall take note of all persons attending these meetings and shall, within one (1) week after each job meeting, submit to the Owner, the Engineer/Architect, the Subconsultants and others present, minutes of the meeting which must show any major decisions made and any instructions or information required.

4.13.2 Where the value of the contract is less than $100,000 (HST included) job meetings shall occur at the discretion of the University Project Coordinator but shall not occur fewer than once per month.

4.14.0 AS-BUILT DRAWINGS

4.14.1 The Engineer/Architect will issue to the Contractor three (3) sets of prints of architectural, mechanical and electrical drawings for the sole purpose of providing "as-built" drawings. The Contractor shall pass these to the relevant Subcontractor who shall keep two (2) sets in their office and one (1) set on the job. As changes occur, the Subcontractor shall make them on the field set. Upon completion of the project, the Subcontractor shall accurately transfer all changes to the two (2) office sets in red ink and pass them to the Engineer/Architect, through the Contractor, for approval. If they are not approved, the Subcontractor shall prepare new sets for resubmission (purchasing additional white prints for this purpose).

4.14.2 As-built drawings shall be white prints and shall indicate all changes in Architectural, Mechanical and Electrical work, including any changes in location of piping, ducts, panels, etc.

4.14.3 Provide electronic as-builts in CD or DVD as original editable file format or, at the direction of the Owner, pdf format.

4.14.4 The Certificate of Total Performance will not be issued until such drawings have been received and approved.

4.15.0 COMPLETION TIME

4.15.1 The project shall be ready for the use and occupancy by the Owner within the time stated in the Open Call and Acceptance Form.

4.15.2 Prior to the acceptance by the Owner of the Substantial Performance, the Contractor and the Owner shall sign a list of deficiencies as prepared by the Engineer/Architect for prompt correction and/or completion.

4.16.0 CLOSE DOWN OF WORK

4.16.1 Should the Work be closed down for any cause, the Contractor shall assume all responsibility for its proper protection during such period. They must protect all foundation work and other work liable to be damaged.

4.17.0 BROKEN GLASS

4.17.1 The Contractor shall be held responsible for any damaged, broken or scratched glass and at completion shall replace all such glass at no additional cost to the Owner.

4.18.0 HOARDING

4.18.1 Before starting excavating, construct and thereafter maintain all necessary hoarding required by Municipal or Provincial regulations or by other authorities having jurisdiction.

4.19.0 COMMISSIONING

4.19.1 The Contractor is responsible for commissioning the Work to ensure that the various parts are operating in a manner as intended by the Contract Documents. Even through individual components and/or parts of the Work may have been tested and approved prior to the substantial completion, the Contractor must coordinate a final commissioning of the complete Work, including at the place of the Work all their major Subcontractors and Suppliers. The final commissioning will be carried out by the appropriate trades working together in a complementary manner such that the successful operation of the whole Work is completed properly to the satisfaction of the Engineer/Architect. The Substantial Performance Certificate will not be issued until the final commissioning of the Work has been successfully completed.

4.20.0 FINAL CLEAN-UP

4.20.1 At the end of the job, thoroughly clean the building of all rubbish and surplus materials.

4.20.2 Make good all damaged areas in the building caused as a result of the Work of this Contract.

4.20.3 Do final cleaning, waxing and polishing of resilient flooring.

5.0 CAMPUS SAFETY AND HEALTH REGULATIONS

Maintaining a healthy and safe environment for all members of the campus community, as well as visitors, is a priority with the University. This involves a commitment from all sectors of the campus community and extends to outside agencies having occasion to come on campus to conduct business.

The following regulations will apply to all work undertaken by contractors and service personnel on any University property.

5.1.0 REGULATIONS, CODES AND STANDARDS

Contractors shall be familiar with and abide by provisions of various safety codes and standards applicable to the work performed and should refer to Article **23. PROTECTION OF WORK AND PROPERTY** in the **General Conditions**.

In particular, strict adherence shall be required to the Provincial Occupational Health and Safety Act and Regulations and the National Building Code of Canada, Part 8.

5.2.0 GENERAL SAFETY REGULATIONS

a) Contractors/service agencies shall ensure that members of the campus community are not endangered by any work or process in which they may be engaged. Work areas shall be adequately barricaded, and if dust or fumes are generated, suitable enclosures shall be installed to contain such emissions.

b) No material shall be stored in such a way as to obstruct walkways or represent a danger to pedestrian traffic.

c) Adequate protection shall be provided to prevent the possibility of materials falling from scaffolding or elevated areas. Areas where materials are being loaded or offloaded shall be barricaded or otherwise protected to prevent unauthorized entry. Where necessary, appropriate warning signs shall be posted.

d) The work areas must be kept reasonably clean and free from debris which could constitute a fire hazard. Care must be taken to ensure that the work process does not activate fire alarm detection devices. (Generation of dust and fumes can activate smoke detectors causing a false alarm).

e) Due consideration shall be given to fire safety in buildings. Flammable materials must be kept away from sources of ignition. No work involving the use of open flame devices must be undertaken around flammable solvents or gases.

f) Do not alter or disturb any materials believed to contain asbestos materials (unless this is a duly authorized part of the project). Should suspect materials be encountered, consult with University officials before proceeding.

g) Material Safety Data Sheets shall be procured for any hazardous product used on campus. Such sheets shall be made readily available for consultation as required under the Workplace Hazardous Materials Information System.

NOTE: The above regulations are not to be considered all inclusive and are considered to be complementary to the safety requirements outlined in the agreement between the Owner and the Contractor/Service Agency. Certain conditions and circumstances may require adherence to additional safety regulations.

As a general requirement, contract/service personnel are expected to conduct all work on campus in a professional and safe manner and to give priority to the welfare of members of the campus community.

6.0 CONTRACTOR PERFORMANCE EVALUATION

6.1.0 The purpose of this process is to maintain an acceptable level of performance with external contractors carrying out work for the Department of Facilities Management.

6.2.0 A record of the performance of external contractors will be maintained to identify the following:

a) Those contractors who by virtue of satisfactory performance will continue to be eligible to submit bids for work at the University;

b) Those contractors whose performance is considered unsatisfactory and will be advised of the need to improve performance to remain eligible to submit bids for work at the University;

c) Those contractors whose record of unsatisfactory performance will render them ineligible to submit bids for work at the University.

6.3.0 Contractors' performance will be evaluated on a points rating system relative to quality of work performed, timeliness in completing work and management/administration of contracts/work and safety parameters.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Types of items described in this Section:

B. Types of items described in this Section:
1. Work Covered By the Contract Documents.
2. Type of Contract.
3. Work Phases.
4. Work Under Other Contracts.
5. Products Ordered In Advance.
6. Owner-Furnished Products.
7. Use of Premises.
8. Owner's Occupancy Requirements.
9. Work Restrictions.
10. Interpretation Of Documents
11. Specification Formats and Conventions.
12. Project Management and Coordination.
13. Construction Progress Documentation.
14. Photographic Documentation.
15. Substitution Procedures.
16. Submittal Procedures.
17. Environmental Procedures.
18. Wildlife Protection.
19. Quality Requirements.
20. Regulatory Requirements.
21. Temporary Facilities and Control.
22. Temporary Barriers and Enclosures.
23. Product Requirements.
24. Execution.
25. Construction Waste Management and Disposal.
26. Closeout Procedures.
27. List of Incomplete Items (Punch List)
28. Operation and Maintenance Data.
29. Project Record Documents.
30. Demonstration and Training.

C. Types of items you will not find described in this Section:
1. Health and Safety Requirements

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: L-119-22 Level 2 Washroom Renovations
1. Project Location: Main Campus, Memorial University, St. John’s, NL.

B. Owner: Memorial University
   1. Owner's Representative: Department of Facilities Management, Tel. 709-864-8725

C. The Work consists of the following:
   1. The Work includes architectural, mechanical, electrical, and plumbing.

1.4 TYPE OF CONTRACT

A. Project will be constructed under a single prime contract.

1.5 WORK PHASES

A. The Work shall be conducted in a single phase

1.6 WORK UNDER OTHER CONTRACTS

A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work performed under separate contracts.

B. Preceding Work: Owner has awarded / will award separate contract(s) for the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.
   1. No proceeding work planned.

C. Concurrent Work: Owner has awarded / will award separate contract(s) for the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.
   1. No concurrent work planned.

D. Future Work: Owner has awarded / will award separate contract(s) for the following additional work to be performed at site after Substantial Completion. Completion of that work will depend on successful completion of preparatory work under this Contract.
   1. No future work planned.

1.7 PRODUCTS ORDERED IN ADVANCE

A. General: Owner has negotiated Purchase Orders with suppliers of material and equipment to be incorporated into the Work. Owner will assign these Purchase Orders to Contractor. Costs for receiving, handling, storage if required, and installation of material and equipment are included in the Contract Sum.
   1. Contractor's responsibilities are same as if Contractor had negotiated Purchase Orders, including responsibility to renegotiate purchase and to execute final Purchase-Order agreements.

B. List of Products Ordered in Advance:
   1. None.

1.8 OWNER-FURNISHED PRODUCTS

A. Owner will furnish products indicated. The Work includes providing support systems to receive Owner's equipment and making plumbing, mechanical, and electrical connections.
   1. Owner will arrange for and deliver Shop Drawings, Product Data, and Samples to Contractor.
   2. Owner will arrange and pay for delivery of Owner-furnished items according to Contractor's Construction Schedule.

3. After delivery, Owner will inspect delivered items for damage. Contractor shall be present for and assist in Owner's inspection.
4. If Owner-furnished items are damaged, defective, or missing, Owner will arrange for replacement.
5. Owner will arrange for manufacturer's field services and for delivery of manufacturer's warranties to Contractor.
6. Owner will furnish Contractor the earliest possible delivery date for Owner-furnished products. Using Owner-furnished earliest possible delivery dates, Contractor shall designate delivery dates of Owner-furnished items in Contractor's Construction Schedule.
7. Contractor shall review Shop Drawings, Product Data, and Samples and return them to Owner's Representative noting discrepancies or anticipated problems in use of product.
8. Contractor is responsible for receiving, unloading, and handling Owner-furnished items at Project site.
9. Contractor is responsible for protecting Owner-furnished items from damage during storage and handling, including damage from exposure to the elements.
10. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall repair or replace them.
11. Contractor shall install and otherwise incorporate Owner-furnished items into the Work.

B. Owner-Furnished Products:
1. No Owner-furnished products.

1.9 USE OF PREMISES

A. General: Contractor shall have full use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

B. General: Contractor shall have limited use of premises for construction operations as indicated on Drawings by the Contract limits.

C. Use of Site: Limit use of premises to areas under construction. Do not disturb portions of Project site beyond areas in which the Work is indicated.
1. Owner Occupancy: Allow for Owner occupancy of Project site and use by the public.
2. Driveways and Entrances: Keep driveways parking garage, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
   a. Schedule deliveries to minimize use of driveways and entrances.
   b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

D. Use of Existing Building: If the work involves construction in an existing building, maintain the existing building in a weather tight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.

1.10 OWNER'S OCCUPANCY REQUIREMENTS

A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits, unless otherwise indicated.
1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.

2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

B. Owner Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.
1. Obtain a Certificate of Occupancy from authorities having jurisdiction before Owner occupancy.
2. Before partial Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of building.
3. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of building.

1.11 WORK RESTRICTIONS

A. On-Site Work Hours: Work shall be generally performed inside the existing building during normal business working hours, Monday through Friday, except otherwise indicated.
1. Weekend Hours: **Contractor to notify Owner's representative 48hrs prior to scheduling.**
2. Early Morning Hours: **Contractor to notify Owner's representative 48hrs prior to scheduling.**
3. Hours for Utility Shutdowns: **Dependant on Scope of shutdown. Contractor to notify Owner's representative 2 weeks prior to scheduling.**
4. Hours for Core Drilling and other noise generating activities: **To be scheduled after regular work hours. Contractor to notify Owner's representative 48hrs prior to scheduling.**

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify Owner's Representative not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's Representative's written permission.

C. No smoking is permitted on MUN Campus.

1.12 INTERPRETATION OF DOCUMENTS

A. In the event of discrepancies or conflicts in interpreting the Plans (drawings) and Specifications,
1. Supplementary General Conditions take precedence over all other documents.
2. General Conditions take precedence over drawings and specifications.
3. Division 1 Sections take precedence over technical specification sections in other Divisions;
4. Legends and schedules take precedence over drawings and Specifications, whether they are bound with the specifications or integral with the drawings;
5. Specifications take precedence over all other drawings;

B. Plans (drawings) and Specifications are complementary. When work is shown or mentioned on the drawings but is not indicated in the Specifications, or when work is indicated in the Specifications but is not shown or mentioned on the Drawings, it shall nevertheless be included in the Contract.

1.13 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 50-division format and CSI/CSC's *MasterFormat* numbering system.
1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is

incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.

2. Division 01: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
   1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
   2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

C. The words *shall*, *shall be*, or *shall comply with*, depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.14 PROJECT MANAGEMENT AND COORDINATION

A. Coordination
   1. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

B. Administrative and supervisory personnel
   1. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.
   2. Maintain same superintendent on Project for duration of Project. Immediately notify Owner`s Representative if superintendent should become unavailable to work and immediately replace with an alternate person acceptable to the Owner`s Representative.

C. Project meetings
   1. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
   2. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Owner`s Representative, within three days of the meeting.
   3. Progress Meetings: Conduct progress meetings at monthly intervals. Coordinate dates of meetings with preparation of payment requests.

1.15 Requests For Interpretation (RFIs)
   1. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
      a. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
   2. Allow seven working days for Owner`s Representative's response for each RFI.
   3. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Owner`s Representative in writing within 10 days of receipt of the RFI response.

1.16 CONSTRUCTION PROGRESS DOCUMENTATION

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice of Award.

1. Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
2. At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

B. Reports
1. Daily Construction Reports: Prepare a daily construction report and submit to Owner`s Representative each week recording the following information concerning events at Project site:
   a. List of subcontractors at Project site.
   b. List of separate contractors at Project site.
   c. Approximate count of personnel at Project site.
   d. Equipment at Project site.
   e. Material deliveries.
   f. High and low temperatures and general weather conditions.
   g. Accidents.
   h. Meetings and significant decisions.
   i. Unusual events.
   j. Stoppages, delays, shortages, and losses.
   k. Meter readings and similar recordings.
   l. Emergency procedures.
   m. Orders and requests of authorities having jurisdiction.
   n. Change Orders received and implemented.
   o. Construction Change Directives received and implemented.
   p. Services connected and disconnected.
   q. Equipment or system tests and start-ups.
   r. Partial Completions and occupancies.
   s. Substantial Completions authorized.
2. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

1.17 PHOTOGRAPHIC DOCUMENTATION

A. Preconstruction Photographs: Before starting construction take, digital photographs of Project site and surrounding areas, including existing items to remain during construction, from different vantage points.

B. Periodic Construction Photographs: Take digital photographs weekly, with timing each month adjusted to coincide with the cut-off date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

C. E-mail or otherwise submit photos to Owner`s representative on monthly basis to coincide with the each Application for Payment.

1.18 SUBSTITUTION PROCEDURES

A. Substitution Requests: Submit PDF copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
   a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.

b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects with project names and addresses and names and addresses of Owner's Representatives and owners.
h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project.
j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

2. Owner's Representative's Action: If necessary, Owner's Representative will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Owner's Representative will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
a. Forms of Acceptance: Change Order, Construction Change Directive, or Owner's Representative's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Owner's Representative does not issue a decision on use of a proposed substitution within time allocated.

B. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
1. Conditions: Owner's Representative will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Owner's Representative will return requests without action, except to record noncompliance with these requirements:
a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.

h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

C. Substitutions for Convenience: Owner's Representative will consider requests for substitution if received within 60 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Owner's Representative.

1. Conditions: Owner's Representative will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Owner's Representative will return requests without action, except to record noncompliance with these requirements:
   a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume.
   b. Requested substitution does not require extensive revisions to the Contract Documents.
   c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
   d. Substitution request is fully documented and properly submitted.
   e. Requested substitution will not adversely affect Contractor's construction schedule.
   f. Requested substitution has received necessary approvals of authorities having jurisdiction.
   g. Requested substitution is compatible with other portions of the Work.
   h. Requested substitution has been coordinated with other portions of the Work.
   i. Requested substitution provides specified warranty.

1.19 SUBMITTAL PROCEDURES

A. Contractor's Review

1. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Owner`s Representative.

B. Preferred Size for Paper Submittals

1. Provide paper submittals on sheets no less than 8 ½ x 11" Whenever practical, provide paper submittals on sheet size not greater than 11 x 17". In all cases ease of readability of submittal content by Engineer shall take precedent over providing information on preferred sheet size.

C. Submittal Procedures

1. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
   a. Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
2. Submit three paper copies of each submittal, unless otherwise indicated. The Owner`s Representative will return no copies on any submittals but instead will e-mail a web link to a web site which will host PDFs of the reviewed documents.
3. Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Owner`s Representative's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
   a. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Owner`s Representative will advise Contractor when a submittal being processed must be delayed for coordination.
   b. Resubmittal Review: Allow 15 days for review of each resubmittal.

c. Sequential Review: Where sequential review of submittals by Owner`s Representative's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.

4. Owner`s Representative will review each submittal, make marks to indicate corrections or modifications required, and return it. Owner`s Representative will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action, as follows:
   a. REVIEWED – NO COMMENTS
   b. REVIEWED WITH COMMENTS. REVISE & RESUBMIT PRIOR TO START OF WROK.
   c. REVIEVED WITH COMMENTS. PROCEED WITH WORK SUBJECT TO IMPLEMENTATION OF NOTED COMMENTS, REVISE AND RESUBMIT.
   d. NOT ACCEPTED.

1.20 ENVIRONMENTAL PROCEDURES

A. Definitions
   1. Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.

B. Fires and burning of rubbish on site not permitted.

C. Store, handle, and dispose of hazardous materials in accordance with applicable federal and provincial laws, regulations, codes and guidelines. Store in location that will prevent spillage into the environment

D. Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
   1. Do not pump water containing suspended materials into waterways, sewer or drainage systems.

E. Protect any trees and plants on site and adjacent properties that are in immediate area of construction.
   1. Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
   2. Restrict tree removal to areas indicated or designated by Owner`s Representative.

F. Minimize stripping of topsoil and vegetation.

1.21 WILDLIFE PROTECTION

A. Should nests of migratory birds (Seagulls) be encountered during work, immediately notify Owner’s Representative for directives to be followed.
   1. Do not disturb nest site and neighbouring vegetation until nesting is completed.
   2. Minimize work immediately adjacent to such areas until nesting is completed.
   3. Protect these areas by following recommendations of Canadian Wildlife Service.

1.22 QUALITY REQUIREMENTS

A. Conflicting Requirements
   1. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Owner`s Representative for a decision before proceeding.
   2. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements,

indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Owner`s Representative for a decision before proceeding.

B. Quality Control
1. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
a. Payment for these services will be made by the Owner.
b. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
2. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
a. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
b. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
c. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

1.23 REGULATORY REQUIREMENTS

A. Perform Work in accordance with National Building Code of Canada (NBC) including all amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

B. Meet or exceed requirements of:
1. Contract documents.
2. Specified standards, codes, and referenced documents.

1.24 TEMPORARY FACILITIES AND CONTROLS

A. Temporary Utility Installation
1. General: Install temporary service or connect to existing service.
a. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
2. Sanitary Facilities: If the Owner has existing toilet facilities these may be used as long as these facilities are kept cleaned and maintained in a condition acceptable to the Owner. Otherwise provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
3. Water Service: If the Owner has existing water service it may be used as long as it does not impact on the Owner`s need. Otherwise install water service and distribution piping in sizes and pressures adequate for construction.
4. Sewers and Drainage: Provide temporary utilities as required to remove effluent lawfully.
5. Heating: Provide temporary heating as required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
6. Ventilation and Humidity Control: Provide temporary ventilation as required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements

being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

7. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
   a. Install electric power service overhead, unless otherwise indicated.
   b. If the Owner has an existing power source, the contractor may access it for temporary power provided it does not impact the Owner`s needs.
8. Lighting: Provide temporary lighting with local switching as required to provide adequate illumination for construction operations, observations, inspections, and traffic conditions.
9. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
10. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather tight enclosure for building exterior.
11. Tree and Plant Protection: Install temporary fencing as required to protect trees and plants intended to remain. Install protection outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
12. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner as required to prevent people and animals from easily entering site except by entrance gates.

B. Operation, Termination, and Removal
   1. Maintain facilities in good operating condition until removal.
   2. Remove each temporary facility when need for its service has ended.

1.25 TEMPORARY BARRIERS AND ENCLOSURES

A. Hoarding
   1. For work involving the excavation for new foundations or the erection of new structures outside of an enclosure, provide hoarding.

B. Weather Enclosures
   1. Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.

C. Dust Tight Screens
   1. Provide dust tight screens or insulated partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.

D. Protection Of Building Finishes
   1. Provide protection for finished and partially finished building finishes and equipment during performance of work.
   2. Provide necessary screens, covers, and hoardings.
   3. Be responsible for damage incurred due to lack of or improper protection.

1.26 PRODUCT REQUIREMENTS

A. Manufacturer's Instructions
   1. Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
   2. Notify Owner`s Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Owner`s Representative may establish course of action.

B. Quality
1. Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source, and quality of products provided.
2. Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
3. Should any dispute arise as to quality or fitness of products, decision rests strictly with Owner`s Representative based upon requirements of Contract Documents.
4. Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

C. Product Warranties
1. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

D. Product Selection Procedures
1. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.

1.27 EXECUTION

A. Materials
1. Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
2. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to the Owner`s Representative for the visual and functional performance of in-place materials.

B. Construction Layout
1. Where work involves construction outside of an existing footprint, engage a land surveyor to lay out the Work using accepted surveying practices.
2. On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified location certificate showing dimensions, locations, angles, and elevations of construction and site work.

C. Installation
1. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
    a. Make vertical work plumb and make horizontal work level.
    b. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
    c. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
    d. Maintain minimum headroom clearance of 2440 mm in occupied spaces and in unoccupied spaces.
2. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
3. Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

a. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Owner`s Representative.

D. Cutting And Patching
1. Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
a. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
2. Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

E. Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

F. Progress Cleaning
1. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
2. Site: Maintain Project site free of waste materials and debris.

G. Correction Of The Work
1. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
2. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
3. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

H. Protection Of Installed Construction
1. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
2. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1.28 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

A. Waste Reduction
1. Reduce construction waste during installation work. Undertake practices which will minimize waste and optimize full use of new materials on site, such as:
a. Use of a central cutting area to allow for easy access to off-cuts;
b. Use of off-cuts for blocking and bridging elsewhere.
c. Use of effective and strategically placed facilities on site for storage and staging of left-over or partially cut materials (such as gypsum board, plywood, ceiling tiles, insulation etc...) to allow for easy incorporation into

B. Material Source Separation Process
1. Perform demolition and removal of existing building components and equipment following a systematic deconstruction process.
2. Separate materials and equipment at source, carefully dismantling, labelling and stockpiling alike items for the following purposes:
a. Reinstallation into the work where indicated.
b. Salvaging reusable items not needed in project which Contractor may sell to other parties. Sale of such items not permitted on site.

c. Sending as many items as possible to locally available recycling facility.
d. Segregating remaining waste and debris into various individual waste categories for disposal in a *non-mixed state* as recommended by waste processing/landfill sites.

C. Disposal Requirements
1. Dispose of waste only at approved waste processing facility or landfill sites approved by authority having jurisdiction.

1.29 CLOSEOUT PROCEDURES

A. Substantial Completion
1. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
a. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
b. Advise Owner of pending insurance changeover requirements.
c. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
d. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
e. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
f. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
g. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
h. Complete start-up testing of systems.
i. Submit test/adjust/balance records.
j. Terminate and remove temporary facilities from Project site, along with mock-ups, construction tools, and similar elements.
k. Advise Owner of changeover in heat and other utilities.
l. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
m. Complete final cleaning requirements, including touch-up painting.
n. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
2. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Owner`s Representative will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner`s Representative will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Owner`s Representative, that must be completed or corrected before certificate will be issued.
3. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

B. Final Completion
1. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
a. Submit a final Application for Payment according to the General Conditions.
b. Submit certified copy of Owner`s Representative's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Owner`s Representative. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
c. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

d. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

2. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Owner`s Representative will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner`s Representative will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
   a. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

C. Final Cleaning
1. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
2. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1.30 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
   a. Project name.
   b. Date.
   c. Name of Owner's Representative.
   d. Name of Contractor.
   e. Page number.
4. Submit list of incomplete items in the following format:
   a. Three paper copies of product schedule or list, unless otherwise indicated.

1.31 WARRANTIES

A. Submittal Time: Submit written warranties on request of Owner's Representative for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 215-by-280-mm paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title *WARRANTIES*, Project name, and name of Contractor.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

1.32 OPERATION AND MAINTENANCE DATA

A. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

B. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

C. Manual Contents: Operations and maintenance manual content is specified in individual specification sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
1. Where applicable, clarify and update reviewed manual content to correspond to modifications and field conditions.

D. Format: Submit operations and maintenance manuals in the following format:
1. PDF electronic file. Assemble each manual into a composite electronically-indexed file. Submit on digital media acceptable to Owner's Representative.
a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically-linked operation and maintenance directory.
b. Enable inserted reviewer comments on draft submittals.

1.33 PROJECT RECORD DOCUMENTS

A. Record Drawings
1. Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.
2. Mark Record Prints to show the actual installation where installation varies from that shown originally.
3. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
a. Accurately record information in an understandable drawing technique.
b. Record data as soon as possible after obtaining it. Record and check the mark-up before enclosing concealed installations.
4. Content: Types of items requiring marking include, but are not limited to, the following:
a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations below first floor.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Change Directive.
k. Changes made following Owner`s Representative's written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.
5. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
6. Mark record sets with erasable, red-coloured pencil. Use other colours to distinguish between changes for different categories of the Work at same location.

7. Mark important additional information that was either shown schematically or omitted from original Drawings.
8. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
9. Submit record drawings to Owner`s Representative prior to requesting Substantial Completion inspection.

1.34 DEMOSTRATION AND TRAINING

A. Demonstrate start-up, operation, control, adjustment, troubleshooting, servicing, and maintenance of each item of maintenance of each item of equipment.

B. Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.

C. Review contents of manual in detail to explain all aspects of operation and maintenance.

D. Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instructions.

E. The GC shall be responsible for training coordination and scheduling and ultimately for ensuring that training is completed.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

.1 Owner has entered into one or more contracts with other contractors for one or more segregated parts of the Work.

.2 Owner may and intends to exercise the right to:
.1 Assign such contracts to this Contractor and
.2 Require this Contractor to accept such assignment and assume complete responsibility for such contracts upon such assignment.

.3 Types of items you will not find described in this Section:
.1 Specify Sections in subparagraphs below that contain requirements Contractor might expect to find in this Section but are specified in other Sections. Do not list Sections that are referenced elsewhere in the Section.
.2 Instruction to Bidders
.3 Assignment and Novation Agreement
.4 Summary of Work
.5 Cash Allowances

1.3 DEFINITIONS

.1 The following definitions shall apply to this Section:
.1 Assignable Contract: A contract entered into by the Owner and a contractor other than this Contractor, the terms and conditions of which provide for the assignment of such contract to this Contractor.
.2 Nominated Subcontractor: The contractor under the Assignable Contract who, upon assignment, will be a Subcontractor under this Contract.

1.4 ASSIGNABLE CONTRACTS AND NOMINATED SUBCONTRACTORS

.1 Following Assignable Contracts shall be assigned to and accepted by this Contractor:
.1 Assignable Contract: [ ]
.1 Nominated Subcontractor:
.2 [name]
.3 [address]
.4 [ ]
.5 [ ]
.6 Telephone: [ ]
.2 Assignable Contract: [ ]
.1 Nominated Subcontractor:
.2 [name]
.3 [address]
.4 [ ]
.5 [ ]
.6 Telephone: [ ]

1.5 CONTRACTUAL RELATIONSHIPS

.1 Each Nominated Subcontractor has entered into contract with Owner for performance of an Assignable Contract.

.2 This Contractor will enter into a contract with Owner which will include work covered by each Assignable Contract.

.3 Upon assignment of each Assignable Contract, contractual relationships shall be as specified in Division 01 Section *Assignment and Novation Agreement*. Each nominated Subcontractor shall become a Subcontractor to this Contractor.

1.6 ASSIGNMENT

.1 Owner intends to assign to this Contractor each Assignable Contract. This Contractor shall accept the assignment to it of each Assignable Contract.

.2 Owner may require such assignment to be effected by way of execution by the Contractor, the Nominated Subcontractor and the Owner of an assignment and novation agreement in respect of the Assignable Contract, in the form of Division 01 Section *Assignment and Novation Agreement*, in which event the Contractor shall so execute the said agreement.

.3 Assignment will take place upon commencement of this Contract or as soon thereafter as the Owner considers practicable.

.4 Owner will give this Contractor and Nominated Subcontractor at least 5 Days notice in advance of effective date of assignment.

1.7 DOCUMENTS

.1 The contract documents for each Assignable Contract are issued as bid documents for this Contract. Refer to Instructions to Bidders.

.2 Upon assignment, the contract documents for each Assignable Contract shall become Contract Documents for this Contract.

1.8 SUBCONTRACT SECURITY

.1 Each Nominated Subcontractor is required by the terms of the Assignable Contract to provide this Contractor, upon assignment, with security for performance of the Assignable Contract (the subcontract) [and security for payment of claims].

1.9 CONTRACT TIME AND SCHEDULING

.1 Refer to contract documents for each Assignable Contract for contract time provisions specified for Assignable Contracts.

.2 Incorporate each Assignable Contract into construction schedule for this Contract, to achieve Interim Acceptance of the Work, including work of Assignable Contracts, within the Contract Time specified in Division 01 Section *Summary of Work*.

.3 Coordinate scheduling with each Nominated Subcontractor.

.4 Contractor shall not be entitled to any extension of Contract Time on account of specified Assignable Contracts.

1.10 CONTRACT PRICE AND COSTS

.1 Cost of each Assignable Contract shall be included in Contract Price as a cash allowance, as specified in Division 01 Section *Cash Allowances*.

.2 Contractor shall include in original Contract price, separate from cash allowances, such sums, including overhead and profit, as he considers necessary to cover his costs in connection with each Assignable Contract specified herein.

.3 Contractor shall not be entitled to any extra payment on account of specified Assignable Contracts.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

.1 Types of items described in this Section:
  .1 Administrative and procedural requirements governing allowances.
    .1 Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to the Contractor. If necessary, additional requirements will be issued by Change Order.
  .2 Types of allowances include the following:
    .1 Revise list below to suit Project.
    .2 Lump-sum allowances.
    .3 Unit-cost allowances.
    .4 Quantity allowances.
    .5 Contingency allowances.
    .6 Testing and inspecting allowances.

.2 Types of items you will not find described in this Section:
  .1 Procedures for using unit prices.
  .2 Procedures governing the use of allowances for testing and inspecting.
  .3 Divisions 02 through 49 Sections for items of Work covered by allowances.

1.3 SELECTION AND PURCHASE

.1 At the earliest practical date after award of the Contract, advise Owner's Representative of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

.2 At Owner's Representative's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

.3 Purchase products and systems selected by Owner's Representative from the designated supplier.

1.4 SUBMITTALS

.1 Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

.2 Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

.3 Submit time sheets and other documentation to show labour time and cost for installation of allowance items that include installation as part of the allowance.

.4 Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

.1 Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 QUANTITY ALLOWANCES

.1 Allowance shall include cost to Contractor of specific products and materials selected by Owner's Representative under allowance and shall include freight, and delivery to Project site.

.2 Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labour, installation, overhead and profit, and similar costs related to products and materials selected by Owner's Representative under allowance shall be included as part of the Contract Sum and not part of the allowance.

.3 Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

.1 If requested by Owner's Representative, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.7 CONTINGENCY ALLOWANCES

.1 Use the contingency allowance only as directed by Owner's Representative for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

.2 Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, insurance, equipment rental, and similar costs.

.3 Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.

.4 At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

.5 The cash allowance shall not include HST.

1.8 TESTING AND INSPECTING ALLOWANCES

.1 Testing and inspecting allowances include the cost of engaging testing agencies, actual tests and inspections, and reporting results.

.2 The allowance does not include incidental labour required to assist the testing agency or costs for retesting if previous tests and inspections result in failure. The cost for incidental labour to assist the testing agency shall be included in the Contract Sum.

.3 At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to Owner by Change Order.

1.9 ADJUSTMENT OF ALLOWANCES

.1 Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If

applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

.1 Include installation costs in purchase amount only where indicated as part of the allowance.

.2 If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.

.3 Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

.2 Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labour, installation, overhead, and profit.

.1 Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.

.2 No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

.1 Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

.1 Control Integration Allowance:

.1 No Control Integration Allowances apply to this Work.

.2 Lump-Sum Allowance:

.1 No Lump Sum Allowances apply to this Work.

.3 Unit-Cost Allowance:

.1 No Unit Cost Allowances apply to this Work.

.4 Contingency Allowance:

.1 Include a contingency allowance of $7500 for use according to Owner's instructions.

.5 Testing and Inspection Allowance:

.1 No Testing and Inspection Allowance apply to this Work.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

.1 Types of items described in this Section:
  .1 Administrative and procedural requirements for handling and processing Contract modifications.

.2 Types of items you will not find described in this Section:
  .1 Administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

.1 Owner's Representative will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.4 CONTENPLATED CHANGE ORDERS

.1 Owner-Initiated Contemplated Change Order: Owner's Representative will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  .1 Proposal Requests issued by Owner's Representative are not instructions either to stop work in progress or to execute the proposed change.
  .2 Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    .1 Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    .2 Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
    .3 Include costs of labour and supervision directly attributable to the change.
    .4 Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
    .5 Quotation Form: Use forms acceptable to Owner's Representative.

.2 Contractor-Initiated Contemplated Change Order: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Owner's Representative.
  .1 Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
  .2 Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
  .3 Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
  .4 Include costs of labour and supervision directly attributable to the change.
  .5 Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

.6 Comply with requirements in Division 01 Section *Substitution Procedures* if the proposed change requires substitution of one product or system for product or system specified.

.7 Proposal Request Form: Use form acceptable to Owner's Representative.

1.5 ADMINISTRATIVE CHANGE ORDERS

.1 Allowance Adjustment: Refer to Division 01 Section *Allowances* for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

.2 Unit Price Adjustment: Refer to Division 01 Section *Unit Prices* for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit price work.

1.6 CHANGE ORDER PROCEDURES

.1 On Owner's approval of a Proposal Request, Owner's Representative will issue a Change Order for signatures of Owner and Contractor.

1.7 CONSTRUCTION CHANGE DIRECTIVE

.1 Construction Change Directive: Owner's Representative may issue a Construction Change Directiv,e as may be permitted in the Contract. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

.1 Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

.2 Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

.1 After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

.1 Types of items described in this Section:
  .1 Administrative and procedural requirements necessary to prepare and process Applications for Payment.

.2 Types of items you will not find described in this Section:
  .1 Procedural requirements governing the handling and processing of allowances.
  .2 Administrative procedures for handling changes to the contract.
  .3 Administrative requirements governing the preparation and submittal of the contractor's construction schedule.
  .4 Administrative requirements governing the preparation and submittal of the submittal schedule.
  .5 Administrative requirements governing submittal of cost breakdown information required for leed documentation.

1.3 DEFINITIONS

.1 Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

.1 Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
  .1 Correlate line items in the schedule of values with other required administrative forms and schedules, including the following:
    .1 Application for Payment forms with continuation sheets.
    .2 Submittal schedule.
    .3 Items required to be indicated as separate activities in Contractor's construction schedule.
  .2 Submit the schedule of values to Owner's Representative at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

.2 Format and Content: Use the Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
  .1 Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
    .1 Related Specification Section or Division.
    .2 Description of the Work.
    .3 Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
  .2 Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of Contract Sum.

.1 Include separate line items under principal subcontracts for sustainability documentation for LEED certification, if applicable, and other project closeout requirements in an amount totalling not less than five percent of the Contract Sum and subcontract amount.

.3 Round amounts to nearest whole dollar; total shall equal the Contract Sum.

.4 Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

.1 Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.

.5 Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.

.6 Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

.1 Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

.7 Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

.1 Each Application for Payment shall be consistent with previous applications and payments as certified by Owner's Representative and paid for by Owner.

.1 Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

.2 Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

.3 Application for Payment Forms: Use forms acceptable to Owner's Representative and Owner for Applications for Payment. Submit forms for approval with initial submittal of schedule of values.

.4 Application Preparation: Complete every entry on form. Execute by a person authorized to sign legal documents on behalf of Contractor. Owner's Representative will return incomplete applications without action.

.1 Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.

.2 Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.

.3 Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

.4 Indicate separate amounts for work being carried out under Owner-requested project acceleration.

.5 Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

.1 Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.

.2 Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.

.3 Provide summary documentation for stored materials indicating the following:

.1 Materials previously stored and included in previous Applications for Payment.

.2 Work completed for this Application utilizing previously stored materials.

.3 Additional materials stored with this Application.
.4 Total materials remaining stored, including materials with this Application.

.6 Transmittal: Submit two signed original copies of each Application for Payment to Owner's Representative by a method ensuring receipt within 24 hours. Provide current Letter of Good Standing from Work Place Health and Safety authority.
.1 Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

.7 Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
.1 List of subcontractors.
.2 Schedule of values.
.3 Contractor's construction schedule (preliminary if not final).
.4 Products list (preliminary if not final).
.5 Schedule of unit prices.
.6 Submittal schedule (preliminary if not final).
.7 List of Contractor's staff assignments.
.8 List of Contractor's principal consultants.
.9 Copies of building permits.
.10 Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
.11 Initial progress report.
.12 Report of preconstruction conference.

.8 Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
.1 Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.

.9 Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
.1 Evidence of completion of Project closeout requirements.
.2 Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
.3 Updated final statement, accounting for final changes to the Contract Sum.
.4 Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Types of items described in this Section:

1. Health and safety requirements for projects located in Newfoundland and Labrador.

1.3 REFERENCES

A. Code and standards referenced in this section refer to the latest edition thereof.

B. Canadian Standards Association (CSA)

1. CSA S269.1 Falsework for Construction Purposes.
2. CAN/CSA-Z259.1 Safety Belts and Lanyards.
3. CAN/CSA-Z259.10 Full body Harnesses.
4. CAN/CSA-Z259.11 Shock Absorbers for Personal Fall Arrest Systems.
5. CAN/CSA-Z259.2, Fall Arresting Devices, Personnel Lowering Devices and Lifelines.
6. FCC No. 301 Standard for Construction Operations.
7. CSA Z275.2 Occupational Safety Code for Diving Operations.
8. CSA Z275.4 Competency Standard for Divers Operations.

C. FCC No. 302 Standard for Welding and Cutting.

D. Transportation of Dangerous Goods Act Regulations.

E. Newfoundland Occupational Health and Safety Act, Amended

F. Consolidated Newfoundland and Regulations 1149 WMIS Regulations Under the Occupational Health and Safety Act

G. Consolidated Newfoundland and Regulations 1165 Occupational Health and Safety Regulations under the Occupational Health and Safety Act.

H. Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.

I. National Building Code of Canada.

1.4 SUBMITTALS

A. At least 10 (ten) working days prior to commencing any site work: submit to Owner's Representative copies of:

1. A complete Site Specific Hazard Assessment and Safety Program Table of Contents.
2. **Including requirments as outlined by the Department of Envrionmental Health & Safety, See APPENDIX A.**

B. Acceptance of the Project Health and Safety Hazard Assessment and Management Plan and other submitted documents by the Owner's Representative shall only be viewed as acknowledgement that the contractor has submitted the required documentation under this specification section.

C. Owner's Representative makes no representation and provides no warranty for the accuracy, completeness and legislative compliance of the Project Health and Safety Hazard Management Plan and other submitted documents by this acceptance.

D. Responsibility for errors and omissions in the Project Health and Safety Hazard Assessment and Management Plan and other submitted documents is not relieved by acceptance by Owner's Representative.

1.5 OCCUPATIONAL HEALTH AND SAFETY (PROJECT HEALTH AND SAFETY HAZARD ASSESSMENT AND MANAGEMENT PLANS)

A. Conduct operations in accordance with latest edition of the Newfoundland Occupational Health and Safety (OH&S) Act and Regulations.

B. Prepare a detailed Project Health and Safety Hazard Assessment and Management Plan for the Owner. Assessment shall identify, evaluate and control job specific hazards and the necessary control measures to be implemented for managing hazards.

C. Provide a copy of the Project Health and Safety Hazard Assessment and Management Plan upon request to Occupational Health and Safety Branch, Department of Labour, Province of Newfoundland and Labrador and the Owner.

D. The written Health and Safety Hazard Assessment and Management Plan shall incorporate the following:

1. A site-specific health and safety plan, refer to clause 1.6 Site-Specific Health and Safety Hazard Assessment and Management Plan of this section for requirements.
2. An organizational structure which shall establish the specific chain of command and specify the overall responsibilities of contractor's employees at the work site.
3. A comprehensive work plan which shall:

    a. define work tasks and objectives of site activities/operations and the logistics and resources required to reach these tasks and objectives
    b. establish personnel requirements for implementing the plan, and
    c. establish site specific training and notification requirements and schedules.

4. A personal protected equipment (PPE) Program which shall detail PPE:

    a. Selection criteria based on site hazards.
    b. Use, maintenance, inspection and storage requirements and procedures.

c. Decontamination and disposal procedures.
d. Inspection procedures prior to during and after use, and other appropriate medical considerations.
e. Limitations during temperature extremes, heat stress and other appropriate medical consideration.

5. An emergency response procedure, refer to Clause 1.7 Supervision and Emergency Response Procedure of this section for requirements.
6. A hazard communication program for informing workers, visitors and individuals outside of the work area as required.
7. A diving program which shall contain standard operating procedures to be followed in the diving operation.
8. A health and safety training program.
9. General safety rules.

E. Periodically review and modify as required each component of the Project Health and Safety Hazard Assessment and Management Plan when a new hazard is identified during completion of work and when an error or omission is identified in any part of the Project Health and Safety Hazard Assessment and Management Plan.

F. Implement all requirements of the Project Health and Safety Hazard Assessment and Management Plan.

1. Ensure that every person entering the project site is informed of requirements under the Project Health and Safety Hazard Assessment and Management Plan.
2. Take all necessary measures to immediately implement any engineering controls, administrative contacts, personal protective equipment required or termination of work procedures to ensure compliance with the Project Health and Safety Hazard Assessment and Management Plan.

1.6 SITE SPECIFIC HEALTH AND SAFETY PLAN

A. Prepare a detailed site Specific Project Health and Safety Plan which shall:

1. Contain certain hazard assessment results.
2. Identify engineering and administrative demonstrative controls (work-practices and procedures) to be implemented for managing identified and potential hazards, and comply with applicable federal and provincial legislation and more stringent requirements that have been specified in these specifications.

B. Review for completeness the hazard assessment results immediately prior to commencing work, when a new hazard is identified during completion of work and when an error or omission is identified.

1. Be solely responsible for investigating, evaluation and managing any report of actual or potential hazards.
2. Retain copies of all completed hazard assessments at the project site and make available to the Owner's Representative immediately upon request.

1.7 SUPERVISION AND EMERGENCY RESCUE PROCEDURE

A. Carry out work under the direct supervision of competent persons responsible for safety by ensuring the work complies with the appropriate section of OH&S Act and Regulations

B. Assign a sufficient number of supervisory personnel to the work site.

C. Provide a suitable means of communications for workers required to work alone.

D. Develop an emergency rescue plan for the job site and ensure that supervisors and workers are trained in the emergency rescue plan.

E. The emergency response plan shall address, as a minimum:

1. Pre-emergency planning.
2. Personnel roles, lines of authority and communication.
3. Emergency recognition and prevention.
4. Safe distances and places of refuge.
5. Site security and control
6. Evacuation routes and procedures
7. Decontamination procedures which are not covered by the site specific safety and health plan.
8. Emergency medical treatment and first aid.
9. Emergency alarm, notification and response procedures including procedures for reporting incidents to local, provincial and federal government departments.
10. PPE and emergency equipment.
11. Procedures for handling emergency incidents.
12. Site specific emergency response training requirements and schedules.
13. For diving operation, include procedures for:

    a. Managing deteriorating environmental conditions.
    b. Managing unexpected weather or sea-state condition.
    c. Evacuation of diver(s) under pressures greater that atmospheric pressure.
    d. In-water emergency transfers.
    e. Managing failing of equipment below the surface that impairs the ability of a diver to complete a dive.
    f. Managing failure of any major component of diving plant or equipment.
    g. Emergency signalling between divers involved in the diving program and between the diver(s) and the attendants using umbilical, tethers or other suitable methods.
    h. Mobilizing stand-by divers.
    i. Mobilizing crafts, stand-by boats and any other devices to be used for rescue.
    j. Contacting evacuation, rescue, treatment facilities and medical services that will be used in the diving program.
    k. Operation of emergency power and lighting facilities.

F. The emergency response procedures shall be rehearsed regularly as part of the overall training program.

G. Provide adequate first aid facilities for the jobsite and ensure that a minimum number of workers are trained in first aid in accordance with the First Aid Regulations.

1.8 CONTRACTORS SAFETY OFFICER

A. The contractor's Safety Officer will be solely responsible for the implementation and monitoring of the Project Health and Safety Hazard Assessment and Management Plan, and will have the authority to implement health and safety changes as directed by the Owner's Representative. The Safety Officer shall have as a minimum:

1. Completed training in hazardous occurrence management and response/protocols.
2. Completed training in the use, maintenance of fall protection systems.
3. Completed training in the design and construction of scaffolding.
4. Completed training in confined space entry protocols and techniques.
5. Completed training in First Aid.

6. Have working knowledge of occupational safety and health regulations.
7. Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
8. Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
9. Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.9 HEALTH AND SAFETY COMMITTEE

A. Establish an Occupational Health and Safety Committee where ten or more workers are employed on the job site as per the OH&S Act and Regulations.Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

C. Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.10 RESPONSIBILITY

A. Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

B. Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.11 UNFORESEEN HAZARDS

A. Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction. Advise Owner’s Representative verbally and in writing.

1.12 INSTRUCTION AND TRAINING

A. Workers shall not participate in or supervise any activity on the work site until they have been trained to a level required by this job function and responsibility. Training shall as a minimum thoroughly cover the following:

1. Federal and Provincial Health and Safety Legislation requirements including roles and responsibilities of workers and person(s) responsible for implementing, monitoring and enforcing health and safety requirements.
2. Safety and health hazards associated with working on a contaminated site including recognition of symptoms and signs which might indicate over exposure to hazards.
3. Limitations, use, maintenance and disinfection-decontamination of personal protective equipment associated with completing work.
4. Limitations, use, maintenance and care of engineering controls and equipment.

5. Limitations and use of emergency notifications and response equipment including emergency response protocol.
6. Work practices and procedures to minimize the risk of an accident and hazardous occurrence from exposure to a hazard.

B. Provide and maintain training of workers, as required, by Federal and Provincial legislation.

C. Provide copies of all safety training certificates, upon request, to Owner's Representative for review, and to be maintained on the worker when they enter the work site.

D. Authorized visitors shall not access the work site until they have been:

1. Notified of the names of persons responsible for implementing, monitoring and enforcing the Health and Safety Hazard Assessment and Management Plan.
2. Briefed on safety and health hazards present on the site.
3. Instructed in the proper use and limitations of personal protective equipment.
4. Briefed as the emergency response protocol including notification and evacuation process.
5. Informed of practices and procedures to minimize risks from hazards and applicable to activities performed by visitors.

1.13 CONSTRUCTION SAFETY MEASURES

A. Observe construction safety measures of National Building Code, latest edition, Provincial Government, OH&S Act and Regulations, Workplace Health and Safety and Compensation Commission and Municipal Authority provided that in any case of conflict or discrepancy more stringent requirements shall apply.

B. Administer the project in a manner that will ensure, at all times, full compliance with Federal and Provincial Acts, regulations and applicable safety codes and the site Health and Safety Hazard Assessment and Management Plan.

C. Provide Owner's Representative with copies of all orders, directions and any other documentation, issued by the Provincial Department of Government Services, Occupational Health and Safety branch immediately after receipt.

1.14 POSTING OF DOCUMENTS

A. Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province and authority having jurisdiction, and in consultation with Owner's Representative.

1.15 HEALTH AND SAFETY MONITORING

A. Periodic inspections of the contractor's work may be carried out by the Owner's Representative to maintain compliance with the Health and Safety Program. Inspections will include visual inspections as well as testing and sampling as required.

B. The contractor shall be responsible for any and all costs associated with delays as a result of contractor's failure to comply with the requirements outlined in this section.

1.16 CORRECTION OF NON-COMPLIANCE

A. Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Owner's Representative.

B. Provide Owner's Representative with written report of action taken to correct non-compliance of health and safety issues identified.

C. Owner's Representative may stop work if non-compliance of health and safety regulations is not corrected.

1.17 WHMIS

A. Ensure that all controlled products are in accordance with the Workplace Hazardous Materials Information System (WHMIS) Regulations and Chemical Substances of the OH&S Act and Regulations regarding use, handling, labelling, storage, and disposal of hazardous materials.

B. Deliver copies of relevant (Material) Safety Data Sheets (SDS) to job site and the Owner's Representative. The SDS must be acceptable to Labour Canada and Health and Welfare Canada for all controlled products that will be used in the performance of this work.

C. Train workers required to use or work in close proximity to controlled products as per OH&S Act and Regulations.

D. Label controlled products at jobsite as per OH&S and Regulations.

E. Provide appropriate emergency facilities as specified in the SDS where workers might be exposed to contact with chemicals, e.g. eye-wash facilities, emergency shower.

1. Workers to be trained in use of such emergency equipment.

F. Contractor shall provide appropriate personal protective equipment as specified in the SDS where workers are required to use controlled products.

1. Properly fit workers for personal protective equipment
2. Train workers in care, use and maintenance of personal protective equipment.

G. No controlled products are to be brought on-site without prior approved SDS.

H. The SDS are to remain on site at all times.

1.18 OVERLOADING

A. Ensure no part of work or associated equipment is subjected to loading that will endanger its safety or will cause permanent deformation.

1.19 FALSEWORK

A. Design and construct falsework in accordance with CSA S269.1.

1.20 SCAFFOLDING

A. Design, erect and maintain scaffolding in accordance with CSA S269.2 and Sections 91-97 of the OH&S Act and Regulations.

B. Ensure that fall-restraint or fall-arrest devices are used by all workers working at elevations greater than 3.05 metres above grade or floor level in accordance with CSA Z259.

1.21 PERSONAL PROTECTIVE EQUIPMENT

A. Ensure workers on the jobsite use personal protective equipment appropriate to the hazards identified in the Hazard Assessment and Management Plan and those workers are trained in the proper care, use, and maintenance of such equipment.

B. PPE selections shall be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the site, task-specific conditions, duration and hazards and potential hazards identified on site.

C. Provide workers and visitors to the site with proper respiratory protection equipment.

1. No work shall be performed in an area where an airborne contaminant exceeds one half (½) the IDLH concentration.
2. Respiratory protection shall be provided in accordance with the requirements of the Occupational Health and Safety Branch, Department of Labour of the Province of Newfoundland and Labrador and these specifications.
3. Establish, implement and maintain a respirator inspection and maintenance program.
4. Copies of all respirator owners' maintenance manuals shall be kept at all times at the contractor's site office.

D. Provide and maintain a supply of dermal protection equipment to allow visitors and all workers proper dermal protection.

1. Dermal protection shall be sufficient to act as a protective barrier between the skin and an airborne contaminant or hazardous material. Dermal protection shall also be provided for all physical hazards.
2. Dermal protection equipment shall not be used after exceeding 75% of the break through time. The break through time shall be based on the contaminant which requires the least amount of time to break through the protective equipment
3. Copies of all dermal protection user specifications, owners and maintenance manuals shall be kept at all times at the contractor's site office.
4. Establish, implement and maintain air inspection program to ensure proper dermal protection in accordance with CSA, NIOSH, U.S. EPA and manufacturer's requirements.

E. Provide all workers and up to two (2) visitors to the site with proper hearing protection. Workers and visitors shall not be exposed to noise levels greater than 85 dB (A) over an eight hour shift without proper hearing protection.

F. Provide all workers and up to two (2) visitors to the site with CSA approved eye protection sufficient to act as a protective barrier between the eye and airborne contaminants, hazardous materials and physical hazard.

G. Provide workers and up to two (2) visitors to the site with CSA approved hard hats.

1.22 EXCAVATION SAFETY

A. Protect excavations more than 1.25 metres deep against cave-ins or wall collapse by side wall sloping to the appropriate angle of repose, an engineered shoring/sheathing system or an approved trench box.

1. Provide a ladder which can extend from the bottom of the excavation to at least 0.91 metres above the top of the excavation.

B. Ensure that all excavations less than 1.25 metres deep are effectively protected when hazardous ground movement may be expected.

C. Design trench boxes, certified by a registered Professional Engineer, and fabricated by a reputable manufacturer. Provide the manufacturer's Depth Certificate Statement permanently affixed. Use trench boxes in strict accordance with manufacturer's instructions and depth certification data.

D. For excavations deeper than six (6) metres, provide a certificate from a registered Professional Engineer stating that the protection methods proposed have been properly designed in accordance with accepted engineering practice. The engineer's certificate shall verify that the trench boxes, if used, are properly designed and constructed to suit the depth and soil conditions.

1. Ensure that the superintendent and every crew chief, foreperson and lead hand engaged in trenching operations or working in trenches have in his/her possession a copy of the Department of Labour's "Trench Excavation Safety Guide".

1.23 CONFINED SPACE WORK

A. Comply with requirements of Canada Occupational Safety and Health Regulations, Part XI and Consolidated Regulations Newfoundland and Labrador (CRNL) OH&S 1165/96.

B. Provide approved air monitoring equipment where workers are working in confined spaces and ensure any test equipment to be used is calibrated, in good working order and used by trained persons.

C. Develop a confined space entry program specific to the nature of work performed and in accordance with OH&S Act and Regulations and ensure supervisors and workers are trained in the confined space entry program.

1. Ensure that personal protective equipment and emergency rescue equipment appropriate to the nature of the work being performed is provided and used.

D. Provide and maintain training of workers, as required by the Federal and Provincial Legislation.

E. Provide Owner's Representative with a copy of an "Entry Permit" for each entry into the confined space to ensure compliance with Federal and Provincial Legislation.

1.24 HAZARDOUS MATERIALS

A. Should material resembling hazardous materials (asbestos/mould) be encountered during the execution of work and notify Owner's Representative. Do not proceed until written instructions have been received from Owner's Representative.

B. Unless otherwise noted, for hazardous materials abatement and repair, employ the services of a recognized Environmental Consultant to provide all air monitoring and testing services for regulatory requirements.

1.25 HEAVY EQUIPMENT

A. Ensure mobile equipment used on jobsite is of the type specified in OH&S Act and Regulations fitted with a Roll Over Protective (ROP) Structure.

B. Provide certificate of training in Power Line Hazards for operators of heavy equipment.

C. Obtain written clearance from the power utility where equipment is used in close proximity to (within 5.5 metres) overhead or underground power lines.

D. Equip cranes with:

1. A mechanism which will effectively prevent the hook assembly from running into the top boom pulley.
2. A legible load chart.
3. A maintenance log book.

1.26 WORK STOPPAGE

A. Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations of Work.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

APPENDIX "A" Contractor Safety Management Element – November 2018

Contractor Safety Management Element

November 2018

Table of Contents

1.0 Purpose

This element establishes the requirements for the administration and monitoring of contractor health and safety programs and activities at Memorial University. These measures shall ensure that contractors understand their collective responsibility with respect to the Occupational Health & Safety Act and Regulations, Memorial University policy and this element.

2.0 Scope

This procedure shall apply to all work done for Memorial University of Newfoundland with respect to the provision of services as outlined below. Memorial University reserves the right to exempt a Contractor from this element, in whole or in part, based upon an evaluation of the risk of the work being conducted. This evaluation must comply with the hazard identification and risk management element.

3.0 Definitions

Act: Newfoundland & Labrador Occupational Health & Safety Act, latest edition.

Contract: A documented agreement between Memorial University and a contractor.

Contractor: The principal contractor, person, partnership, or corporation bound to execute the work under the contract and defined as such in the agreement is responsible for the supervision of the work so as to ensure the work is carried out in accordance with the contract.

Project Management Team: The group assigned by the University to act on behalf of the owner with respect to the execution of Contractor work.

Principal Contractor: The person primarily responsible for the carrying out of a contract.

Regulations: Newfoundland & Labrador Occupational Health & Safety Regulations, latest edition.

Subcontractor: A person, firm or corporation having a direct contract with the Contractor or subcontractor(s) to perform a part or parts of the work included in the contract, or to supply products worked to a special design according to the contract documents, but does not include one who merely supplies products not so worked.

Owner: The Owner, Engineer/Architect are the persons, firms or corporation identified as such in the Contract. The term Owner, Engineer/Architect means, respectively, each of the Owner, Engineer/Architect and their authorized representatives as designated by each such party in writing.

Work: The services and job procedure completion that is described in the contract.

4.0 Roles and Responsibilities

4.1 Project Management Team

Will monitor the Contractor's performance for health and safety compliance. Monitoring activities may include but are not limited to:

- planned and unplanned workplace inspections;
- attendance of meetings;
- communications of safety related issues and topics, as deemed necessary;
- review of contractor records, inspections, work practices and documentation; and
- complete audits to verify that contractors and subcontractors are meeting their legislative, procedural and contractual responsibilities.

4.2 Contractors

Will comply with applicable Federal and Provincial legislation and applicable MUN safety procedures. Contractor responsibilities include but not limited to:

- report all incidents immediately to the required University project team followed by a written incident report within 24 hours;
- be responsible for the safety of subcontractors including those not under their employ;
- stop work if the conditions are such that work cannot be performed safely;
- perform evaluation, monitoring of the workplace to identify potential hazards and associated risks and ensure corrective actions are implemented;
- ensure daily task specific hazard assessments are completed; and
- maintain the accountability of persons responsible for the reporting and correction of hazards.

5.0 Procedure

5.1 Considerations prior to signing of contract

5.1.1 Prior to signing of contract, the preferred General Contractor shall provide proof of compliance with 5.2.1.

Within seven (7) calendar days after a pre-signing start up meeting the General Contractor shall provide proof of compliance of themselves and their subcontractors with 5.2.1 as well as provide the information requested in Section 5.2.2(a) (b).

5.2 Requirements

5.2.1 All Contractors, and their Subcontractors, shall be required to submit confirmation of a current third party occupational health and safety program certification (Letter of Assurance). These may include, but not be limited to, Certificate of Recognition (COR), OHSAS 18001, and CSA Z.1000.

5.2.2 Contractors shall also provide the following:

(a) health and safety policy statement;

(b) safety program table of contents; and

(c) site hazard assessment;

The hazard assessment shall be updated by the General Contractor and re-submitted whenever the conditions, work practices or work forces change to the extent that new hazards can be identified.

5.2.3 In lieu of a Subcontractors 3rd party program, Contractors shall be required to integrate the Subcontractor(s) into the Contractors program and provide proof of same.

5.2.4 Memorial reserves the right to request and audit the full safety program of Contractors and Subcontractors and their associated documentation. This documentation may include, but not be limited to the following:

(a) safety program and/or manual

(b) applicable documented safe work practices;

(c) inspection reports and schedules;

(d) required employee safety training certifications and qualifications; and

(e) updated list of OHS Committee and/or a worker health and safety representative, or workplace health and safety designate.

Request for submission shall be complied with within 7 calendar days of a written request from Memorial's Environmental Health and Safety unit.

5.2.5 Memorial reserves the right to:

(1) Reject any Contractor that fails to meet the requirements or schedules outlined herein;

(2) The University reserves the right to stop any work or portion of work where the risk presents an immediate danger.

5.3 Schedule of Submissions

5.3.1 General Contractors and their sub-contractors who have complied with 5.1.1 will be permitted to commence physical work on the site however no work shall be performed by the General Contractor, their sub-contractors until such a time as they comply with 5.1.1.

6.0 Post-Contract Evaluation

The Project Management Team will determine the extent of the evaluation of the Contractor's safety performance at the completion of the contract. This evaluation will be conducted by way of a standard contractor safety evaluation form and will be supported by objective evidence documented during the term of the Contract. The records of the evaluation must be retained with the project owner.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

.1 General: Basic Contract definitions are included in the Conditions of the Contract.

.2 *Approved*: When used to convey Owner's Representative's action on Contractor's submittals, applications, and requests, *approved* is limited to Owner's Representative's duties and responsibilities as stated in the Conditions of the Contract.

.3 *Directed*: A command or instruction by Owner's Representative. Other terms including *requested*, *authorized*, *selected*, *required*, and *permitted* have the same meaning as *directed*.

.4 *Indicated*: Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including *shown*, *noted*, *scheduled*, and *specified* have the same meaning as *indicated*.

.5 *Regulations*: Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

.6 *Furnish*: Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

.7 *Install*: Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

.8 *Provide*: Furnish and install, complete and ready for the intended use.

.9 *Project Site*: Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

.1 Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

.2 Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

.3 Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
.1 Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

.1 Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

.1 AA - Aluminium Association, 900 19th Street N.W., Washington, D.C., U.S.A. 20006 URL http://www.aluminum.org

.2 AASHTO - American Association of State Highway and Transportation Officials, 444 N Capitol Street N.W., Suite 249, Washington, D.C., U.S.A. 20001 URL http://www.aashto.org

.3 ACEC Association of Consulting Engineers of Canada,130 Albert Street, Ottawa, ON. K1P 5G4 URL http://www.acec.ca .

.4 AHA - American Hardboard Association, 1210W Northwest Hwy., Palatine, Illinois, U.S.A. 60067 URL : http://www.areat.com

.5 AITC - American Institute of Timber Construction, 7012 S. Revere Parkway, Suite 140, Englewood, Colorado, U.S.A. 80112 URL http://www.aitc-glulam.org

.6 AMCA - Air Movement and Control Association Inc., 30 West University Drive, Arlington Heights, Illinois, U.S.A. 60004-1893 URL http://www.amca.org

.7 ANSI - American National Standards Institute, 11 West 42nd Street, New York, New York, U.S.A. 10036 URL http://www.ansi.org

.8 APA - The Engineered Wood Association, P.O. Box 11700, Tacoma, Washington, U.S.A. 98411-0700 URL http://www.apawood.org

.9 API - American Petroleum Institute,1220 L St. Northwest, Washington, D.C., U.S.A. 20005-4070 URL http://www.api.org

.10 ARI - Air Conditioning and Refrigeration Institute, 4301 North Fairfax Drive, Suite 425, Arlington, Virginia, U.S.A. 22203 URL http://www.ari.org

.11 ASHRAE - American Society of Heating, Refrigeration and Air-Conditioning Engineers, 1791 Tullie Circle NE, Atlanta, Georgia, U.S.A. 30329 URL http://www.ashrae.org

.12 ASME - American Society of Mechanical Engineers, United Engineering Centre, Three Park Avenue, New York, New York, U.S.A. 10016-5990 URL http://www.asme.org

.13 ASPT Association for Asphalt Paving Technologists, 400 Selby Avenue, Suite 1, St. Paul, MN 55102 U.S.A. URL http://www.asphalt.org

.14 ASTM - American Society for Testing and Materials, 100 Barr Harbor Drive West, Conshohocken, Pennsylvania 19428-2959 URL http://www.astm.org

.15 AWCI - Association of the Wall and Ceiling Industries International, 803 West Broad Street, Suite 600, Falls Church, UA, U.S.A. 22046 URL http://www.awci.org

.16 AWMAC - Architectural Woodwork Manufacturers Association of Canada, 516 4 Street West, High River, Alberta T1V 1B6 URL http://www.awmac.com

.17 AWPA - American Wire Producer's Association, 6232 Roudsby, Alexandria, VA U.S.A. 22315-5285 URL http://www.awpa.org

.18 AWPA - American Wood Preservers' Association, P.O. Box 5690, Grandbury Texas, U.S.A. 76049-0690 URL http://www.awap.com

.19 AWS - American Welding Society, 550 N.W. LeJeune Road, Miami, Florida U.S.A. 33126 URL http://www.amweld.org

.20 AWWA - American Water Works Association, 6666 W. Quincy Avenue, Denver, Colorado, U.S.A. 80235 URL http://www.awwa.org

.21 CCA Canadian Construction Association,75 Albert St., Suite 400 Ottawa, Ontario, K1P 5E7 URL http://www.cca-acc.com

.22 CCDC Canadian Construction Documents Committee, Refer to ACEC, CCA, CSC or RAIC

.23 CITC Canadian Institute of Timber Construction, 200 Cooper Street, Ottawa, Ontario K2P 0G1

.24 CFFM - Canadian Forces Fire Marshal, 101 Colonel By Drive, 8NT MGen George R. Pearkes Bldg., Ottawa, Ontario K1A 0K2

.25 CGA - Canadian Gas Association, 20 Eglinton Avenue West, Suite 1305, Toronto, Ontario M4R 1K8 URL http://www.cga.ca

.26 CGSB - Canadian General Standards Board, Place du Portage, Phase III, 6B1, 11 Laurier Street, Hull, Quebec K1A 1G6 URL http://w3.pwgsc.gc.ca/cgsb

.27 CISC - Canadian Institute of Steel Construction, 201 Consumers Road, Suite 300, Willowdale, Ontario M2J 4G8 URL http://www.buildingweb.com/CISC

.28 CLA - Canadian Lumbermen's Association, 27 Goulburn Avenue, Ottawa, Ontario, K1N 8C7 URL http://www.cla.ca.ca

.29 CNLA - Canadian Nursery Landscape Association, RR #4, Stn. Main, 7856 Fifth Street, Milton, Ontario. L9T 2X8 URL http://www.canadanursery.com

.30 CRCA - Canadian Roofing Contractors Association, 155 Queen Street, Suite 130C, Ottawa, Ontario K1P 6L1 URL http://www.roofingcanada.com

.31 CSA - Canadian Standards Association International, 178 Rexdale Blvd., Toronto, Ontario M9W 1R3 URL http://www.csa-international.org

.32 CSC - Construction Specifications Canada, 100 Lombard Street, Suite 200, Toronto, Ontario M5C 1M3 URL http://www.csc-dcc.ca

.33 CSDFMA - Canadian Steel Door and Frame Manufacturing Association One Yonge Street, Suite 1400, Toronto, Ontario M5E 1J9

.34 CSPI - Corrugated Steel Pipe Institute, 201 Consumers Road, Suite 306, Willowdale, Ontario M2J 4G8

.35 CSSBI - Canadian Sheet Steel Building Institute, 652 Bishop St. N., Unit 2A, Cambridge, Ontario N3H 4V6 URL http://www.cssbi.ca

.36 CUFCA Canadian Urethane Foam Contractor's Association

.37 CWC - Canadian Wood Council, 1400 Blair Place, Suite 210, Ottawa, Ontario K1J 9B8 URL http://www.cwc.ca

.38 EC - Environment Canada, Conservation and Protection, Ottawa, Ontario KIA 0H3 URL http://www.ec.gc.ca

.39 EEMAC - Electrical and Electronic Manufacturers' Association of Canada, 5800 Explorer Drive, Suite 200, Mississauga, Ontario L4W 5K9 URL http://www.electrofed.ca

.40 EIMA EIFS Industry Manufacturer's Association, 3000 Corporate Center Drive, Suite 270, Morrow, Georgia U.S.A. 30260 URL http://www.eifsfacts.com

.41 FCC - Fire Commissioner of Canada, Place du Portage, Phase II, 165 rue Hotel de Ville, Hull Quebec K1A 0J2 URL http://www.hrdc-drhc.gc.ca

.42 IEEE - Institute of Electrical and Electronics Engineers, 345 East 47th Street, New York, New York U.S.A. 10017 URL http://www.ieee.org

.43 MPI - The Master Painters Institute, 4090 Graveley Street, Burnaby, BC V5C 3T6 URL http://www.paintinfo.com

.44 MSS - Manufacturers Standardization Society of the Valve and Fittings Industry, 127 Park Street, N.E., Vienna, Virginia U.S.A.22180

.45 NAAMM - National Association of Architectural Metal Manufacturers, 8 South Michigan Avenue, Suite 1000, Chicago, Illinois U.S.A. 60603 URL http://www.naamm.org

.46 NABA - National Air Barrier Association, 400-283 Bannatyne Avenue, Winnipeg, Manitoba R3B 3B2

.47 NEMA - National Electrical Manufacturers Association,1300 N. 17th Street, Suite 1847, Rosslyn, Virginia 22209 URL http://www.nema.org

.48 NFPA - National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101Quincy, Massachusetts, U.S.A. 02269-9101 URL http://www.nfpa.org

.49 NFSA - National Fire Sprinkler Association, 40 Jon Barrett Road, P.O. Box 1000, Patterson, New York, U.S.A. 12563 URL http://www.nfsa.org

.50 NHLA - National Hardwood Lumber Association, P.O. Box 34518, Memphis, Tennessee, U.S.A 38184-0518 URL http://www.natlhardwood.org

.51 NLGA - National Lumber Grades Authority, 406 First Capital Place, New Westminster, B.C. V3M 6G2

.52 NRC - National Research Council, Montreal Road, Ottawa, Ontario K1A 0S2 URL http://www.nrc.gc.ca

.53 NSPE National Society of Professional Engineers, 1420 King Street, Alexandria, VA U.S.A. 22314-2794 URL http://www.nspe.org
.54 PCI - Prestressed Concrete Institute, 209 W. Jackson Blvd., Suite 500, Chicago, Illinois, U.S.A. 60606 URL http://www.pci.org
.55 PEI - Porcelain Enamel Institute, P.O. Box 158541, 4004 Hillsboro Pike, Suite 224-B Nashville, TN, U.S.A. 37215 URL http://www.porecelainenamel.com
.56 QPL - Qualification Program List, c/o Canadian General Standards Board, Place du Portage, Phase III, 6B1, 11 Laurier Street, Hull, Quebec K1A 1G6 URL http://www.pwgsc.gc.ca/cgsb
.57 RAIC Royal Architectural Institute of Canada, 55 Murray Street, Suite 330, Ottawa, Ontario, K1N 5M3 URL http://www.raic.org
.58 SCC - Standards Council of Canada, 200 Albert Street, Suite 2000, Ottawa, Ontario K1P 6N7 URL http://www.scc.ca
.59 SSPC - The Society for Protective Coatings, 40 24th Street, Pittsburgh, Pennsylvania 15222-4656 URL http://www.sspc.org
.60 TPI - Truss Plate Institute, 583 D'Onofrio Drive, Suite 200, Madison, WI, U.S.A. 53719 URL http://www.tpinst.org
.61 TTMAC - Terrazzo, Tile and Marble Association of Canada, 30 Capston Gate, Unit 5 Concord, Ontario L4K 3E8 URL http://www.ttmac.com
.62 UL - Underwriters' Laboratories, 333 Pfingsten Road, Northbrook, Illinois, U.S.A. 60062 URL http://www.ul.com
.63 ULC - Underwriters' Laboratories of Canada, 7 Crouse Road, Toronto, Ontario M1R 3A9 URL http://www.ulc.ca

.2 Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
.1 NBCC – National Building Code of Canada
.2 NFCC – National Fire Code of Canada
.3 NFPA 101 - National Fire protection Association Life Safety Code

.3 Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
.1 PWGSC – Public Works and Government Services Canada
.2 DND – Department of National Defence.

.4 Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
.1 -

.5 Provincial Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
.1 -

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

.2 OPR and BoD documentation are included by reference for information only.

1.2 SUMMARY

.1 Types of items described in this Section:
  .1 General requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components.

.2 Types of items you will not find described in this Section:
  .1 Commissioning process activities for building exterior enclosure, roof, and foundation systems, assemblies, equipment, and components.
  .2 Commissioning process activities for building interiors construction, stairways, and finish systems and assemblies.
  .3 Commissioning process activities for conveying systems, assemblies, equipment, and components.
  .4 Commissioning process activities for fire-suppression systems, assemblies, equipment, and components.
  .5 Commissioning process activities for plumbing systems, assemblies, equipment, and components.
  .6 Commissioning process activities for HVAC systems, assemblies, equipment, and components.
  .7 Commissioning process activities for integrated automation systems, assemblies, equipment, and components.
  .8 Commissioning process activities for electrical systems, assemblies, equipment, and components.
  .9 Commissioning process activities for communications systems, assemblies, equipment, and components.
  .10 Commissioning process activities for electronic safety and security systems, assemblies, equipment, and components.

1.3 DEFINITIONS

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

.2 Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

.3 CxA: Commissioning Authority.

.4 OPR: Owner's Project Requirements. A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

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

1.4 COMMISSIONING TEAM

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

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

1.5 OWNER'S RESPONSIBILITIES

.1 Provide the OPR documentation to the CxA and Contractor for information and use.

.2 Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.

.3 Provide the BoD documentation, prepared by Owner's Representative and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.6 CONTRACTOR'S RESPONSIBILITIES

.1 Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:
- .1 Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
- .2 Cooperate with the CxA for resolution of issues recorded in the Issues Log.
- .3 Attend commissioning team meetings held on a variable basis.
- .4 Integrate and coordinate commissioning process activities with construction schedule.
- .5 Review and accept construction checklists provided by the CxA.
- .6 Complete paper construction checklists as Work is completed and provide to the Commissioning Authority on a weekly basis.
- .7 Review and accept commissioning process test procedures provided by the Commissioning Authority.
- .8 Complete commissioning process test procedures.

1.7 CxA'S RESPONSIBILITIES

.1 Organize and lead the commissioning team.

.2 Provide commissioning plan.

.3 Convene commissioning team meetings.

.4 Provide Project-specific construction checklists and commissioning process test procedures.

.5 Verify the execution of commissioning process activities using random sampling. The sampling rate may vary from 1 to 100 percent. Verification will include, but is not limited to, equipment submittals, construction checklists, training, operating and maintenance data, tests, and test reports to verify compliance with the OPR. When a random sample does not meet the requirement, the CxA will report the failure in the Issues Log.

.6 Prepare and maintain the Issues Log.

.7 Prepare and maintain completed construction checklist log.

.8 Witness systems, assemblies, equipment, and component startup.

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

.1 Section Includes a copy of:

.1 Asbestos Assessment, dated 2013-06-19

.2 This report was prepared primarily for the use of the Owner and the Design Team. The recommendations shall not be construed as a requirement of this Contract, unless also contained elsewhere in the Contract Documents.

.3 The report, by its nature, cannot reveal all conditions that exist or occur on the site. Undertake whatever precautionary measures as required by authorities having jurisdiction and whatever measures as you see prudent and appropriate to protect workers, building occupants, and the environment from hazardous materials.

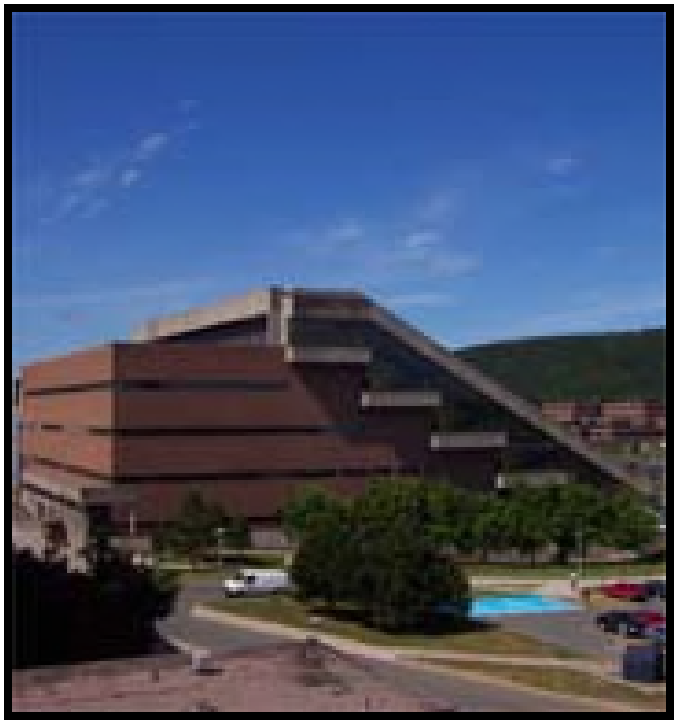
.4 Should conditions be found to vary substantially from the report, changes in the design and construction of the Work may be made, with resulting credits or expenditures to the Contract Price accruing to the Owner.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION (Not used)

END OF SECTION

ASBESTOS AND LEAD PAINT BUILDING MATERIALS SURVEY FOR:
QUEEN ELIZABETH II LIBRARY
MEMORIAL UNIVERSITY OF NEWFOUNDLAND



Prepared for:

Memorial University of Newfoundland

St. John's, NL

Pinchin LeBlanc Environmental Ltd
Project No. 02-02-00900

June 19, 2013

27 AUSTIN STREET, ST. JOHN'S NL, A1B 4C3 TEL: (709) 754-4490 FAX: (709) 754-1359
SAINT JOHN, NB • DARTMOUTH, NS • LABRADOR CITY, NL • CORNER BROOK, NL

ISO 9001:2008 Registered Quality System (Dartmouth, NS)

EXECUTIVE SUMMARY

Pinchin LeBlanc Environmental Limited (Pinchin) was retained by Memorial University of Newfoundland to perform asbestos and lead paint surveys in selected buildings on the Memorial University of Newfoundland's St. John's, NL campus. A total of twenty-seven (27) buildings were surveyed for asbestos containing materials (ACM) and lead based paints (LBP). This report will provide the findings for the following location;

BUILDING DESCRIPTION: QE II LIBRARY

BUILDING ADDRESS: MEMORIAL UNIVERSITY OF NL, ST. JOHN'S CAMPUS, NL

A summary of the findings for the QE II Library (hereafter referred to as "Site Building") is provided. For specific recommendations regarding any hazardous materials listed the reader will refer to Sections 3 and 4 of this report:

1. Non-friable materials with the potential to become friable during renovation and demolition activities were identified inside the Site Building, specifically drywall joint compound.
2. Non-friable asbestos-containing building materials were identified in the Site Building, specifically vinyl floor tiles, tar mastics, jacketing on ductwork, and transite.
3. Paints containing greater than 600 mg/kg of lead were identified in the Site Building, specifically the orange paint as observed in L 2022.

This Executive Summary is subject to the same standard limitations as contained in the report and must be read in conjunction with the entire report.

TABLE OF CONTENTS

1.0 INTRODUCTION

Pinchin LeBlanc Environmental Ltd. (Pinchin) was retained by Memorial University of Newfoundland to perform asbestos and lead paint surveys in selected buildings on the Memorial University of Newfoundland's St. John's, NL campus. A total of twenty-seven (27) buildings were surveyed for asbestos containing materials (ACM) and lead based paints (LBP). This report will provide the findings for the following location;

BUILDING DESCRIPTION: QE LIBRARY

BUILDING ADDRESS: MEMORIAL UNIVERSITY OF NL, ST. JOHN'S CAMPUS, NL

The report presents a detailed investigation of condition, quantity, location, access, and type of ACM and LBP present in the building. The Overview Report, provided under separate cover, provides detailed information regarding the survey methodology, sampling procedure, evaluation criteria, suspect materials and regulatory information.

Provincial regulations and guidelines distinguish between friable[1] and non-friable[2] materials. The asbestos building materials survey performed by Pinchin included a search for both friable and common non-friable ACM.

For reporting purposes, the survey will be divided into sections. The report is presented in this manner to accommodate ease in reading and to allow access to report information for specific areas or materials within the building. The report also addresses specific systems and products likely present in the building. The sections of the report are as follows:

2.0 Survey Information

3.0 ACM Survey Findings

4.0 LBP Survey Findings

5.0 Recommendations

1 The term friable is applied to a material that can be readily reduced to dust or powder by hand or moderate pressure. Friable ACM has a much greater potential to release airborne asbestos fibres when disturbed. The most common friable ACM used in the past are sprayed or trowelled materials (for fireproofing or thermal insulation), texture plaster (decorative or acoustic), and mechanical insulations.

2 Common non-friable ACM include vinyl floor tiles, ceiling tiles, gasket materials, asbestos cement pipe or board (transite), and asbestos textiles. Although a product may be considered non-friable when new, if the product releases fine dust due to deterioration or during removal, the free dust is considered friable. For example, most lay-in or glued on acoustic ceiling tiles release significant dust during removal of large quantities of these tiles.

2.0 SURVEY INFORMATION

The survey was conducted on between August and September, 2012. The survey, collection of representative bulk samples, and recording of information was performed by Mr. Trent Hardy and Mrs. Angela Stagg of Pinchin. All accessible areas of the building were inspected for the presence of asbestos containing materials (ACM) and lead based paints (LBP).

A total of forty-nine (49) representative bulk samples were collected for analysis for asbestos content,

A total of ten (10) bulk samples were collected for analysis of lead content.

3.0 ACM SURVEY FINDINGS

The ACM found during this survey are detailed in the location & data excel document provided to the client. The excel document serves as the clients active asbestos management plan. Quantities of materials identified, locations and friable or non-friable are also present in this excel file. Laboratory certificates for asbestos samples collected are presented in Appendix I and lead samples are presented in Appendix II. Sample location drawings are provided in Appendix III. A photographic record of the samples collected during the survey of the building is presented in Appendix IV. The following is summary of the findings for this building.

3.1 Sprayed or Trowelled Fireproofing and Thermal Insulation

No suspect sprayed or trowelled fireproofing or thermal insulation was observed in the Site Building.

3.2 Mechanical Insulation

One (1) sample of tar mastic above ceiling pipe elbows was collected in room L 1010A and contains 20% chrysotile asbestos (reference sample 02-02-900-S022). For locations and conditions of this material at the time of the building survey refer to location & data excel document.

One (1) sample of jacket above ceiling on ductwork was collected in room L4017 and contains 70% chrysotile asbestos (reference sample 02-02-900-S044). For locations and conditions of this material at the time of the building survey refer to location & data excel document.

Insulating cement, also referred to as "parging cement", present on pipe elbows, fittings and as tank insulation was sampled in two locations in the site building. Analysis of these samples did

not identify the presence of asbestos (reference samples 02-02-900-S009, 02-02-900-S046 and 02-02-900-S047).

One (1) sample of the tar paper used on fibreglass insulation was collected from the ductwork in the main hallway. Analysis of the sample did not identify the presence of asbestos (reference samples 02-02-900-S040).

3.3 Acoustic Ceiling Tiles

Nine (9) samples were collected of acoustic ceiling tiles were observed in the site building. Analysis of the sample did not identify the presence of asbestos. A summary of the acoustic ceiling tiles samples collected is observed as follows:

- The 2"x2" acoustic ceiling tile distinguished with a pinhole and fleck pattern located in L 2027 (reference sample 02-02-900-S017);
- The 2"x2" acoustic ceiling tile distinguished with a pinhole and dense fleck pattern located in L 2024 (reference sample 02-02-900-S011);
- The 2"x2" acoustic ceiling tile distinguished with a small fissure and fleck pattern located in L 3022 (reference sample 02-02-900-S038);
- The 2"x4" acoustic ceiling tile distinguished with a pinhole stipple pattern located in L 2000A (reference sample 02-02-900-S013);
- The 2"x4" acoustic ceiling tile distinguished with a pinhole pattern located in L 2018 (reference sample 02-02-900-S007);
- The 2"x4" acoustic ceiling tile distinguished with a pinhole and hole pattern located in L 1014G (reference sample 02-02-900-S028);
- The 2"x4" acoustic ceiling tile distinguished with a pinhole and fleck pattern located in L 2021 (reference sample 02-02-900-S004);
- The 2"x2" acoustic ceiling tile distinguished with a pinhole & stipple pattern located in L 1009 (reference sample 02-02-900-S024);
- The 2"x2" acoustic ceiling tile distinguished with a pinhole pattern located in L 1014H (reference sample 02-02-900-S026); and
- The 2"x2" acoustic ceiling tile distinguished with a pinhole and fissure (reference sample 02-02-900-S048).

3.4 Drywall, Plaster, and Texture Finishes

Drywall was used as a wall and ceiling finish throughout the building. Until the early to mid-1980s, drywall joint compound may have contained chrysotile asbestos. Drywall joint compound is considered a non-friable material. Most buildings of this type undergo constant renovation, including the removal and replacement of drywall partitions. Therefore extensive sampling of drywall compound is necessary to come to a reasonable conclusion regarding the extent of asbestos. Furthermore, any attempt to distinguish and delineate all asbestos-containing drywall compounds from new non-asbestos drywall compound is often unachievable. Therefore, drywall joint compound was sampled at walls, which were believed to be original to try to define the presence of asbestos content in the original drywall compound.

Ten (10) samples, in total, of drywall joint compound were collected in the site building. Results from one (1) samples collected contain 3% chrysotile asbestos (reference samples, 02-02-900-S025).

3.5 Vinyl Flooring Materials

3.5.1 Vinyl Floor Tiles

Fifteen (15) types of vinyl floor tiles were observed in the site building. Results from one (1) of the fifteen (15) samples collected to contain 3% chrysotile asbestos. A list of the visually different asbestos and non-asbestos vinyl floor tiles is provided in the tables below:

3.5.1.1 Asbestos Containing Vinyl Floor Tiles

Asbestos Containing Vinyl Floor Tiles **Library**			
Sample Number	Description	Location	Asbestos (%)
02-02-900-S036	12"x12" Vinyl Floor Tiles - White with brown streaks	L 2018	3% Chrysotile
For locations and conditions of this material at the time of the building survey refer to location & data excel document.			

3.5.1.2 Non-Asbestos Containing Vinyl Floor Tiles

Non-Asbestos Containing Vinyl Floor Tiles **Library**		
Sample Number	Description	Location
02-02-900-S005	12"x 12" Vinyl Floor Tiles - Blue with Large Black Streaks	L 2018
02-02-900-S003	12"x 12" Vinyl Floor Tiles - White with Large Blue Flecks	L 2021
02-02-900-S035	12"x12" Vinyl Floor Tiles - Beige with Brown and Blue Specks	L 1017
02-02-900-S029	12"x12" Vinyl Floor Tiles - Burgundy with Light Burgundy and White Flecks	L IC05
02-02-900-S023	12"x12" Vinyl Floor Tiles - Cream	L 1009C
02-02-900-S019	12"x12" Vinyl Floor Tiles - Cream with Large Brown Flecks	L 1005A
02-02-900-S039	12"x12" Vinyl Floor Tiles - Grey with Abundant White and Brown Flecks	L 3017
02-02-900-S041	12"x12" Vinyl Floor Tiles - Grey with Dark Grey and White Flecks	L 3108
02-02-900-S015	12"x12" Vinyl Floor Tiles - Light Brown	L 2027
02-02-900-S018	12"x12" Vinyl Floor Tiles - Light Brown with Dark Blue and White Flecks	L 1003
02-02-900-S016	12"x12" Vinyl Floor Tiles - Red	L 2027
02-02-900-S010	12"x12" Vinyl Floor Tiles - Very Light Brown with Abundant Brown Flecks	L 2024
02-02-900-S037	12"x12" Vinyl Floor Tiles - White with Black	L 1010

Non-Asbestos Containing Vinyl Floor Tiles Library		
Sample Number	Description	Location
	streaks	
02-02-900-S030	12"x12" Vinyl Floor Tiles -White with Grey Flecks	L 1012A
For locations and conditions of this material at the time of the building survey refer to location & data excel document.		

3.5.2 Vinyl Sheet Flooring

Three (3) types of vinyl sheet flooring were observed in the site building. Analysis of these samples did not identify the presence of asbestos. A summary of the visually different asbestos containing vinyl sheet flooring is provided it the tables below:

3.5.2.1 Non-Asbestos Containing Vinyl Sheet Flooring

Non-Asbestos Containing Vinyl Sheet Flooring QE Library		
Sample Number	Description	Location
02-02-900-S001	Vinyl Sheet Flooring - Beige with Light Grey Flecks	L 2017
02-02-900-S021	Vinyl Sheet Flooring - Cream	L 1005
02-02-900-S049	Vinyl Sheet Flooring – Light Grey Stone	L 2028A
For locations and conditions of this material at the time of the building survey refer to location & data excel document.		

3.6 Asbestos Cement Products

The black phenolic lab bench also referred as "transite counter" was sampled from L 1013C and contains 15% chrysotile asbestos (reference sample 02-02-900-S034). For locations and conditions of this material at the time of the building survey refer to location & data excel document.

Transite sheeting was sampled from L1V01 and contains 20% chrysotile asbestos (reference sample 02-02-900-S032). For locations and conditions of this material at the time of the building survey refer to location & data excel document.

3.7 Vermiculite Insulation

No vermiculite containing products were observed. Visual observations were made above the ceiling and through any hatches.

3.8 Other Asbestos Containing Building Materials

One (1) sample of tar mastics on the sinks (gold colour) was collected from L 1013and contains 5% chrysotile asbestos (reference sample 02-02-900-S031). For locations and conditions of this material at the time of the building survey refer to location & data excel document.

One (1) sample of red duct sealant was collected from room L 2021. Analysis of the sample did not identify the presence of asbestos (reference sample 02-02-900-S008).

One (1) sample of caulking on ductwork was collected from room L 2024. Analysis of the sample did not identify the presence of asbestos (reference sample 02-02-900-S012).

4.0 LBP SURVEY FINDINGS

Analytical results indicate that one (1) of the samples collected of painted surfaces would be considered a risk to worker exposure during construction or renovation activities (with lead concentrations exceeding 0.06%). The orange paint as observed in L 2022 (reference sample 02-02-900-L003) contains 1.1% and the same paint colours located elsewhere, should be managed as lead-containing.

Results indicate that were detected, all other paint samples containing less than 0.06% lead.

All paints observed inside the Site Building were observed in GOOD condition.

5.0 RECOMMENDATIONS

Asbestos containing materials and lead based paints have been identified in the Site Building. Listed below are a series of general recommendations for the Site Building. Recommendations provided in the Overview Report may also be reviewed and applied to this building.

Friable ACMs

Potentially Friable Materials

Non-friable materials with the potential to become friable during renovation and demolition activities were identified inside the Site Building, specifically drywall joint compound.

1. Under the NL guidance documents for moderate and low risk asbestos abatement procedures, quantities of these materials within an enclosure exceeding 100 ft^2 should be removed using Type III (high risk) asbestos abatement procedures. Quantities less than 100 ft^2 but exceeding 10ft^2 should be removed using Type II (moderate risk) asbestos abatement procedures, while quantities less than 10 ft^2 should be removed using Type I (low risk) asbestos abatement procedures.

Non-Friable Materials

Non-friable asbestos containing materials identified inside the Site Building include: transite, tar mastics, textile cloth on ductwork, and vinyl floor tiles.

1. Type I (low risk) asbestos abatement procedures should be carried out for the scheduled disturbance of any non-friable materials provided the materials can be removed intact, and without the use of powered hand tools.

2. Should the use of powered hand tools or excessive breakage of the materials become necessary, Type II (moderate risk) asbestos abatement procedures should be adopted.

Lead Based Paints

Any painted surfaces visually matching the identified paint colors should be managed as lead containing and necessary precautions (i.e.: worker protection) should be employed prior to the disturbance to these materials. Do not grind, sand, torch or cut lead materials without using proper procedures, as material poses a health hazard if disturbed by these methods.

Should there be any questions pertaining to the contents of this report, please do not hesitate to contact the undersigned at our office.

PINCHIN LEBLANC ENVIRONMENTAL LIMITED

Prepared by;

Paul Staeben
NL Vice President
pstaeben@pinchinleblanc.com

APPENDIX I

ASBESTOS ANALYTICAL REPORT

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

NVLAP Lab Code: 200664-0

Customer: Pinchin LeBlanc Environmental
27 Austin St
2nd Flr
St Johns, NL A1B 4C3

Attn: Dawn Benteau
Paul Staeben

Project: MUN Asbestos and Lead Survey QE II
Library 02-02-00900

Lab Order ID: 1219066
Analysis ID: 1219066PLM
Date Received: 11/26/2012
Date Reported: 11/30/2012

Sample ID / *Lab Sample ID*	Description / *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes / Treatment
02-02-900-S001 - A *1219066PLM_1*	Vinyl Sheet Flooring - Beige with Light Grey Flecks *vinyl*	None Detected		100% Other	Beige Non Fibrous Heterogeneous Dissolved
02-02-900-S001 - B *1219066PLM_47*	Vinyl Sheet Flooring - Beige with Light Grey Flecks *mastic/leveling*	None Detected	3% Cellulose	97% Other	Yellow, Gray Non Fibrous Heterogeneous Dissolved
02-02-900-S002 *1219066PLM_2*	Drywall Joint Compound	None Detected		100% Other	White Non Fibrous Heterogeneous Teased
02-02-900-S003 - A *1219066PLM_3*	12"x 12" Vinyl Floor Tiles - White with Large Blue Flecks *tile*	None Detected		100% Other	White Non Fibrous Heterogeneous Dissolved
02-02-900-S003 - B *1219066PLM_48*	12"x 12" Vinyl Floor Tiles - White with Large Blue Flecks *mastic*	None Detected	3% Cellulose	97% Other	Yellow, Black Non Fibrous Heterogeneous Dissolved
02-02-900-S004 *1219066PLM_4*	2'x 4' Acoustic Ceiling Tiles - Pinhole and Fleck Pattern	None Detected	40% Cellulose 40% Fiber Glass	10% Perlite 10% Other	White Fibrous Heterogeneous Teased
02-02-900-S005 - A *1219066PLM_5*	12"x 12" Vinyl Floor Tiles - Blue with Large Black Streaks *tile*	None Detected		100% Other	Blue Non Fibrous Heterogeneous Dissolved
02-02-900-S005 - B *1219066PLM_49*	12"x 12" Vinyl Floor Tiles - Blue with Large Black Streaks *mastic*	None Detected	3% Cellulose	97% Other	Black Non Fibrous Heterogeneous Dissolved

Ired Gulley (62)

Analyst

Nathaniel Durham, MS or Approved Signatory

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

NVLAP Lab Code: 200664-0

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Sample ID / *Lab Sample ID*	Description / *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes / Treatment
02-02-900-S006	Drywall Joint Compound	None Detected		100% Other	White Non Fibrous Heterogeneous
1219066PLM_6					Teased
02-02-900-S007	2'x 4' Acoustic Ceiling Tiles - Pinhole Pattern	None Detected	40% Cellulose 40% Fiber Glass	10% Perlite 10% Other	White Fibrous Heterogeneous
1219066PLM_7					Teased
02-02-900-S008	Red Duct Sealant	None Detected	8% Cellulose	92% Other	Red Non Fibrous Heterogeneous
1219066PLM_8					Dissolved
02-02-900-S009	Parging Cement	None Detected	30% Fiber Glass	70% Other	Gray Fibrous Heterogeneous
1219066PLM_9					Teased
02-02-900-S010 - A	12"x12" Vinyl Floor Tiles - Very Light Brown with Abundant Brown Flecks	None Detected		100% Other	Brown Non Fibrous Heterogeneous
1219066PLM_10	*ile*				Dissolved
02-02-900-S010 - B	12"x12" Vinyl Floor Tiles - Very Light Brown with Abundant Brown Flecks	None Detected	3% Cellulose	97% Other	Yellow, Black Non Fibrous Heterogeneous
1219066PLM_50	*mastic*				Dissolved
02-02-900-S011	2'x4' Acoustic Ceiling Tiles - Pinhole and Dense Fleck Pattern	None Detected	40% Cellulose 40% Fiber Glass	10% Perlite 10% Other	White Fibrous Heterogeneous
1219066PLM_11					Teased
02-02-900-S012	Grey Caulking on Ductwork	None Detected		100% Other	Gray Non Fibrous Heterogeneous
1219066PLM_12					Dissolved

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommended that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agenc

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By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

NVLAP Lab Code: 200664-0

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Sample ID / *Lab Sample ID*	Description / *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes / Treatment
02-02-900-S013	2'x 4' Acoustic Ceiling Tiles - Pinhole Stipple Pattern	None Detected	40% Cellulose 40% Fiber Glass	10% Perlite 10% Other	White Fibrous Heterogeneous
1219066PLM_13					Teased
02-02-900-S014	Drywall Joint Compound	None Detected		100% Other	White Non Fibrous Heterogeneous
1219066PLM_14					Teased
02-02-900-S015 - A	12"x12" Vinyl Floor Tiles - Light Brown	None Detected		100% Other	Brown Non Fibrous Heterogeneous
1219066PLM_15	*tile*				Dissolved
02-02-900-S015 - B	12"x12" Vinyl Floor Tiles - Light Brown	None Detected		100% Other	Black Non Fibrous Heterogeneous
1219066PLM_51	*mastic*				Dissolved
02-02-900-S016 - A	12"x12" Vinyl Floor Tiles - Red	None Detected		100% Other	Red Non Fibrous Heterogeneous
1219066PLM_16	*tile*				Dissolved
02-02-900-S016 - B	12"x12" Vinyl Floor Tiles - Red	None Detected	3% Cellulose	97% Other	Black Non Fibrous Heterogeneous
1219066PLM_52	*mastic*				Dissolved
02-02-900-S017	2'x 2' Acoustic Ceiling Tiles - Pinhole and Fleck Pattern	None Detected	40% Cellulose 40% Fiber Glass	10% Perlite 10% Other	White Fibrous Heterogeneous
1219066PLM_17					Teased
02-02-900-S018 - A	12"x12" Vinyl Floor Tiles - Light Brown with Dark Blue and White Flecks	None Detected		100% Other	Brown Non Fibrous Heterogeneous
1219066PLM_18	*tile*				Dissolved

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommended that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agenc

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Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

NVLAP Lab Code: 200664-0

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Lab Order ID: 1219066
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Date Received: 11/26/2012
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Sample ID / *Lab Sample ID*	Description / *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes / Treatment
02-02-900-S018 - B	12"x12" Vinyl Floor Tiles - Light Brown with Dark Blue and White Flecks	None Detected	3% Cellulose	97% Other	Black Non Fibrous Heterogeneous
1219066PLM_53	*mastic*				Dissolved
02-02-900-S019 - A	12"x12" Vinyl Floor Tiles - Cream with Large Brown Flecks	None Detected		100% Other	Cream Non Fibrous Heterogeneous
1219066PLM_19	*tile*				Dissolved
02-02-900-S019 - B	12"x12" Vinyl Floor Tiles - Cream with Large Brown Flecks	None Detected	3% Cellulose	97% Other	Black Non Fibrous Heterogeneous
1219066PLM_54	*mastic*				Dissolved
02-02-900-S020	Drywall Joint Compound	None Detected		100% Other	White Non Fibrous Heterogeneous
1219066PLM_20					Teased
02-02-900-S021 - A	Vinyl Sheet Flooring - Cream	None Detected		100% Other	Cream Non Fibrous Heterogeneous
1219066PLM_21	*vinyl*				Dissolved
02-02-900-S021 - B	Vinyl Sheet Flooring - Cream	None Detected	5% Cellulose	95% Other	Yellow Non Fibrous Heterogeneous
1219066PLM_55	*mastic*				Dissolved
02-02-900-S022	Tar Mastic On Pipe Elbows	20% Chrysotile		80% Other	Black Fibrous Heterogeneous
1219066PLM_22					Dissolved
02-02-900-S023 - A	12"x12" Vinyl Floor Tiles - Cream	None Detected		100% Other	Cream Non Fibrous Heterogeneous
1219066PLM_23	*tile*				Dissolved

Ired Gulley (62)

Analyst

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Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

NVLAP Lab Code: 200664-0

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Sample ID / *Lab Sample ID*	Description / *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes / Treatment
02-02-900-S023 - B *1219066PLM_56*	12"x12" Vinyl Floor Tiles - Cream *mastic*	None Detected	3% Cellulose	97% Other	Black Non Fibrous Heterogeneous Dissolved
02-02-900-S024 *1219066PLM_24*	2'x 2' Acoustic Ceiling Tiles - Pinhole Stipple Pattern	None Detected	40% Cellulose 40% Fiber Glass	10% Perlite 10% Other	White Fibrous Heterogeneous Teased
02-02-900-S025 *1219066PLM_25*	Drywall Joint Compound	3% Chrysotile		97% Other	White Non Fibrous Heterogeneous Teased
02-02-900-S026 *1219066PLM_26*	2'x 2' Acoustic Ceiling Tiles - Pinhole Pattern	None Detected	40% Cellulose 40% Fiber Glass	10% Perlite 10% Other	White Fibrous Heterogeneous Teased
02-02-900-S027 *1219066PLM_27*	Drywall Joint Compound	None Detected		100% Other	White Non Fibrous Heterogeneous Teased
02-02-900-S028 *1219066PLM_28*	2'x 4' Acoustic Ceiling Tiles - Pinhole and Hole Pattern	None Detected	35% Cellulose 35% Fiber Glass 5% Wollastonite	25% Other	White Fibrous Heterogeneous Teased
02-02-900-S029 - A *1219066PLM_29*	12"x12" Vinyl Floor Tiles - Burgandy with Light Burgandy and White Flecks *tile*	None Detected		100% Other	Red Non Fibrous Heterogeneous Dissolved
02-02-900-S029 - B *1219066PLM_57*	12"x12" Vinyl Floor Tiles - Burgandy with Light Burgandy and White Flecks *mastic*	None Detected	3% Cellulose	97% Other	Black Non Fibrous Heterogeneous Dissolved

Ired Gulley (62)

Analyst

Nathaniel Durham, MS or Approved Signatory

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

NVLAP Lab Code: 200664-0

Customer: Pinchin LeBlanc Environmental
27 Austin St
2nd Flr
St Johns, NL A1B 4C3

Attn: Dawn Benteau
Paul Staeben

Project: MUN Asbestos and Lead Survey QE II
Library 02-02-00900

Lab Order ID: 1219066
Analysis ID: 1219066PLM
Date Received: 11/26/2012
Date Reported: 11/30/2012

Sample ID / *Lab Sample ID*	Description / *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes / Treatment
02-02-900-S030 - A *1219066PLM_30*	12"x12" Vinyl Floor Tiles - White with Grey Flecks *tile*	**None Detected**		**100% Other**	White Non Fibrous Heterogeneous Dissolved
02-02-900-S030 - B *1219066PLM_58*	12"x12" Vinyl Floor Tiles - White with Grey Flecks *mastic*	**None Detected**	**3% Cellulose**	**97% Other**	Black Non Fibrous Heterogeneous Dissolved
02-02-900-S031 *1219066PLM_31*	Gold colored Tar Mastic On Sink Liner	**5% Chrysotile**		**95% Other**	Silver Non Fibrous Heterogeneous Dissolved
02-02-900-S032 *1219066PLM_32*	Transite Sheeting	**20% Chrysotile**		**80% Other**	Gray Fibrous Heterogeneous Teased
02-02-900-S033 *1219066PLM_33*	Drywall Joint Compound	**None Detected**		**100% Other**	White Non Fibrous Heterogeneous Teased
02-02-900-S034 *1219066PLM_34*	Transite Countertop	**15% Chrysotile**		**85% Other**	Black Fibrous Heterogeneous Teased
02-02-900-S035 - A *1219066PLM_35*	12"x12" Vinyl Floor Tiles - Beige with Brown and Blue Specks *tile*	**None Detected**		**100% Other**	White Non Fibrous Heterogeneous Dissolved
02-02-900-S035 - B *1219066PLM_59*	12"x12" Vinyl Floor Tiles - Beige with Brown and Blue Specks *mastic*	**None Detected**	**3% Cellulose**	**97% Other**	Black Non Fibrous Heterogeneous Dissolved

Ired Gulley (62)
Analyst

Nathaniel Durham, MS or Approved Signatory

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

NVLAP Lab Code: 200664-0

Customer: Pinchin LeBlanc Environmental
27 Austin St
2nd Flr
St Johns, NL A1B 4C3

Attn: Dawn Benteau
Paul Staeben

Project: MUN Asbestos and Lead Survey QE II
Library 02-02-00900

Lab Order ID: 1219066
Analysis ID: 1219066PLM
Date Received: 11/26/2012
Date Reported: 11/30/2012

Sample ID / *Lab Sample ID*	Description / *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes / Treatment
02-02-900-S036 / *1219066PLM_36*	12"x12" Vinyl Floor Tiles - White with brown streaks / *tile only*	**3% Chrysotile**		**97% Other**	White, Non Fibrous, Heterogeneous / Dissolved
02-02-900-S037 - A / *1219066PLM_37*	12"x12" Vinyl Floor Tiles - White with Black streaks / *tile*	**None Detected**		**100% Other**	White, Non Fibrous, Heterogeneous / Dissolved
02-02-900-S037 - B / *1219066PLM_60*	12"x12" Vinyl Floor Tiles - White with Black streaks / *mastic*	**None Detected**	**3% Cellulose**	**97% Other**	Black, Non Fibrous, Heterogeneous / Dissolved
02-02-900-S038 / *1219066PLM_38*	2'x 4' Acoustic Ceiling Tiles - Small Fissure and Fleck Pattern	**None Detected**	**40% Cellulose** **40% Fiber Glass**	**10% Perlite** **10% Other**	White, Fibrous, Heterogeneous / Teased
02-02-900-S039 - A / *1219066PLM_39*	12"x12" Vinyl Floor Tiles - Grey with Abundant White and Brown Flecks / *tile*	**None Detected**		**100% Other**	Gray, Non Fibrous, Heterogeneous / Dissolved
02-02-900-S039 - B / *1219066PLM_61*	12"x12" Vinyl Floor Tiles - Grey with Abundant White and Brown Flecks / *mastic*	**None Detected**	**5% Cellulose**	**95% Other**	Black, Non Fibrous, Heterogeneous / Dissolved
02-02-900-S040 / *1219066PLM_40*	Tar Paper Jacket On Ductwork	**None Detected**	**70% Cellulose**	**30% Other**	Black, Fibrous, Heterogeneous / Dissolved, Teased
02-02-900-S041 - A / *1219066PLM_41*	12"x12" Vinyl Floor Tiles - Grey with Dark Grey and White Flecks / *tile*	**None Detected**		**100% Other**	Gray, Non Fibrous, Heterogeneous / Dissolved

Ired Gulley (62)
Analyst

Nathaniel Durham, MS or Approved Signatory

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

NVLAP Lab Code: 200664-0

Customer: Pinchin LeBlanc Environmental
27 Austin St
2nd Flr
St Johns, NL A1B 4C3

Attn: Dawn Benteau
Paul Staeben

Project: MUN Asbestos and Lead Survey QE II
Library 02-02-00900

Lab Order ID: 1219066
Analysis ID: 1219066PLM
Date Received: 11/26/2012
Date Reported: 11/30/2012

Sample ID *Lab Sample ID*	Description *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes Treatment
02-02-900-S041 - B	12"x12" Vinyl Floor Tiles - Grey with Dark Grey and White Flecks	**None Detected**	**3% Cellulose**	**97% Other**	Black Non Fibrous Heterogeneous
1219066PLM_62	*mastic*				Dissolved
02-02-900-S042	Drywall Joint Compound	**None Detected**		**100% Other**	White Non Fibrous Heterogeneous
1219066PLM_42					Teased
02-02-900-S043	Drywall Joint Compound	**None Detected**		**100% Other**	White Non Fibrous Heterogeneous
1219066PLM_43					Teased
02-02-900-S044	Jacket On Ductwork	**70% Chrysotile**		**30% Other**	Gray Fibrous Heterogeneous
1219066PLM_44					Teased
02-02-900-S045	Drywall Joint Compound	**None Detected**		**100% Other**	White Non Fibrous Heterogeneous
1219066PLM_45					Teased
02-02-900-S046	Parging Cement	**None Detected**	**30% Fiber Glass**	**70% Other**	Gray Fibrous Heterogeneous
1219066PLM_46					Teased

Ired Gulley (62)

Analyst

Nathaniel Durham, MS or Approved Signatory

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

NVLAP Lab Code: 200664-0

Customer: Pinchin LeBlanc Environmental
27 Austin St
2nd Flr
St Johns NL A1B 4C3

Attn: Dawn Benteau
Paul Staeben

Project: 02-02-00900;MUN Asbestos and Lead Survey

Lab Order ID: 1308150
Analysis ID: 1308150_PLM
Date Received: 5/2/2013
Date Reported: 5/7/2013

Sample ID *Lab Sample ID*	Description *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes Treatment
02-02-900-S047 *1308150PLM_1*	Tank Insulation	**None Detected**	**30% Fiber Glass**	**70% Other**	Gray Fibrous Heterogeneous Teased
02-02-900-S048 *1308150PLM_2*	2x2 Acoustic Ceiling Tiles - Pinhole and fissure	**None Detected**	**45% Cellulose** **45% Fiber Glass**	**10% Other**	White Fibrous Heterogeneous Teased
02-02-900-S049 - A *1308150PLM_3*	Vinyl Sheet Flooring - Light Grey Stone *vinyl*	**None Detected**		**100% Other**	Gray Non Fibrous Heterogeneous Dissolved
02-02-900-S049 - B *1308150PLM_4*	Vinyl Sheet Flooring - Light Grey Stone *mastic*	**None Detected**	**3% Cellulose**	**97% Other**	Yellow Non Fibrous Heterogeneous Dissolved

Ired Gulley (4)

Analyst

Approved Signatory

APPENDIX II

LEAD PAINT ANALYTICAL REPORT

Analysis for Lead Concentration in Paint Chips

by Flame Atomic Absorption Spectroscopy
EPA SW-846 3rd Ed. Method No. 3050B/Method No. 7420

AIHA LAP, LLC ACCREDITED LABORATORY ENVIRONMENTAL LEAD ISO/IEC 17025:2005 www.aihaaccreditedlabs.org LAB #173190

Customer: Pinchin LeBlanc Environmental
27 Austin St
2nd Flr
St Johns NL A1B 4C3

Attn: Dawn Benteau
Paul Staeben

Project: MuN Asbestos and Lead Survey; 02-02-00900 QE II Library

Lab Order ID: 1219065
Analysis ID: 1219065_PBP
Date Received: 11/26/2012
Date Reported: 11/30/2012

Sample ID *Lab Sample ID*	Description *Lab Notes*	Mass *(g)*	Analytical Sensitivity *(% by weight)*	Concentration *(% by weight)*
02-02-900-L001 1219065PBP_1	White	0.0359	0.004%	**< 0.011%**
02-02-900-L002 1219065PBP_2	Grey	0.0574	0.002%	**< 0.007%**
02-02-900-L003 1219065PBP_3	Orange	0.0650	0.002%	**1.1%**
02-02-900-L004 1219065PBP_4	Blue	0.0567	0.002%	**< 0.007%**
02-02-900-L005 1219065PBP_5	Dark green	0.0764	0.002%	**0.008%**
02-02-900-L006 1219065PBP_6	Red	0.0525	0.003%	**< 0.008%**
02-02-900-L007 1219065PBP_7	Light brown	0.0387	0.003%	**< 0.010%**
02-02-900-L008 1219065PBP_8	Dark blue	0.0747	0.002%	**0.007%**
02-02-900-L009 1219065PBP_9	Brown	0.0664	0.002%	**0.006%**
02-02-900-L010 1219065PBP_10	Dark grey	0.0673	0.002%	**0.028%**

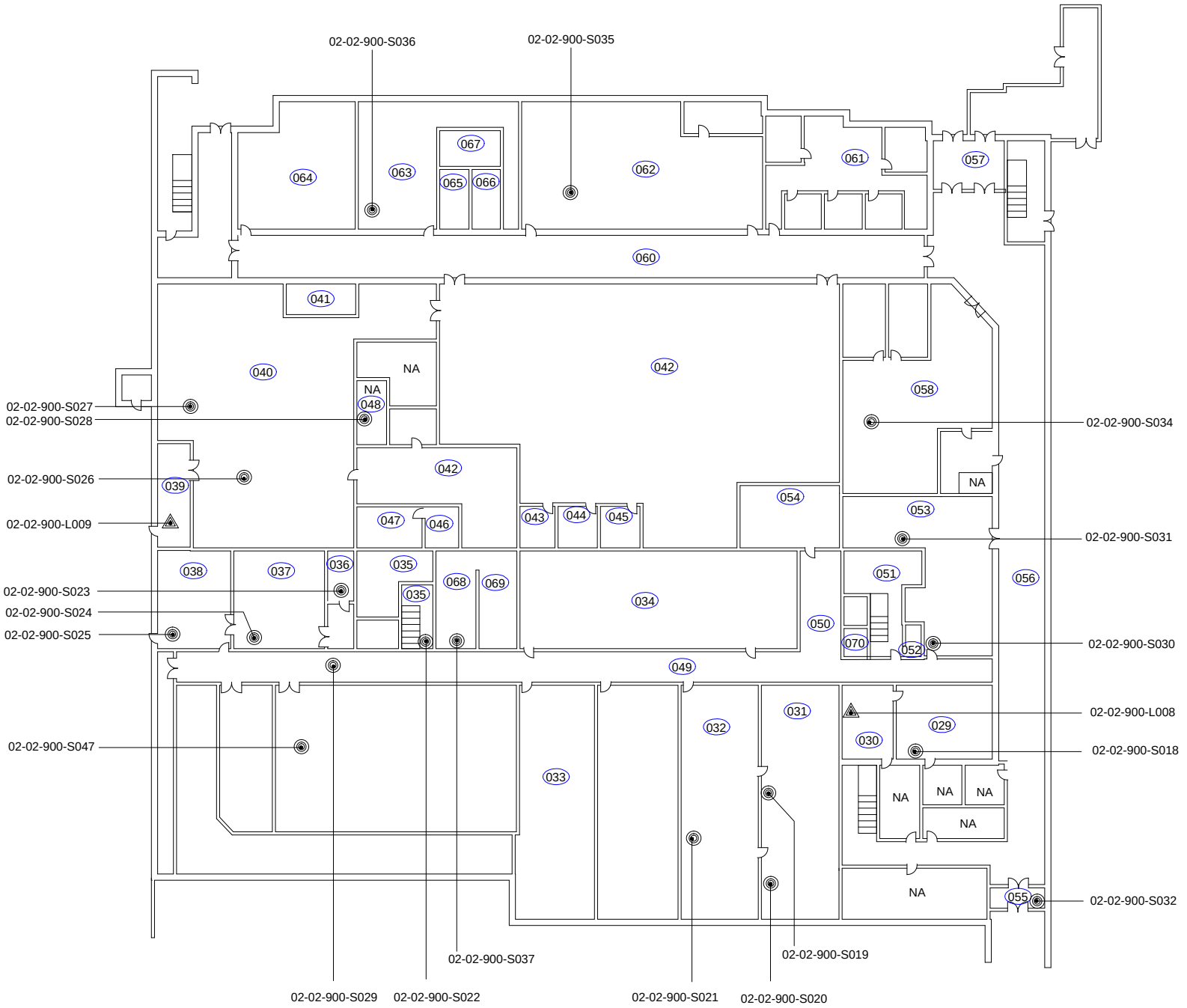
Robert Duke (10)

Analyst

Laboratory Director

APPENDIX III

SITE DRAWINGS



PINCHIN LEBLANC ENVIRONMENTAL

LEGEND:

- XXX — PINCHIN LOCATION NUMBER
- ASBESTOS SAMPLE ID NUMBER
- LEAD SAMPLE ID NUMBER
- **NA** — NOT ACCESSIBLE

N

CLIENT:

MEMORIAL UNIVERSITY OF NEWFOUNDLAND

PROJECT:

ASBESTOS AND LEAD PAINT BUILDING MATERIALS SURVEY

SITE ADDRESS:

QUEEN ELIZABETH II LIBRARY,
ST. JOHN'S CAMPUS,
NEWFOUNDLAND AND LABRADOR

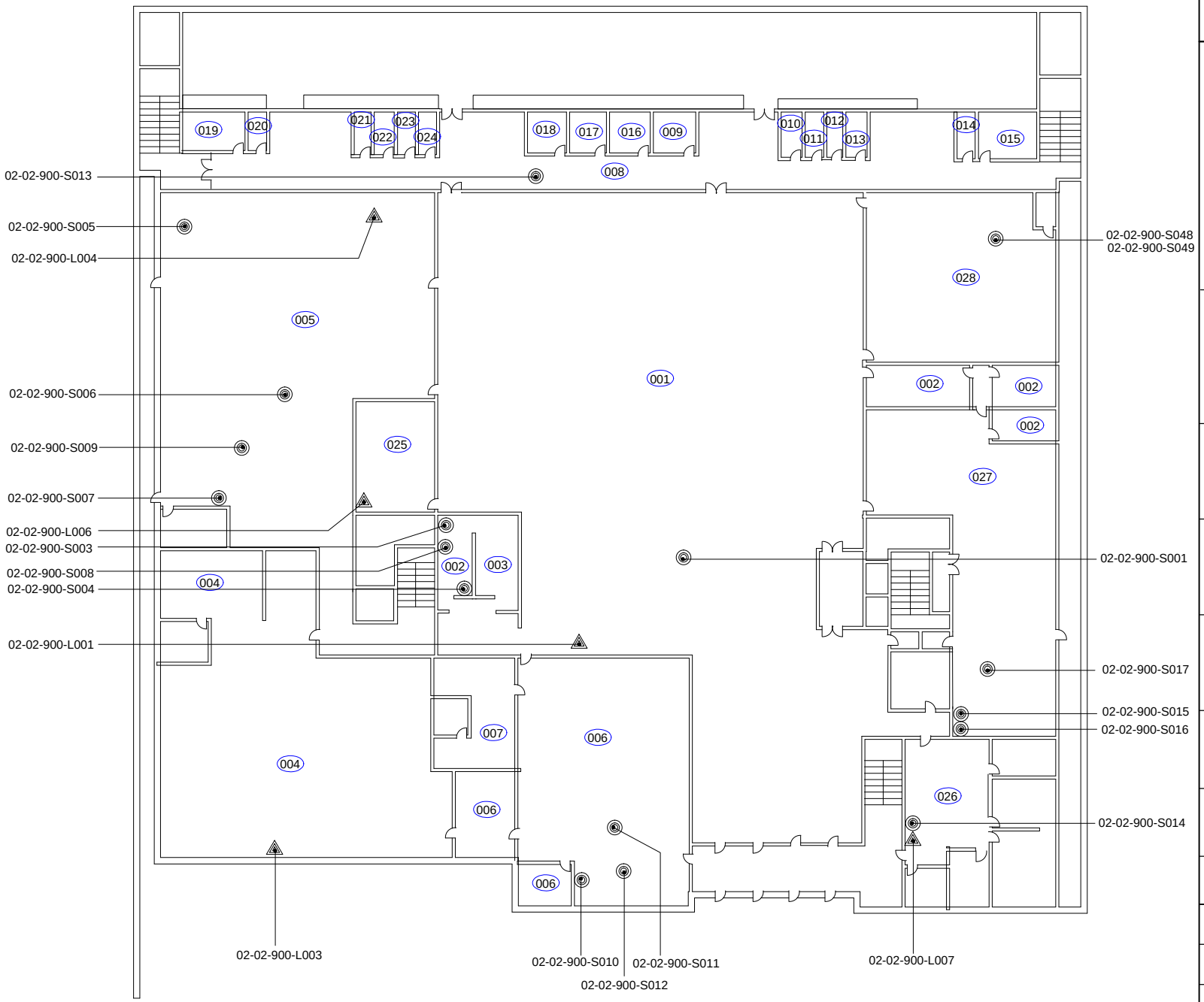
DRAWING NAME:

SAMPLE LOCATIONS
LEVEL 1

REFERENCE:

PLEL SITE SURVEY

DATE:	PROJECT #:
DECEMBER 2012	02 - 02 - 00900
SCALE: N.T.S.	FIGURE #: 1
DRAWN BY: A. ANISCIKLI	
CHECKED BY: T. HARDY	



PINCHIN LEBLANC ENVIRONMENTAL

LEGEND:

XXX PINCHIN LOCATION NUMBER

ASBESTOS SAMPLE ID NUMBER

LEAD SAMPLE ID NUMBER

CLIENT:

MEMORIAL UNIVERSITY OF NEWFOUNDLAND

PROJECT:

ASBESTOS AND LEAD PAINT BUILDING MATERIALS SURVEY

SITE ADDRESS:

QUEEN ELIZABETH II LIBRARY,
ST. JOHN'S CAMPUS,
NEWFOUNDLAND AND LABRADOR

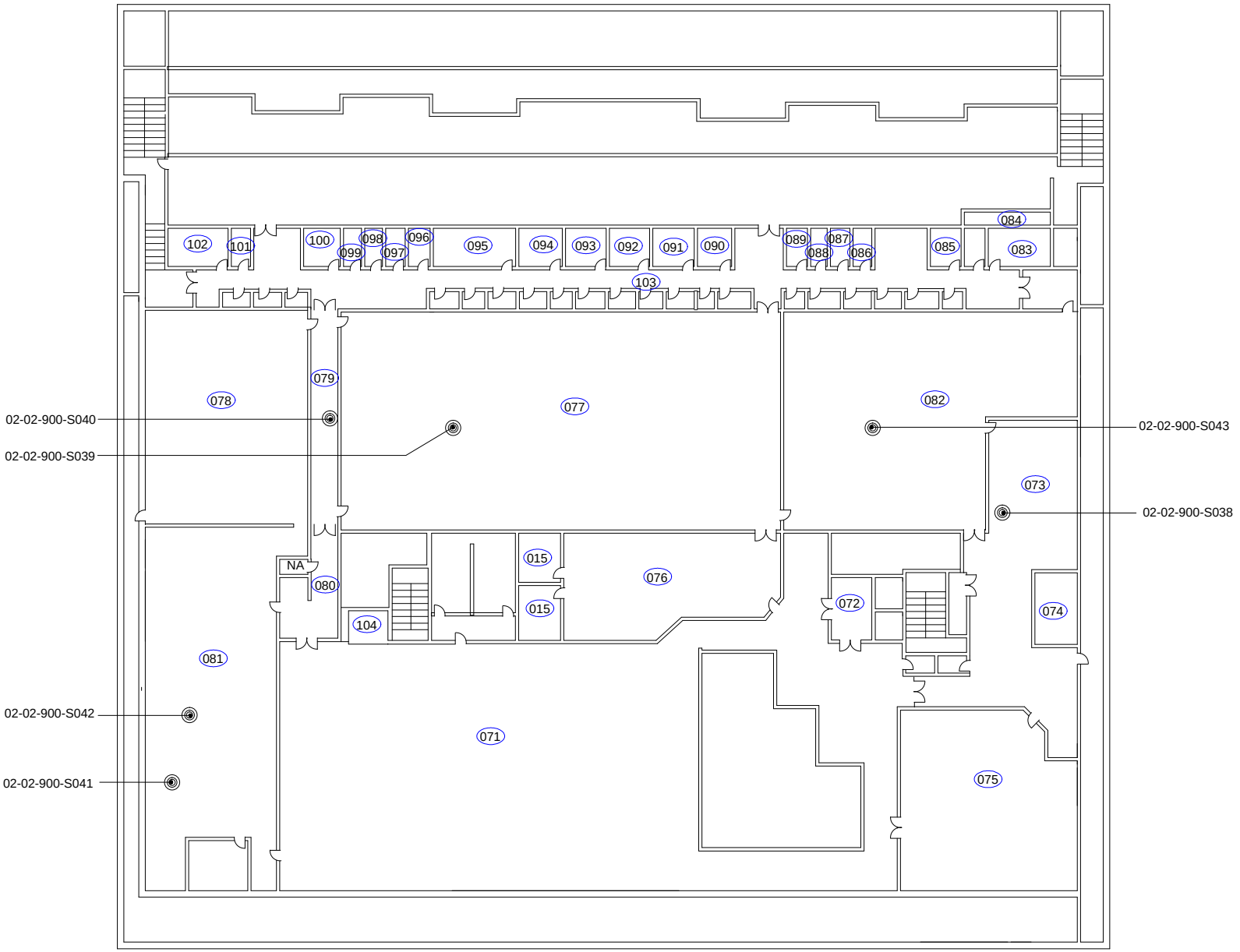
DRAWING NAME:

SAMPLE LOCATIONS
LEVEL 2

REFERENCE:

PLEL SITE SURVEY

DATE:	PROJECT #:
DECEMBER 2012	02 - 02 - 00900
SCALE: N.T.S.	FIGURE #: 2
DRAWN BY: A. ANISCIKLI	
CHECKED BY: T. HARDY	



PINCHIN LEBLANC ENVIRONMENTAL

LEGEND:

XXX PINCHIN LOCATION NUMBER

ASBESTOS SAMPLE ID NUMBER

NA NOT ACCESSIBLE

N

CLIENT:

MEMORIAL UNIVERSITY OF NEWFOUNDLAND

PROJECT:

ASBESTOS AND LEAD PAINT BUILDING MATERIALS SURVEY

SITE ADDRESS:

QUEEN ELIZABETH II LIBRARY,
ST. JOHN'S CAMPUS,
NEWFOUNDLAND AND LABRADOR

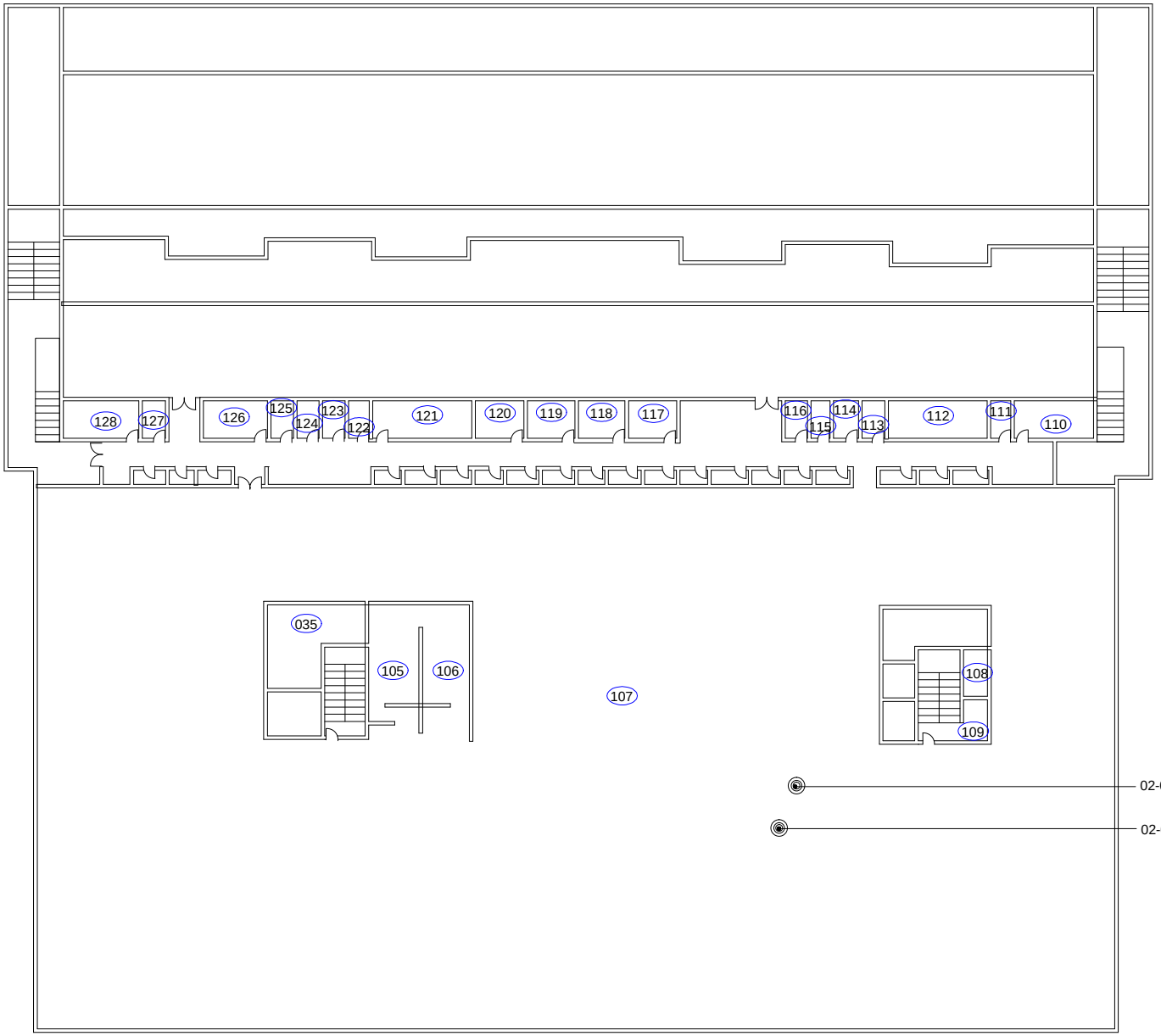
DRAWING NAME:

SAMPLE LOCATIONS
LEVEL 3

REFERENCE:

PLEL SITE SURVEY

DATE:	PROJECT #:
DECEMBER 2012	02 - 02 - 00900
SCALE: N.T.S.	FIGURE #: 3
DRAWN BY: A. ANISCIKLI	
CHECKED BY: T. HARDY	



PINCHIN LEBLANC ENVIRONMENTAL

LEGEND:

XXX PINCHIN LOCATION NUMBER

ASBESTOS SAMPLE ID NUMBER

N

CLIENT:

MEMORIAL UNIVERSITY OF NEWFOUNDLAND

PROJECT:

ASBESTOS AND LEAD PAINT BUILDING MATERIALS SURVEY

SITE ADDRESS:

QUEEN ELIZABETH II LIBRARY,
ST. JOHN'S CAMPUS,
NEWFOUNDLAND AND LABRADOR

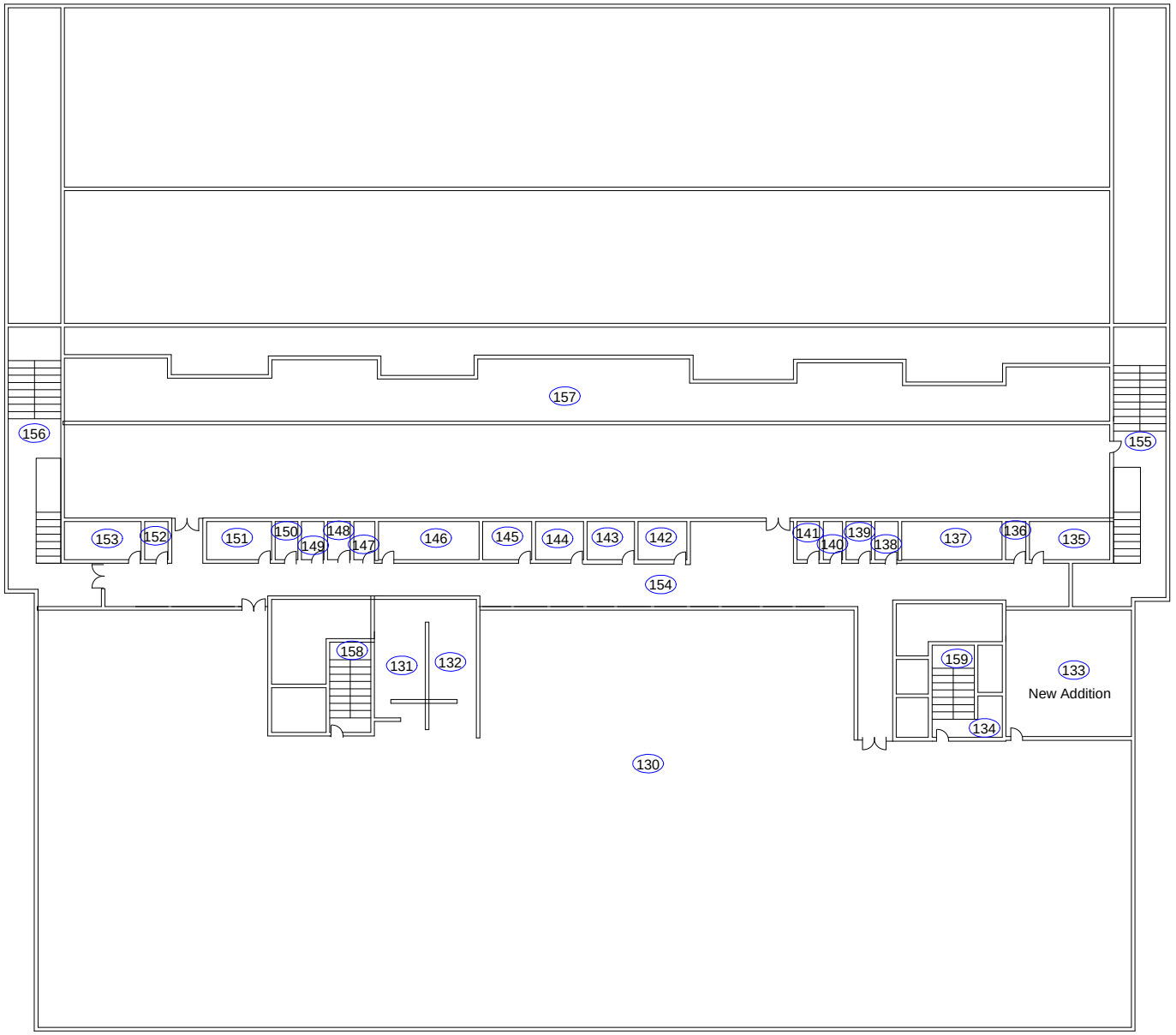
DRAWING NAME:

SAMPLE LOCATIONS
LEVEL 4

REFERENCE:

PLEL SITE SURVEY

DATE:	PROJECT #:
DECEMBER 2012	02 - 02 - 00900
SCALE: N.T.S.	FIGURE #: 4
DRAWN BY: A. ANISCIKLI	
CHECKED BY: T. HARDY	



PINCHIN LEBLANC ENVIRONMENTAL

LEGEND:

XXX PINCHIN LOCATION NUMBER

N

CLIENT:

MEMORIAL UNIVERSITY OF NEWFOUNDLAND

PROJECT:

ASBESTOS AND LEAD PAINT BUILDING MATERIALS SURVEY

SITE ADDRESS:

QUEEN ELIZABETH II LIBRARY,
ST. JOHN'S CAMPUS,
NEWFOUNDLAND AND LABRADOR

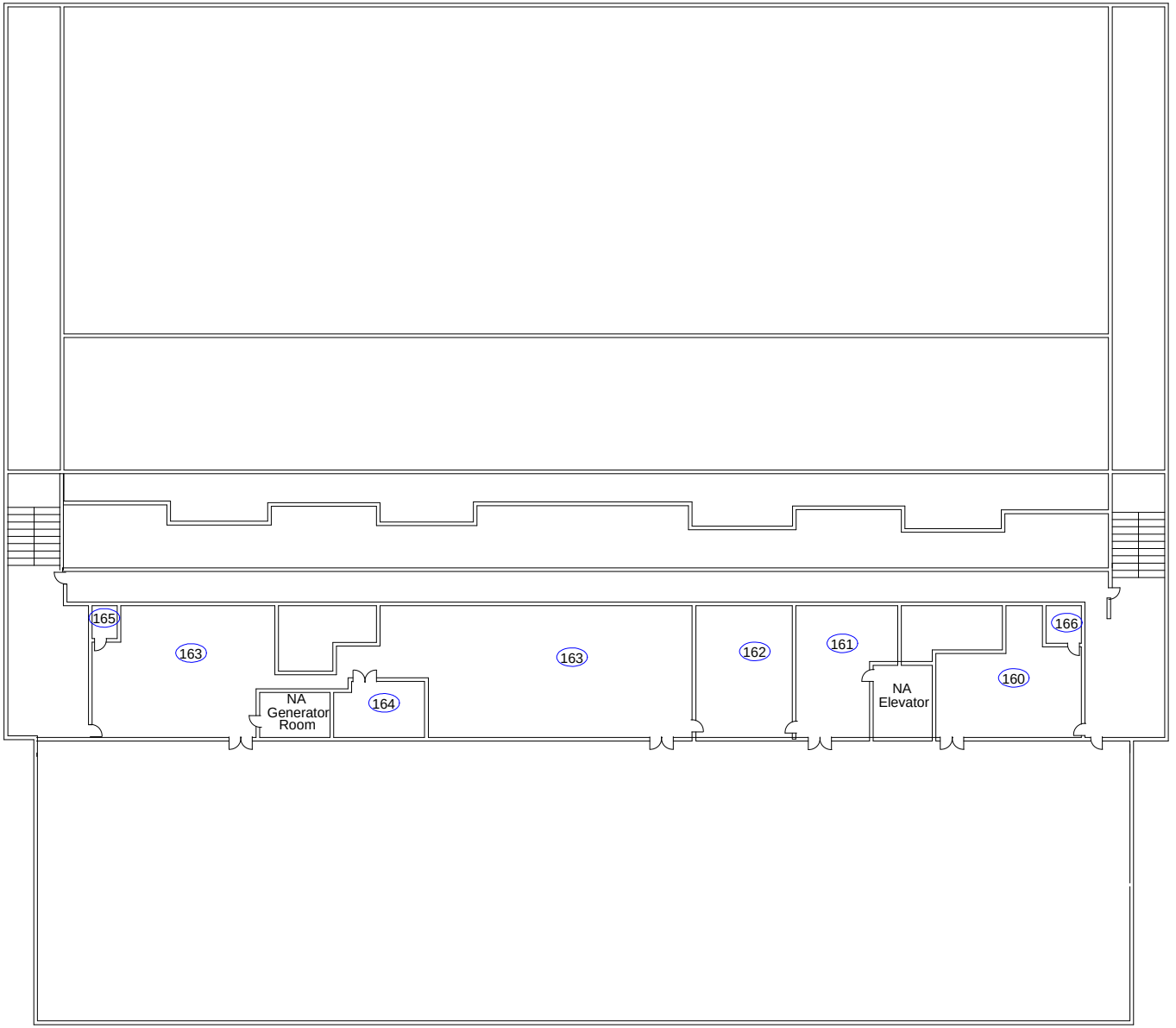
DRAWING NAME:

SAMPLE LOCATIONS
LEVEL 5

REFERENCE:

PLEL SITE SURVEY

DATE:	PROJECT #:
DECEMBER 2012	02 - 02 - 00900
SCALE: N.T.S.	FIGURE #: 5
DRAWN BY: A. ANISCIKLI	
CHECKED BY: T. HARDY	



PINCHIN LEBLANC ENVIRONMENTAL

LEGEND:

XXX PINCHIN LOCATION NUMBER

NA NOT ACCESSIBLE

N

CLIENT:

MEMORIAL UNIVERSITY OF NEWFOUNDLAND

PROJECT:

ASBESTOS AND LEAD PAINT BUILDING MATERIALS SURVEY

SITE ADDRESS:

QUEEN ELIZABETH II LIBRARY,
ST. JOHN'S CAMPUS,
NEWFOUNDLAND AND LABRADOR

DRAWING NAME:

SAMPLE LOCATIONS
LEVEL 6

REFERENCE:

PLEL SITE SURVEY

DATE:	PROJECT #:
DECEMBER 2012	02 - 02 - 00900
SCALE: N.T.S.	FIGURE #: 6
DRAWN BY: A. ANISCIKLI	
CHECKED BY: T. HARDY	

APPENDIX IV

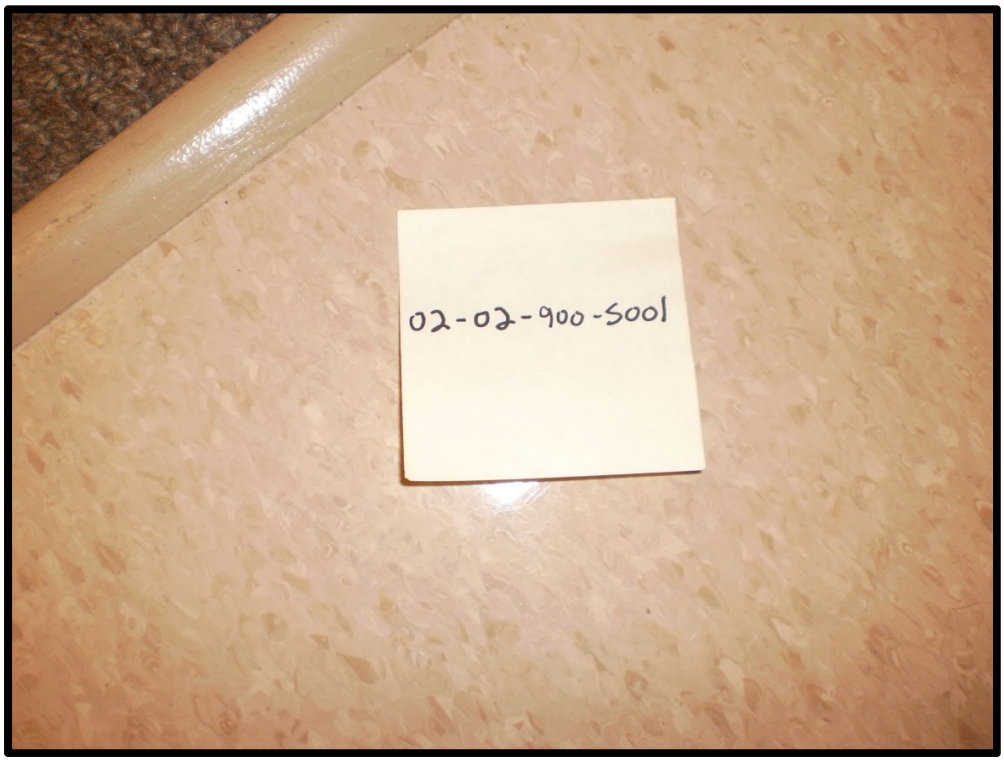
SAMPLE LOG

ASBESTOS BULK SAMPLING FORM

Sample #:	S001	**Date Sampled:**	October 1, 2012
Building :	QE II Library	**Sampler:**	Andy Mitchell
Location:	001, room L2017	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	X Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	X Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: Beige with light grey flecks	

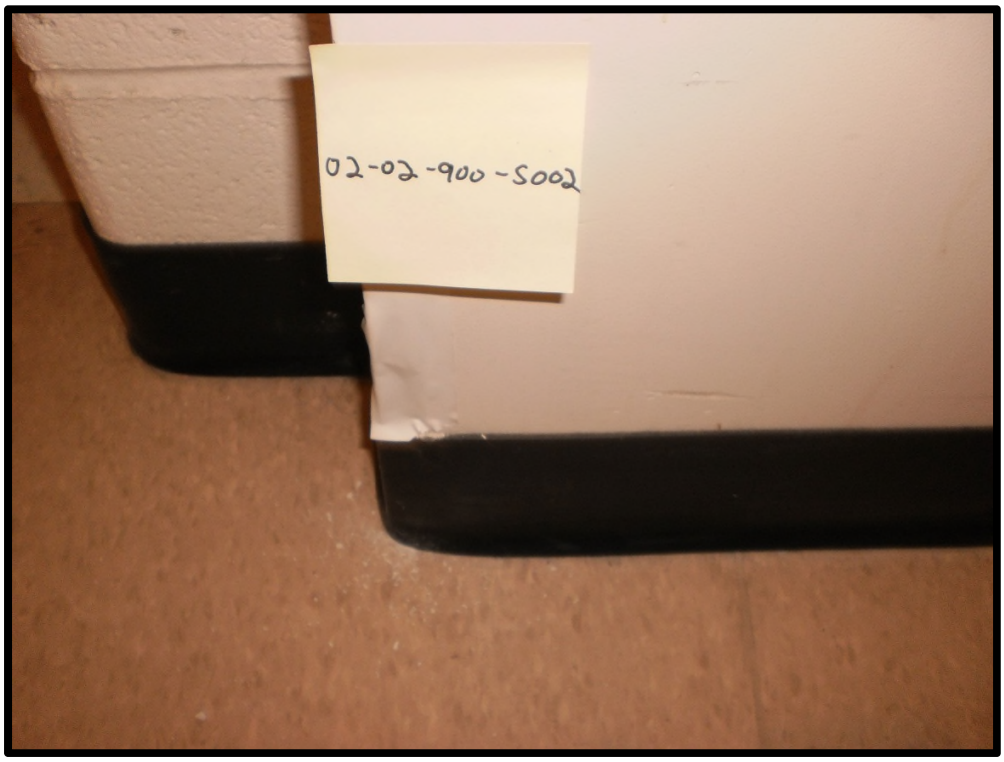


ASBESTOS BULK SAMPLING FORM

Sample #:	S002	**Date Sampled:**	October 1, 2012
Building :	QE II Library	**Sampler:**	Andy Mitchell
Location:	001, room L2017	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	X Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	X DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

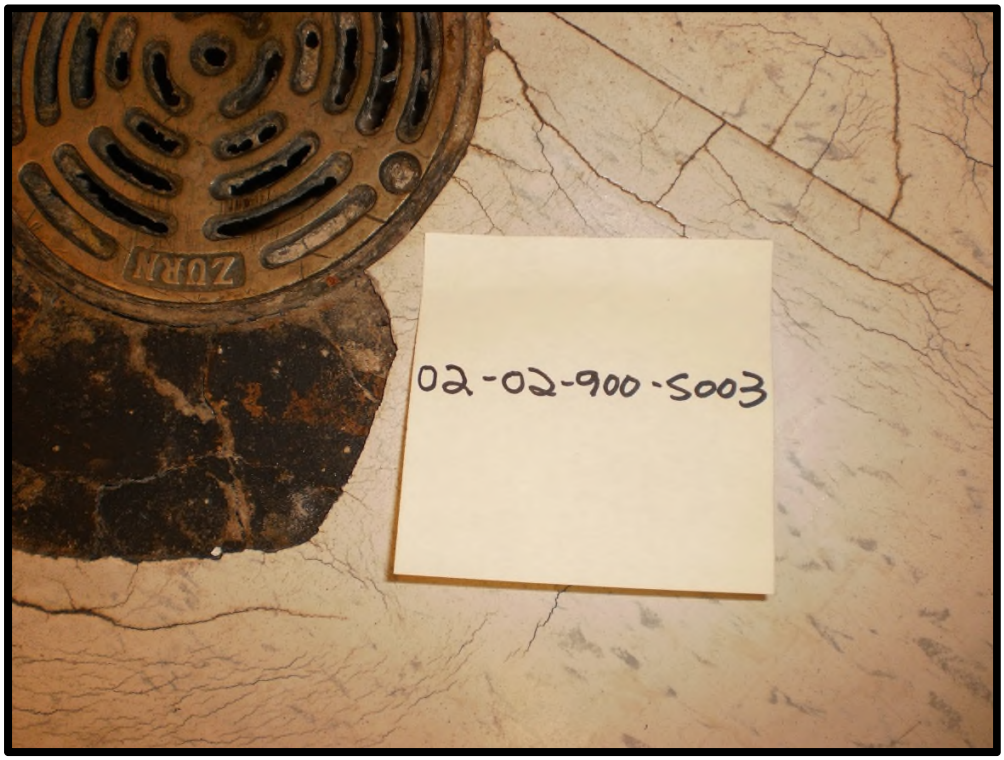


ASBESTOS BULK SAMPLING FORM

Sample #:	S003	**Date Sampled:**	October 1, 2012
Building :	QE II Library	**Sampler:**	Andy Mitchell
Location:	002, room L2021	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	X 12'x12' Tile	☐ Textured	☐ Shingle	X Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: White with large blue fleck	

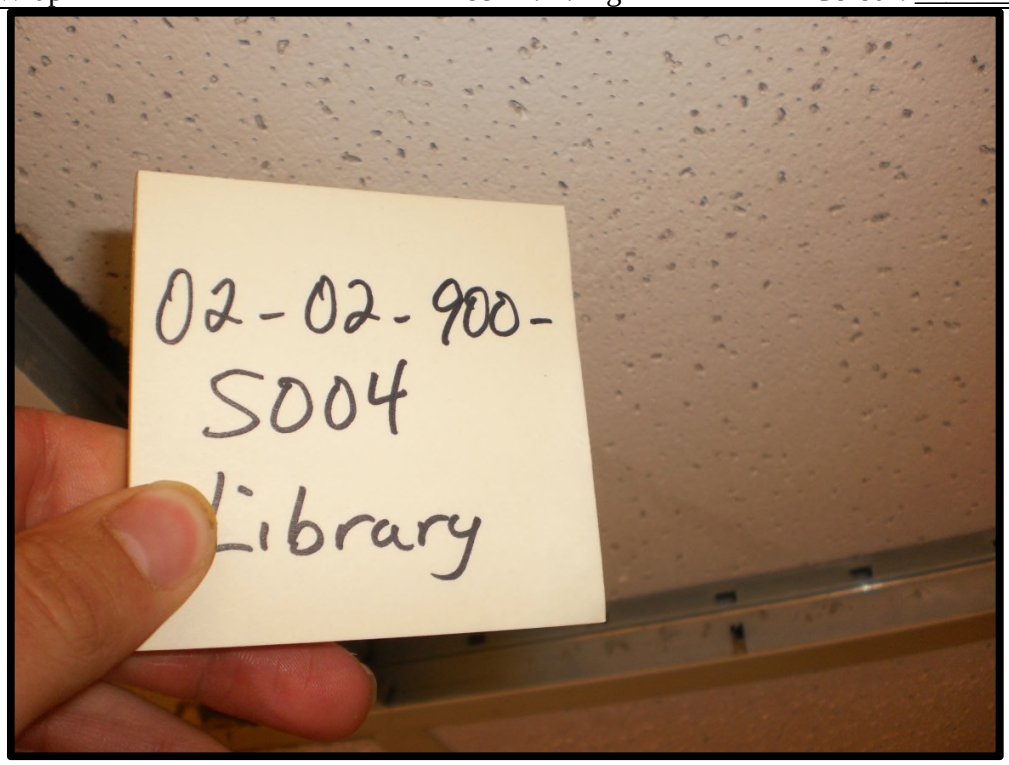


ASBESTOS BULK SAMPLING FORM

Sample #:	S004	**Date Sampled:**	October 1, 2012
Building :	QE II Library	**Sampler:**	Andy Mitchell
Location:	002, room L2021	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12’x12’ Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9’x9’Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	X Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	X Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: 2’ x 4’ pinhole fleck	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

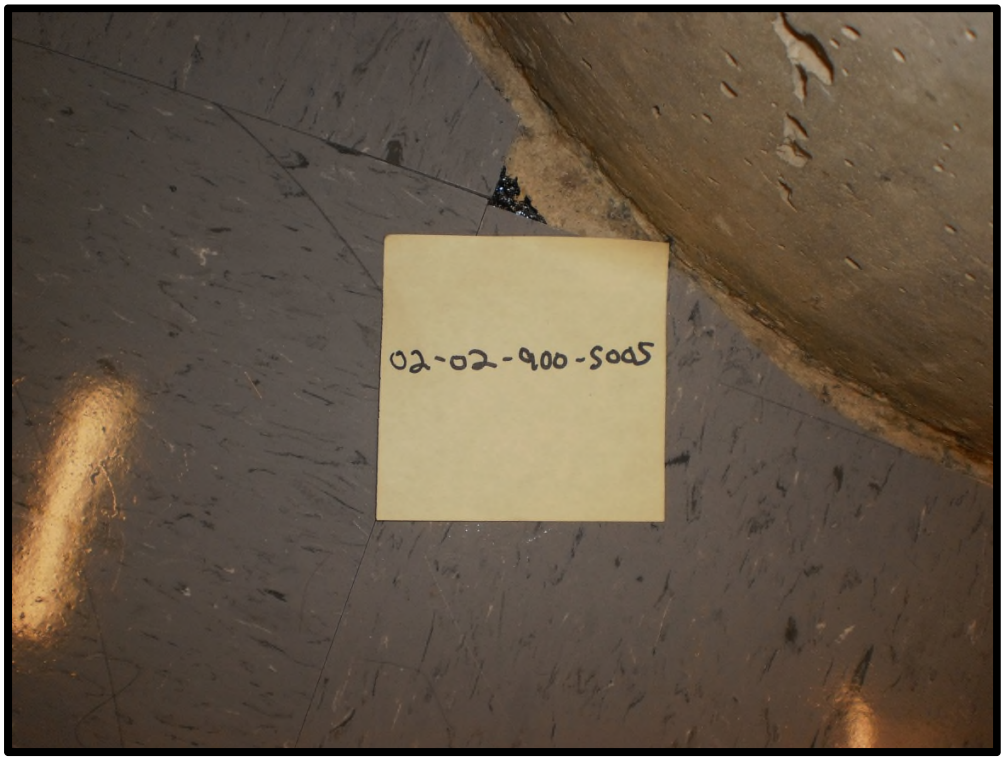


ASBESTOS BULK SAMPLING FORM

Sample #:	S005	**Date Sampled:**	October 1, 2012
Building :	QE II Library	**Sampler:**	Andy Mitchell
Location:	005, room L2018	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	X12'x12' Tile	☐ Textured	☐ Shingle	X Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: Blue with large black fleck	

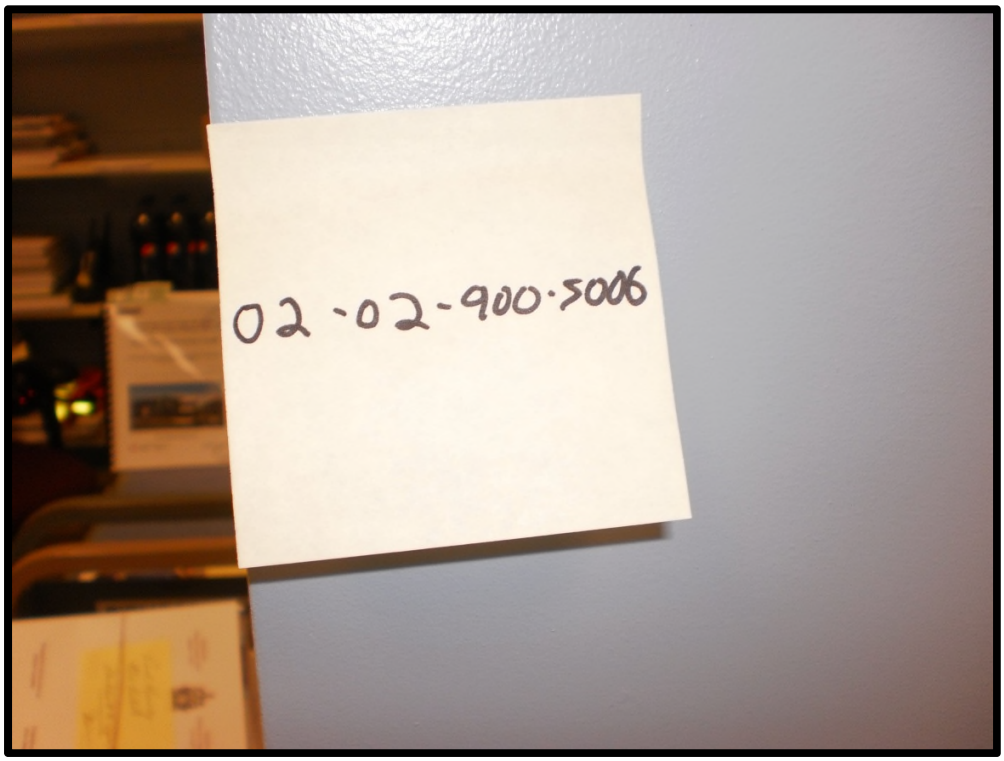


ASBESTOS BULK SAMPLING FORM

Sample #:	S006	**Date Sampled:**	October 1, 2012
Building :	QE II Library	**Sampler:**	Andy Mitchell
Location:	005, room L2018	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	X Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	X DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

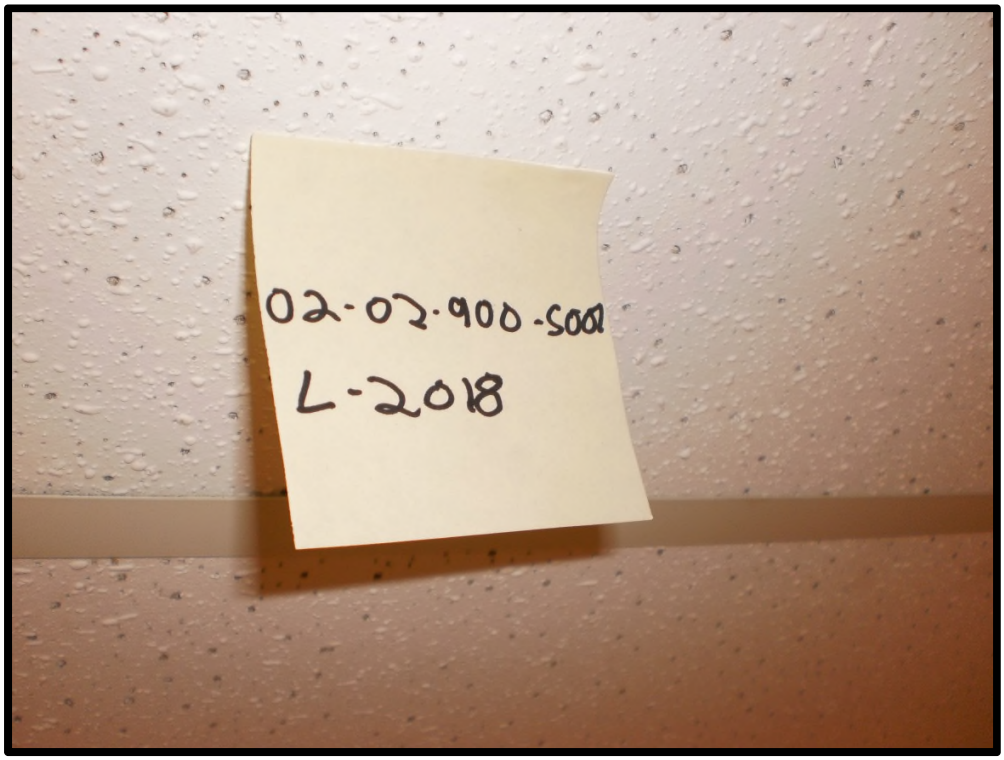


ASBESTOS BULK SAMPLING FORM

Sample #:	S007	**Date Sampled:**	October 1, 2012
Building :	QE II Library	**Sampler:**	Andy Mitchell
Location:	005, room L2018	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	X Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	X Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: 2' x 4' pinhole	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

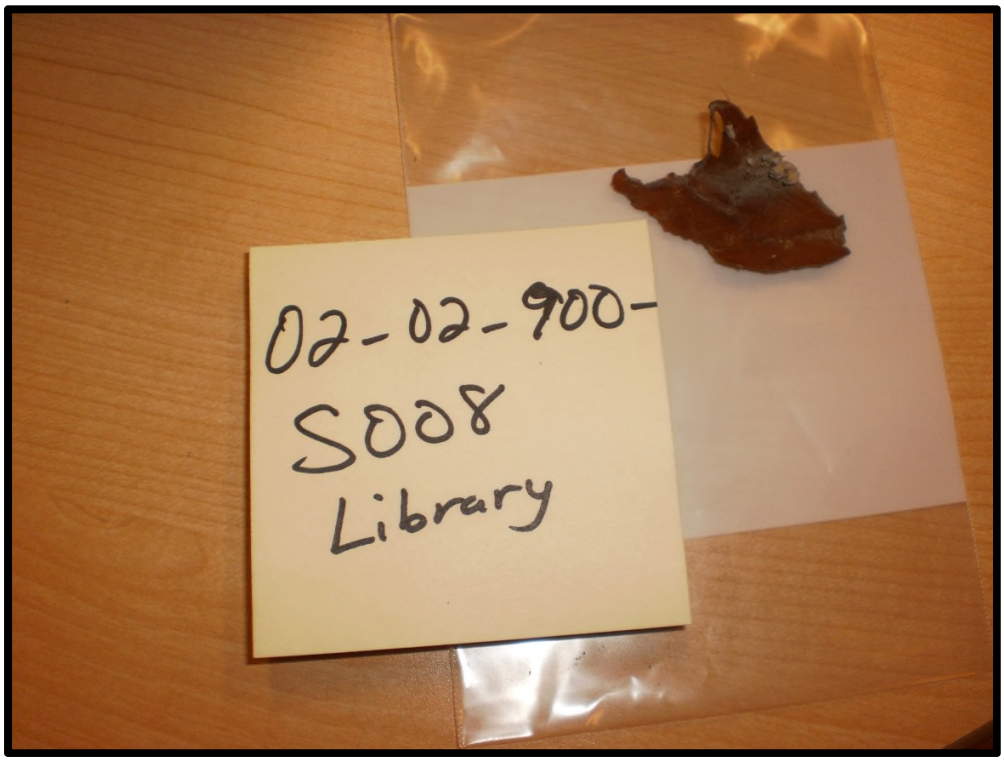


ASBESTOS BULK SAMPLING FORM

Sample #:	S008	**Date Sampled:**	October 1, 2012
Building :	QE II Library	**Sampler:**	Andy Mitchell
Location:	room 2051	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	X Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: Red duct sealant	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

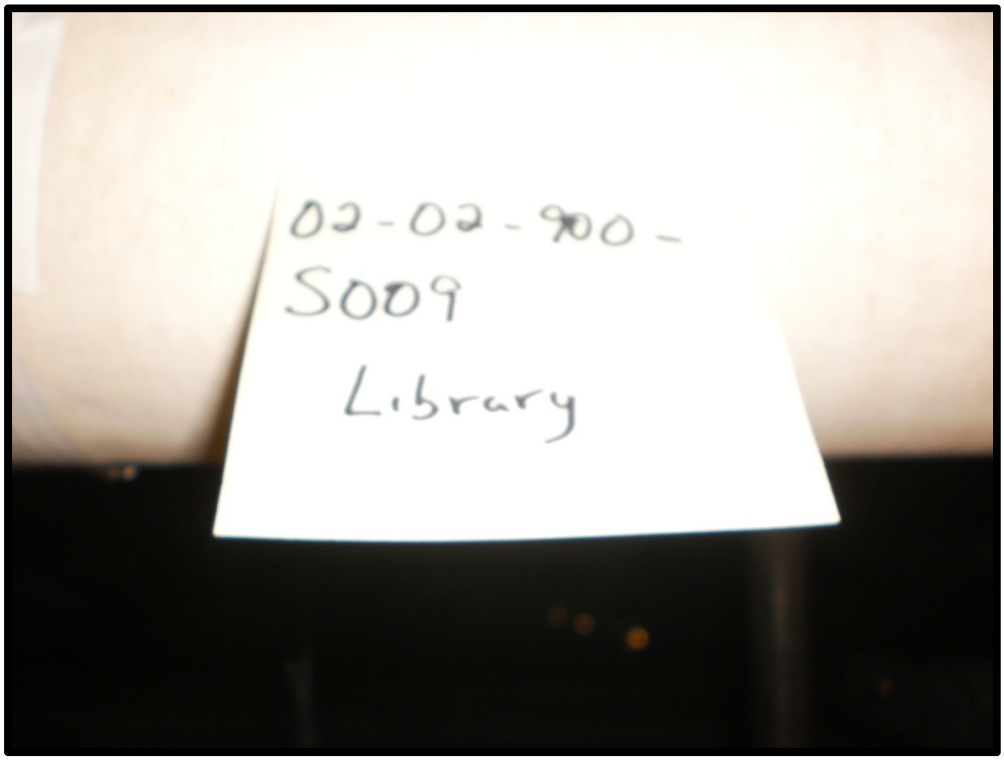


ASBESTOS BULK SAMPLING FORM

Sample #:	S009	**Date Sampled:**	October 1, 2012
Building :	QE II Library	**Sampler:**	Andy Mitchell
Location:	005, room 2018	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
X Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	X Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	



ASBESTOS BULK SAMPLING FORM

Sample #:	S010	**Date Sampled:**	October 2, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	006, room L2024	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

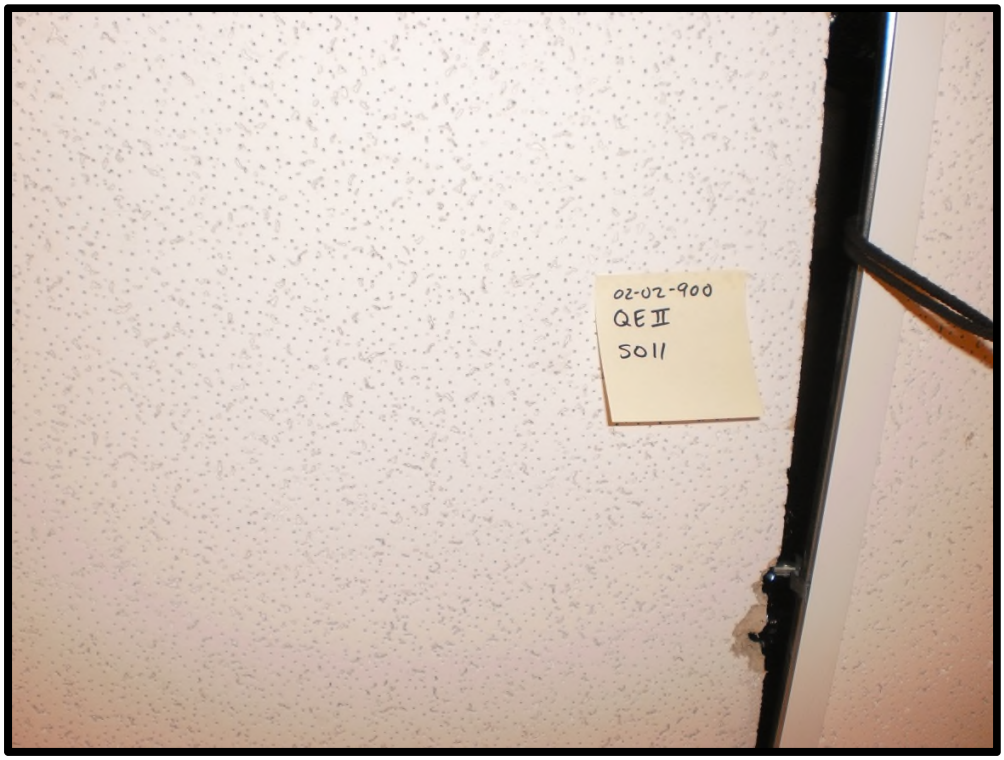
Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	X12'x12' Tile	☐ Textured	☐ Shingle	X Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: Very light brown with dark brown fleck	

ASBESTOS BULK SAMPLING FORM

Sample #:	S011	**Date Sampled:**	October 2, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	006, room L2024	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	X Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	X Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: 2' x 4' pinhole fleck dense	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

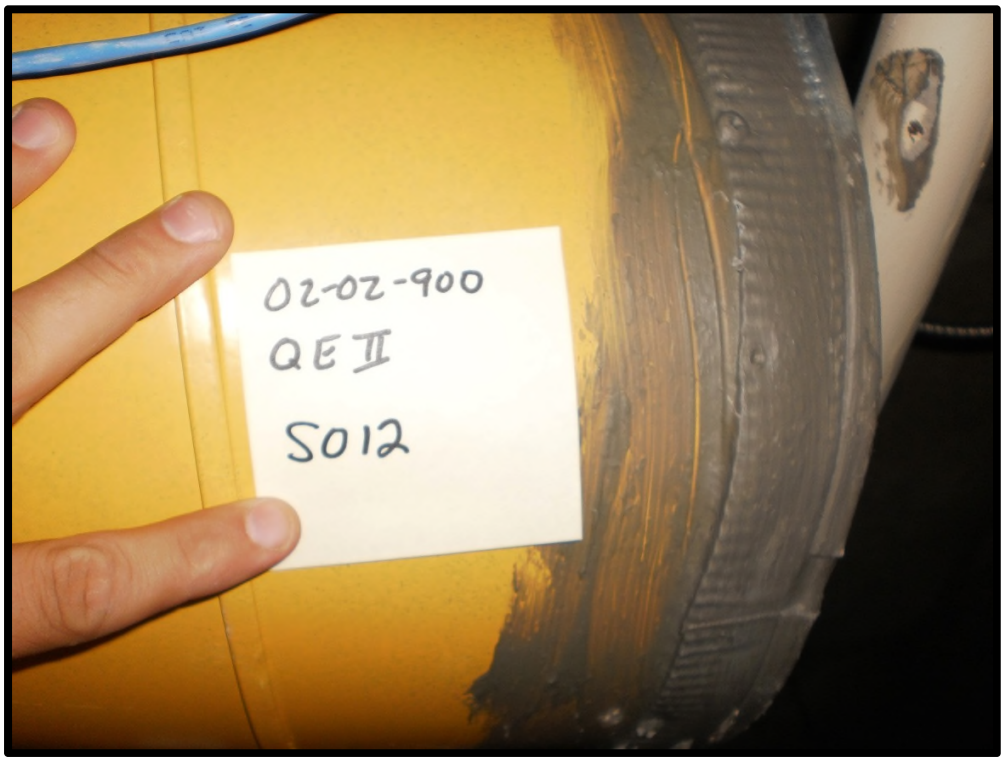


ASBESTOS BULK SAMPLING FORM

Sample #:	S012	**Date Sampled:**	October 2, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	006, room L2024	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	X Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: Grey duct sealant	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	



ASBESTOS BULK SAMPLING FORM

Sample #:	S013	**Date Sampled:**	October 2, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	008, room L2000A	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	X Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	X Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: 2' x 4' pinhole stipple	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S014	**Date Sampled:**	October 2, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	026, room L2025	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	X Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	X DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S015	**Date Sampled:**	October 2, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	027, room L2027	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	X 12'x12' Tile	☐ Textured	☐ Shingle	X Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: Light brown	

ASBESTOS BULK SAMPLING FORM

Sample #:	S016	**Date Sampled:**	October 2, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	027, room L2027	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	X12'x12' Tile	☐ Textured	☐ Shingle	X Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: Red	

ASBESTOS BULK SAMPLING FORM

Sample #:	S017	**Date Sampled:**	October 2, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	027, room L2027	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	X Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	X Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: 2' x 2' pinhole fleck	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S018	**Date Sampled:**	October 2, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	029, room L1003	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	X12'x12' Tile	☐ Textured	☐ Shingle	X Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: Light brown with dark blue and white flecks	

ASBESTOS BULK SAMPLING FORM

Sample #:	S019	**Date Sampled:**	October 2, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	031, room 1005A	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	X 12'x12' Tile	☐ Textured	☐ Shingle	X Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: Cream with large brown flecks	

ASBESTOS BULK SAMPLING FORM

Sample #:	S020	**Date Sampled:**	October 2, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	031, room L1005A	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	X Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	X DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S021	**Date Sampled:**	October 2, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	031, room L1005	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	X Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	X Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: Cream	

ASBESTOS BULK SAMPLING FORM

Sample #:	S022	**Date Sampled:**	October 2, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	035, room 1010A	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: Tar mastic	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S023	**Date Sampled:**	October 3, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	036, room L1009C	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	X12'x12' Tile	☐ Textured	☐ Shingle	X Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: Cream	

ASBESTOS BULK SAMPLING FORM

Sample #:	S024	**Date Sampled:**	October 3, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	037, room L1009	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	X Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	X Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: 2' x 2' pinhole stipple	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S025	**Date Sampled:**	October 3, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	038, room 1009A	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

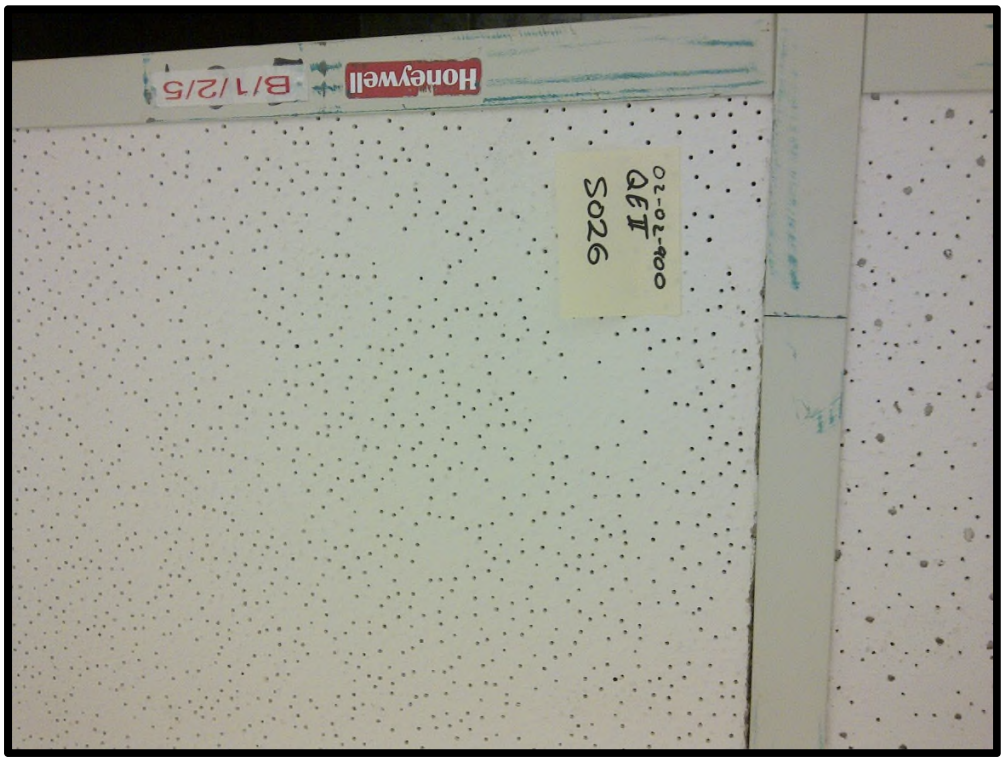
Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	X Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	X DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S026	**Date Sampled:**	October 3, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	040, room 1014H	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	X Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	X Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: 2' x 2' pinhole	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	



ASBESTOS BULK SAMPLING FORM

Sample #:	S027	**Date Sampled:**	October 3, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	045, room 1014A	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	X Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	X DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S028	**Date Sampled:**	October 3, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	048, room 1014G	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12’x12’ Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9’x9’Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	X Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	X Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: 2’ x 4’pinhole	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S029	**Date Sampled:**	October 3, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	Room L1C05	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	X12'x12' Tile	☐ Textured	☐ Shingle	X Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: Burgundy with light burgundy and white fleck	

ASBESTOS BULK SAMPLING FORM

Sample #:	S030	**Date Sampled:**	October 3, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	Room L1012A	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	X12'x12' Tile	☐ Textured	☐ Shingle	X Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: White with grey speck	

ASBESTOS BULK SAMPLING FORM

Sample #:	S031	**Date Sampled:**	October 3, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	Room L1013	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: Gold mastic on bottom of the sink	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S032	**Date Sampled:**	October 3, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	Room L1V01	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12’x12’ Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9’x9’Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	X Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: Transite	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S033	**Date Sampled:**	October 3, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	Room 1C01	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	X Ceiling
☐ Transite Pipe	☐ Mastic	X DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S034	**Date Sampled:**	October 3, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	Room L1013C	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		X Other (countertop)
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: Transite	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S035	**Date Sampled:**	October 3, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	Room L1017	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	X12'x12' Tile	☐ Textured	☐ Shingle	X Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: Beige with blue and brown specks	

ASBESTOS BULK SAMPLING FORM

Sample #:	S036	**Date Sampled:**	October 3, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	Room L1021	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	X12'x12' Tile	☐ Textured	☐ Shingle	X Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: White with brown streaks	

ASBESTOS BULK SAMPLING FORM

Sample #:	S037	**Date Sampled:**	October 4, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	Room L1010	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	X12'x12' Tile	☐ Textured	☐ Shingle	X Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: White with black streaks	

ASBESTOS BULK SAMPLING FORM

Sample #:	S038	**Date Sampled:**	October 4, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	Room L3022	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	X Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	X Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: 2' x 4' small fissure and fleck	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S039	**Date Sampled:**	October 4, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	Room L3017	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	X12'x12' Tile	☐ Textured	☐ Shingle	X Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: Grey with abundant white and brown flecks	

ASBESTOS BULK SAMPLING FORM

Sample #:	S040	**Date Sampled:**	October 4, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	079, hallway	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: Tar paper jacket on ductwork	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S041	**Date Sampled:**	October 4, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	081, room L3018	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

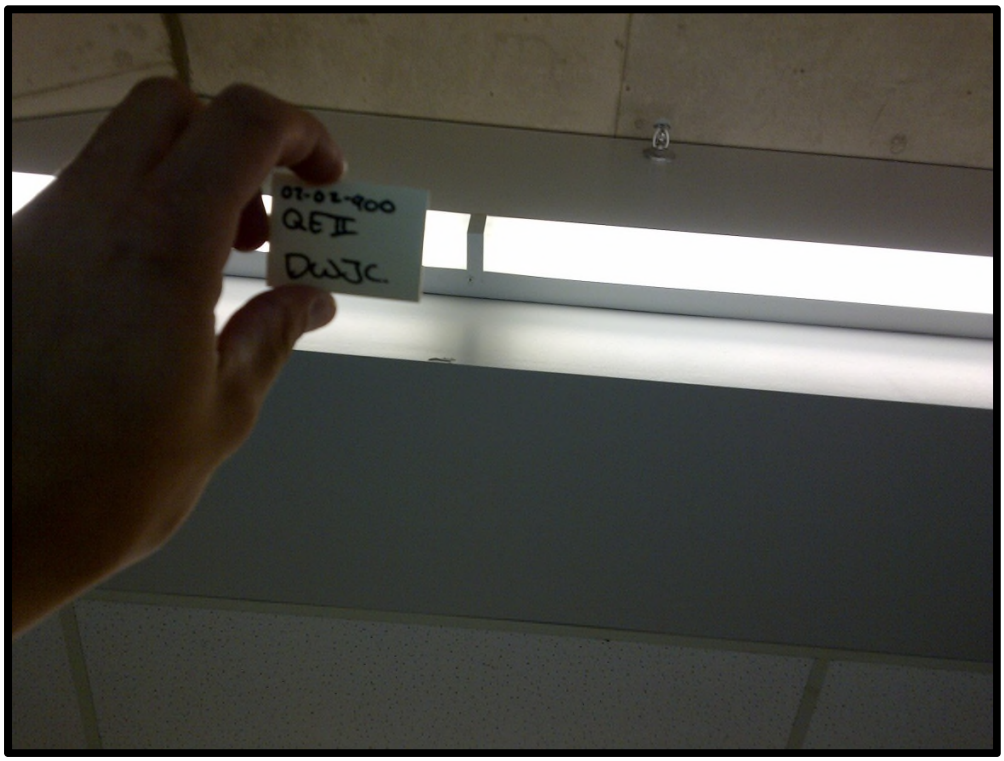
Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	X12'x12' Tile	☐ Textured	☐ Shingle	X Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: Grey with dark grey and white fleck	

ASBESTOS BULK SAMPLING FORM

Sample #:	S042	**Date Sampled:**	October 4, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	081, room L3018	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	X Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	X DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	



ASBESTOS BULK SAMPLING FORM

Sample #:	S043	**Date Sampled:**	October 4, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	082, room 3023	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	X Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	X DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S044	**Date Sampled:**	October 4, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	107, room L4017	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
X Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S045	**Date Sampled:**	October 4, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	107, room L4017	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	X Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: _____	
☐ Insulation	X DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S046	**Date Sampled:**	November 2, 2012
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	160, room L6006	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
X Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	X Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: Parging	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S047	**Date Sampled:**	May 2, 2013
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	Room 1007	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		X Other
X Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: Parging	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S048	**Date Sampled:**	May 2, 2013
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	1013A	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

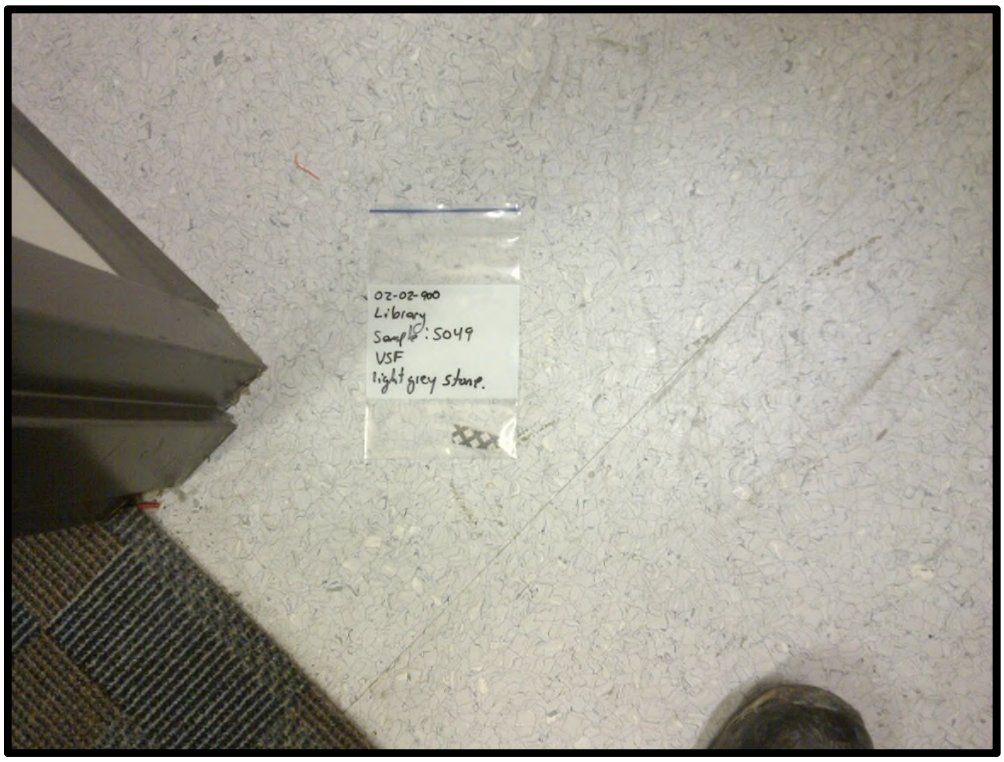
Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	☐ Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	☐ Vinyl Sheet	☐ Popcorn	☐ Felt	X Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	X Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: Acoustic Ceiling Tile 2x4 pinhole and fissure	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	

ASBESTOS BULK SAMPLING FORM

Sample #:	S049	**Date Sampled:**	May 2, 2013
Building :	QE II Library	**Sampler:**	Trent Hardy
Location:	2028A	**Analysis:**	SAI - PLM
MUN Project #:	02-02-900	**Work Order #:**	

Bulk Sampling Parameters

Pipe/Tank	Flooring	Ceiling	Roofing	Location
☐ Insulation	☐12'x12' Tile	☐ Textured	☐ Shingle	X Floor
☐ Elbow	☐ 9'x9'Tile	☐ Stucco	☐ Rolled	☐ Wall Orientation
☐ Fitting	X Vinyl Sheet	☐ Popcorn	☐ Felt	☐ Ceiling
☐ Transite Pipe	☐ Mastic	☐ DWJC	☐ Tar	☐ Above Ceiling
☐ Gasket	**Wall**	☐ Plaster		☐ Other
☐ Tank Insulation	☐ Transite Panel	☐ Acoustic Tile (Dropped)		
☐ Pipe Wrap	☐ Textured Wall	☐ Acoustic Tile (Glued-on)		
HVAC	☐ Plaster	☐ Mastic	Miscellaneous: Grey Stone Pattern	
☐ Insulation	☐ DWJC	**Structural**		
☐ Tape		☐ Steel F. P. ing	No. of Phases: _____	
☐ Paper Wrap		☐ Deck F. P. ing	Colour: _____	



PART 1 - GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:
- .1 Demolition and removal of selected portions of building or structure.
- .2 Demolition and removal of selected site elements.
- .3 Salvage of existing items to be reused or recycled.

.2 Types of items you will not find described in this Section:
- .1 Use of premises, and phasing, and Owner-occupancy requirements.
- .2 Photographic Documentation for preconstruction photographs taken before selective demolition operations.
- .3 Temporary Facilities and Controls for temporary construction and environmental-protection measures for selective demolition operations.
- .4 Cutting and Patching for cutting and patching procedures.
- .5 Construction Waste Management and Disposal for disposal of demolished materials.

1.2 DEFINITIONS

.1 Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

.2 Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.

.3 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

.4 Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 MATERIALS OWNERSHIP

.1 Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.
- .1 Coordinate with Owner's archaeologist, who will establish special procedures for removal and salvage.

1.4 SUBMITTALS

.1 Schedule of Selective Demolition Activities: Indicate the following:
- .1 Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's building managers and other tenants' on-site operations are uninterrupted.
- .2 Interruption of utility services. Indicate how long utility services will be interrupted.
- .3 Coordination for shutoff, capping, and continuation of utility services.
- .4 Use of elevator and stairs.
- .5 Locations of proposed dust- and noise-control temporary partitions and means of egress, including for other tenants affected by selective demolition operations.
- .6 Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- .7 Means of protection for items to remain and items in path of waste removal from building.

.2 Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.

.3 Predemolition Photographs or Videotapes: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by selective demolition operations. Comply with Division 01 Section *Photographic Documentation*. Submit before Work begins.

.4 Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
.1 Comply with submittal requirements in Division 01 Section "*Construction Waste Management and Disposal*."

1.5 QUALITY ASSURANCE

.1 Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

.2 Standards: Comply with ANSI A10.6, NFPA 241, NBCC, and NFCC.

.3 Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 01 Section *Project Management and Coordination*. Review methods and procedures related to selective demolition including, but not limited to, the following:
.1 Inspect and discuss condition of construction to be selectively demolished.
.2 Review structural load limitations of existing structure.
.3 Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
.4 Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
.5 Review areas where existing construction is to remain and requires protection.

1.6 PROJECT CONDITIONS

.1 Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
.1 Comply with requirements specified in Division 01 Section *Summary*.

.2 Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
.1 Before selective demolition, Owner will remove the following items:
.1 Items as selected by the Owner.

.3 Notify Owner's Representative of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

.4 Hazardous Materials: It may be possible hazardous materials could be present in construction to be selectively demolished. A report on the presence of hazardous materials is attached for review and use (If no report is attached, request clarification from Owner's Representative. Examine report to become aware of locations where hazardous materials are present.
.1 Hazardous material remediation is specified elsewhere in the Contract Documents.
.2 Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.

.5 Storage or sale of removed items or materials on-site is not permitted.

.6 Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
.1 Maintain fire-protection facilities in service during selective demolition operations.

1.7 WARRANTY

.1 Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verify that utilities have been disconnected and capped.

.2 Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

.3 Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

.4 When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Owner's Representative.

.5 Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.

.6 Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.
.1 Comply with requirements specified in Division 01 Section "*Photographic Documentation*."
.2 Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

.7 Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

.1 Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
.1 Comply with requirements for existing services/systems interruptions specified in Division 01 Section *Summary*.

.2 Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
.1 Arrange to shut off indicated utilities with utility companies.
.2 If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

.3 Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
.1 Where entire wall is to be removed, existing services/systems may be removed with removal of the wall.

3.3 PREPARATION

.1 Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
.1 Comply with requirements for access and protection specified in Division 01 Section *Temporary Facilities and Controls*.

.2 Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
.1 Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
.2 Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
.3 Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
.4 Cover and protect furniture, furnishings, and equipment that have not been removed.
.5 Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section *Temporary Facilities and Controls*.

.3 Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
.1 Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

.1 General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
.1 Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
.2 Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
.3 Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
.4 Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
.5 Maintain adequate ventilation when using cutting torches.
.6 Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
.7 Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
.8 Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

.9 Dispose of demolished items and materials promptly. Comply with requirements in Division 01 Section *Construction Waste Management and Disposal*.

.2 Reuse of Building Elements: Project has been designed to result in end-of-Project rates for reuse of building elements as follows. Do not demolish building elements beyond what is indicated on Drawings without Owner's Representative's approval.

.3 Removed and Salvaged Items:
.1 Clean salvaged items.
.2 Pack or crate items after cleaning. Identify contents of containers.
.3 Store items in a secure area until delivery to Owner.
.4 Transport items to Owner's storage area designated by Owner.
.5 Protect items from damage during transport and storage.

.4 Removed and Reinstalled Items:
.1 Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
.2 Pack or crate items after cleaning and repairing. Identify contents of containers.
.3 Protect items from damage during transport and storage.
.4 Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

.5 Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Owner's Representative, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

.1 Concrete: Demolish in small sections. Cut concrete to a depth of at least 19 mm at junctures with construction to remain, using power-driven saw. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete indicated for selective demolition. Neatly trim openings to dimensions indicated.

.2 Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.

.3 Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

.4 Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

.5 Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI-WP and its Addendum.
.1 Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.

.6 Roofing: Remove no more existing roofing than can be covered in one day by new roofing and so that building interior remains watertight and weather tight. Refer to Division 07 for new roofing requirements.
.1 Remove existing roof membrane, flashings, copings, and roof accessories.
.2 Remove existing roofing system down to substrate.

.7 Air-Conditioning Equipment: Remove equipment without releasing refrigerants.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

.1 General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an approved landfill.
- .1 Do not allow demolished materials to accumulate on-site.
- .2 Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- .3 Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- .4 Comply with requirements specified in Division 01 Section *Construction Waste Management and Disposal*.

.2 Burning: Do not burn demolished materials.

.3 Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

.1 Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.8 SELECTIVE DEMOLITION SCHEDULE

.1 Existing Construction to Be Removed: See Drawings

.2 Existing Items to Be Removed and Salvaged: See Drawings

.3 Existing Items to Be Removed and Reinstalled: See Drawings

.4 Existing Items to Remain: See Drawings

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:
- .1 Requirements and procedures for asbestos abatement of minor amounts of chrysotile asbestos-containing materials of the type describe within.
  - .1 Removing suspended ceilings, as indicated.
  - .2 Removal of asbestos containing material from piping and equipment.
  - .3 Enclosure of friable asbestos containing material.
  - .4 Application of tape or sealant or other covering to pipe and boiler insulation containing asbestos.

.2 Types of items you will not find described in this Section:
- .1 Submittal Procedures.
- .2 Health and Safety Requirements.
- .3 Construction/Demolition Waste Management and Disposal.

.3 References
- .1 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-1.205-94, Sealer for Application of Asbestos Fibre Releasing Materials.
- .2 Department of Justice Canada (Jus).
  - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .4 Transport Canada (TC).
  - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .5 Underwriters' Laboratories of Canada (ULC).

1.2 DEFINITIONS

.1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any dimension at 99.97% efficiency.

.2 Amended Water: water with non-ionic surfactant wetting agent added to reduce water tension to allow wetting of fibres.

.3 Asbestos Containing Materials (ACMs): materials identified under *Existing Conditions* Article, including fallen materials and settled dust.

.4 Minor Amounts of ACMs: less than or equal to 0.1 m2 of friable material containing chrysotile asbestos.

.5 Asbestos Work Area: area where work takes place which will, or may disturb ACMs.

.6 Authorized Visitors: Owner's Representatives, or designated representatives, and representatives of regulatory agencies.

.7 Friable Material: material that when dry can be crumbled, pulverized or powdered by hand pressure and includes such material that is crumbled, pulverized or powdered.

.8 Occupied Area: any area of building or work site that is outside Asbestos Work Area.

.9 Polyethylene: polyethylene sheeting or rip proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide protection and isolation.

.10 Glove Bag: prefabricated glove bag as follows:

.1 Minimum thickness 0.25 mm (10 mil) polyvinyl-chloride bag.
.2 Integral 0.25 mm (10 mil) thick polyvinyl-chloride gloves and elastic ports.
.3 Equipped with reversible double pull double throw zipper on top and at approximately mid-section of the bag.
.4 Straps for sealing ends around pipe.
.5 Must incorporate internal closure strip if it is to be moved or used in more than one specific location.

.11 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have appropriate capacity for scope of work.

1.3 SUBMITTALS

.1 Submit proof satisfactory to Owner's Representative that suitable arrangements have been made to dispose of asbestos containing waste in accordance with requirements of authority having jurisdiction.

.2 Submit Provincial/Territorial and/or local requirements for Notice of Project Form.

.3 Submit proof of Contractor's Asbestos Liability Insurance.

.4 Submit to Owner's Representative necessary permits for transportation and disposal of asbestos containing waste and proof that asbestos containing waste has been received and properly disposed.

.5 Submit proof satisfactory to Owner's Representative that employees have had instruction on hazards of asbestos exposure, respirator use, dress, entry and exit from Asbestos Work Area, and aspects of work procedures and protective measures.

.6 Submit proof that supervisory personnel have attended asbestos abatement course, of not less than two days duration, approved by Owner's Representative. Minimum of one supervisor for every ten workers.

.7 Submit Worker's Compensation Board status and transcription of insurance.

.8 Submit documentation including test results, fire and flammability data, and Material Safety Data Sheets (MSDS) for chemicals or materials including:
.1 encapsulants;
.2 amended water;
.3 slow drying sealer.

1.4 QUALITY ASSURANCE

.1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at the time work is performed.

.2 Health and Safety:
.1 Do construction occupational health and safety in accordance with *Health and Safety Requirements*.
.2 Safety Requirements: worker and visitor protection.
.1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area include:

.1 Non-powered reusable or replaceable filter type respirator equipped with HEPA filter cartridges, personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Provincial Authority having jurisdiction.

.2 Disposable type protective clothing that does not readily retain or permit penetration of asbestos fibres, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.

.2 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.

.3 Before leaving Asbestos Work Area, dispose of protective clothing as contaminated waste as specified.

.4 Ensure workers wash hands and face when leaving Asbestos Work Area. Facilities for washing are located.

.5 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects seal between respirator and face.

.3 Visitor Protection:

.1 Provide protective clothing and approved respirators to Authorized Visitors to work areas.

.2 Instruct Authorized Visitors in the use of protective clothing, respirators and procedures.

.3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Asbestos Work Area.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Place materials defined as hazardous or toxic in designated containers.

.2 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.3 Fold up metal banding, flatten and place in designated area for recycling.

.4 Disposal of asbestos waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of asbestos waste in sealed double thickness 6 ml bags or leak proof drums. Label containers with appropriate warning labels.

.5 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.6 EXISTING CONDITIONS

.1 Results of tests of asbestos containing materials to be handled, removed, or otherwise disturbed and disposed of during this Project are bound into this specification manual. These are for general information only and are not necessarily representative of asbestos containing materials covered within scope of this Project.

1.7 SCHEDULING

.1 Not later than ten (10) days before beginning Work on this Project notify following in writing:

.1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.

.2 Regional Office of Labour Canada.

.3 Provincial/Territorial, Department of Labour.

.4 Disposal Authority.

.2 Inform sub trades of presence of friable asbestos containing materials identified in *Existing Conditions*.

.3 Submit to Owner's Representative copy of notifications prior to start of Work.

1.8 OWNER'S INSTRUCTIONS

.1 Before beginning Work, provide to Owner's Representative satisfactory proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene including dress and showers, in entry and exit from Asbestos Work Area, in aspects of work procedures including glove bag procedures, and in use, cleaning, and disposal of respirators and protective clothing.

.2 Instruction and training related to respirators includes, at minimum:
- .1 Proper fitting of equipment.
- .2 Inspection and maintenance of equipment.
- .3 Disinfecting of equipment.
- .4 Limitations of equipment.

.3 Instruction and training must be provided by competent, qualified person.

.4 Supervisory personnel to complete required training.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Drop and Enclosure Sheets.
- .1 Polyethylene: 0.15 mm thick.
- .2 FR polyethylene: 0.15 mm thick woven fibre reinforced fabric bonded both sides with polyethylene.

.2 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in concentration to provide thorough wetting of asbestos containing material.

.3 Waste Containers: contain waste in two separate containers.
- .1 Inner container: 0.15 mm thick sealable polyethylene bag or where glove bag method is used, glove bag itself.
- .2 Outer container: sealable metal or fibre type where there are sharp objects included in waste material; otherwise outer container may be sealable metal or fibre type or second 0.15 mm thick sealable polyethylene bag.
- .3 Labelling requirements: affix preprinted cautionary asbestos warning, in both official languages, that is visible when ready for removal to disposal site.

.4 Glove bag:
- .1 Acceptable materials: safe-T-Strip products in configuration suitable for Work, or Alternative material approved by addendum during tendering period in accordance with Instructions to Tenderers.
- .2 Glove bags intended for use in more than one location must be equipped with reversible, double pull, double throw zipper on top and at approximately mid-section of bag.

.5 Tape: tape suitable for sealing polyethylene to surfaces under both dry and wet conditions using amended water.

.6 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual asbestos fibres.
- .1 Sealer: flame spread and smoke developed rating less than 50.

.7 Encapsulants: Type 2 surface film forming or Type 1 penetrating type Class A water based conforming to CAN/CGSB-1.205 and approved by the Fire Commissioner of Canada.

PART 3 - EXECUTION

3.1 SUPERVISION

.1 Minimum of one Supervisor for every ten workers is required.

.2 Approved Supervisor must remain within Asbestos Work Area during disturbance, removal, or other handling of asbestos containing materials.

3.2 PROCEDURES

.1 Do construction occupational health and safety in accordance with *Health and Safety Requirements*.

.2 Before beginning Work, at each access to Asbestos Work Area, install warning signs in both official languages in upper case *Helvetica Medium* letters reading as follows, where number in parentheses indicates font size to be used : *CAUTION ASBESTOS HAZARD AREA (25 mm) / NO UNAUTHORIZED ENTRY (19 mm) / WEAR ASSIGNED PROTECTIVE EQUIPMENT (19 mm) / BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM (7 mm)*.

.3 Before beginning Work remove visible dust from surfaces in work area where dust is likely to be disturbed during course of work.
.1 Use HEPA vacuum, or damp cloths where damp cleaning does not create hazard and is otherwise appropriate.
.2 Do not use compressed air to clean up or remove dust from any surface.

.4 Prevent spread of dust from Asbestos Work Area using measures appropriate to work to be done.
.1 Use FR polyethylene drop sheets over flooring such as carpeting that absorbs dust and over flooring in work areas where dust or contamination cannot otherwise be safely contained.
.2 When removing suspended ceilings and walls themselves do not enclose work area and when removing asbestos containing material from piping or equipment and *glove bag* method is not used erect enclosure of polyethylene sheeting around work area, shut off mechanical ventilation system serving work area and seal ventilation ducts to and from work area.

.5 Before removing suspended ceilings, remove friable material on upper surfaces using HEPA vacuum equipment.
.1 Remove and clean surfaces of ceiling panels using HEPA vacuum, wrap clean panels in 0.10 mm thick polyethylene, and store in building as directed by Owner's Representative.
.2 Clean *T* grid suspension system, disconnect, wrap in 0.10 mm thick polyethylene, and store in building as directed by Owner's Representative.

.6 Remove loose material by HEPA vacuum; thoroughly wet friable material containing asbestos to be removed or disturbed before and during Work unless wetting creates hazard or causes damage.
.1 Use garden reservoir type low - velocity sprayer or airless spray equipment capable of producing mist or fine spray.
.2 Perform Work in a manner to reduce dust creation to lowest levels practicable.

.7 Pipe Insulation Removal Using Glove Bag:
.1 Place tools necessary to remove insulation in tool pouch. Wrap bag around pipe and close zippers. Seal bag to pipe with cloth straps.
.2 Place hands in gloves and use necessary tools to remove insulation. Arrange insulation in bag to obtain full capacity of bag.
.3 Insert nozzle of garden reservoir type sprayer into bag through valve and wash down pipe and interior of bag thoroughly. Wet surface of insulation in lower section of bag.

.4 When glove bags are intended for use at more than one location: after wash down and application of sealer, seal off waste in lower section of bag using zipper at mid-section of bag. Remove air from top section of bag through elasticized valve using HEPA vacuum. Remove bag from pipe, reinstall in new location, and reseal to pipe prior to opening lower section of bag. Repeat stripping operation.

.5 If bag is to be moved along pipe, first remove air from top section through elasticized valve using HEPA vacuum. Next loosen straps, move bag, re-seal to pipe using double pull zipper to pass hangers. Repeat stripping operation.

.6 To remove bag after completion of stripping, wash top section and tools thoroughly. Remove air from top section through elasticized valve using a HEPA vacuum. Pull polyethylene waste container over glove bag before removing from pipe. Release one strap and remove freshly washed tools. Place tools in water. Remove second strap and zipper. Fold over into waste container and seal.

.7 After removal of bag ensure that pipe is free of residue. Remove residue using HEPA vacuum or wet cloths. Ensure that surfaces are free of sludge which after drying could release asbestos dust into atmosphere. Seal exposed surfaces of pipe and ends of insulation with slow drying sealer to seal in any residual fibres.

.8 Upon completion of Work shift, cover exposed ends of remaining pipe insulation with polyethylene taped in place.

.8 Work is subject to visual inspection and air monitoring. Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas.

.9 Clean-up:

.1 Frequently during Work and immediately after completion of work, clean up dust and asbestos containing waste using HEPA vacuum or by damp mopping.

.2 Place dust and asbestos containing waste in sealed dust tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste and wet and fold to contain dust and then place in waste bags.

.3 Immediately before their removal from Asbestos Work Area and disposal, clean each filled waste bag using damp cloths or HEPA vacuum and place in second clean waste bag.

.4 Seal and remove double bagged waste from site. Dispose of in accordance with requirements of Provincial/Territorial and Federal authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and that guidelines and regulations for asbestos disposal are followed.

.5 Perform final thorough clean-up of Asbestos Work Areas and adjacent areas affected by Work using HEPA vacuum.

3.3 AIR MONITORING

.1 From beginning of Work until completion of cleaning operations, Owner's Representative to take air samples on daily basis outside of Asbestos Work Area enclosures in accordance with Health Canada recommendations.

.1 Contractor will be responsible for monitoring inside enclosure in accordance with applicable Provincial/Territorial Occupational Health and Safety Regulations.

.2 If air monitoring shows that areas outside Asbestos Work Area enclosures are contaminated, enclose, maintain and clean these areas in same manner as that applicable to Asbestos Work Area.

.3 Ensure that respiratory safety factors are not exceeded.

.4 During the course of Work, Owner's Representative to measure fibre content of air outside Work areas by means of fibrous aerosol monitors (FAM).

.1 When FAM readings exceed 0.25 f/cc, adopt more stringent Work procedures immediately and perform PCM test.

.5 Stop Work when PCM measurements exceed 0.01 f/cc and correct procedures.

END OF SECTION .02

PART 1 - GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Multi-step mechanical polishing and finishing of existing concrete floor slabs.

.2 Chemically reactive, sodium silicate/ siliconate penetrating liquid hardener/densifier.

.3 Lithium-fortified liquid sealer/guard applied to densified concrete.

1.2 REFERENCES

.1 Canadian Standard Association (CSA):

.1 CSA A23.1 Concrete Materials & Methods of Concrete Construction.

.2 Concrete Floor Contractors Association (CFCA):

.1 CFCA Definitions: Terminology used herein.

1.3 PREINSTALLATION MEETINGS

.1 Pre-installation Conference: Conduct conference at Business Administration BN-4019.

.2 Review scope of Work expected. Require representatives of each entity directly concerned with concrete slab work to attend, including the following:

.1 Contractor’s superintendent.

.2 Concrete slab installer/finisher.

.3 Polishing contractor.

.4 Architect's and/or Owner's representative (at their option).

.3 Review the following, at a minimum:

.1 Schedule

.2 Extent of Work.

.3 Curing method and materials.

.4 Polishing steps, including abrasive grit levels, and curing, densifying, and sealing sequence.

.5 Materials to be applied.

.6 Material storage and staging.

.7 Temporary heating (if needed).

.8 Water management procedures.

.9 Cleanup and disposal of waste materials.

1.4 ACTION SUBMITTALS

.1 General: Submit the following for approval. Do not proceed with work involving any action submittal until approval is obtained.

.2 Product Data: For each product used. Include material physical characteristics, storage and application instructions, precautions and safety data, cleanup, and maintenance information.

1.5 INFORMATIONAL SUBMITTALS

.1 General: Submit the following to the Owner for the Owner's information and records. If acceptable, and unless otherwise indicated, Informational Submittals will not be acted upon or returned.

.2 Safety Data Sheets (SDS) for all products used.

.3 Qualification Data: For polishing subcontractor.

.4 Maintenance Data: For inclusion in Operation and Maintenance Manual required by Division 01.

.1 Include instructions for cleaning and maintenance of polished concrete floor, as well as precautions against cleaning products and other chemicals that may be detrimental to satisfactory appearance of polished floor.

1.6 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Company regularly engaged in the manufacturing of the products specified in this section, with at least ten (10) years' successful history manufacturing material specified herein.

.2 Polisher Qualifications:

.1 Experience: Company with at least five (5) years' successful experience in performing work similar in design, products, and extent to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, and personnel to produce specified work.

.2 Supervision: Maintain competent supervisor who is at Project site during times work is in progress, and is a member of CFCA.

.3 Approved by, or acceptable to manufacturer to apply liquid applied products.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Deliver products in original factory packaging, bearing identification of product, manufacturer, batch number (or equivalent code), and expiration date.

.1 Safety Data Sheets for each product to the project superintendent.

.2 Store products in a location protected from freezing, damage, construction activity, precipitation and direct sunlight in strict accordance with the manufacturer's recommendations.

.3 Handle all products with appropriate precautions and care as recommended by manufacturer and as stated on the Safety Data Sheet.

1.8 PROJECT CONDITIONS

.1 Environmental Limitations: Comply with manufacturer's written instructions for ambient temperature and humidity, slab substrate temperature and moisture content, wind, precipitation, and other conditions affecting densifier performance.

.2 Damage and Stain Prevention: Take precautions to prevent damage and staining of concrete surfaces to be polished.

.1 Prohibit use of markers, spray paint, and soapstone.

.2 Prohibit improper application of liquid membrane film-forming curing compounds.

.3 Prohibit vehicle parking over concrete surfaces.

.4 Prohibit pipe-cutting operations over concrete surfaces.

.5 Prohibit storage of any items over concrete surfaces for not less than 28 days after concrete placement.

.6 Prohibit ferrous metals storage over concrete surfaces.

.7 Protect from petroleum, oil, hydraulic fluid, or other liquid dripping from equipment working over concrete surfaces.

.8 Protect from acids and acidic detergents contacting concrete surfaces.

.9 Protect from painting activities over concrete surfaces.

.3 Use appropriate measures for protection and supplementary heating in accordance with manufacturer's recommendations during times of temperature extremes or inclement weather.

.1 Avoid heating methods that may result of carbonation of concrete surface.

.4 Do not allow liquid materials to freeze.

.5 Protect adjacent work from contamination due to mixing, handling, and application of liquid densifier and finishing products.

PART 2 - PRODUCTS

2.1 LIQUID MATERIALS

.1 Curing Compound: As specified elsewhere in Division 03.

.2 Liquid Densifier: Water-based, odorless solution of sodium silicates and siliconates, designed to react with materials present in new or old concrete in order to densify, harden, and dustproof the surface of the slab.

.3 Finish and Protector: Clear, water-based, lithium-fortified penetrating and micro film-forming liquid compound designed to enhance water resistance, chemical resistance and abrasion resistance of the densified floor.

.4 Water: Potable and at a temperature of not more than 21 degrees C.

2.2 POLISHING EQUIPMENT

.1 Field Grinding and Polishing Equipment:

.1 A multiple head, counter rotating, walk-behind or ride-on machine, of various size and weights, with diamond tooling affixed to the head for the purpose of grinding concrete. Excludes janitorial maintenance equipment.

.2 If dry grinding, honing, or polishing, use dust extraction equipment with flow rate suitable for dust generated, with squeegee attachments.

.3 If wet grinding, honing, or polishing, use slurry extraction equipment suitable for slurry removal and containment prior to proper disposal.

.2 Edge Grinding and Polishing Equipment: Hand-held or walk-behind machine which produces same results, without noticeable differences, as field grinding and polishing equipment.

.3 Burnishing Equipment: High speed walk-behind or ride-on machines capable of generating 1,000 to 2,000 revolutions per minute and with sufficient head pressure of not less than 89 N to raise floor temperature by 11 degrees C.

.4 Diamond Tooling: Abrasive tools that contain industrial grade diamonds within a bonded matrix (such as metallic, resinous, ceramic, etc.) that are attached to rotating heads to refine the concrete substrate.

.1 Bonded Abrasive: Abrasive medium that is held within a bonding that erodes away to expose new abrasive medium as it is used.

.2 Metal Bond Tooling: Diamond tooling that contains industrial grade diamonds with a metallic bonded matrix that is attached to rotating heads to refine the concrete substrate.

.3 Resin Bond Tooling: Diamond tooling that contains industrial grade diamonds within a resinous bonded matrix that is attached to rotating heads to refine the concrete substrate.

.4 Hybrid Tooling: Diamond tooling that combines metal bond and resin bond that has the characteristics of both types of tooling.

.5 Transitional Tooling: Diamond tooling that is used to refine the scratch pattern of metal bond tooling prior to the application of resin bond tooling in an effort to extend the life of resin bond tooling and to create a better foundation for the polishing process.

.6 Abrasive Pad: An abrasive pad, resembling a typical floor maintenance burnishing pad, that has the capability of refining the concrete surface on a microscopic level that may or may not contain industrial grade diamonds

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Acceptance: Obtain written acceptance by Owner of concrete slab for flatness, levelness, and surface characteristics before beginning polishing work.

.2 Inspect surfaces to be polished; ensure that substrate is clean, sound, properly cured, free of standing water, coatings, or curing compounds, foreign particles, oil, dust, grease, or laitance, that will adversely affect the performance of liquid materials.

.3 Inspect all areas involved in work to establish extent of work, access, and need for protection of surrounding construction.

.4 Examine Project conditions, with Installer present, for conditions affecting performance of the Work.

.5 Verify proper placement, finishing, and curing of the concrete floor slab to be densified.

.6 Proceed with concrete slab densifier work only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Protect all surroundings from exposure to densifier and sealer materials including, but not limited to, windows, roofs, walkways, drives, and landscaping.

.1 Particularly protect glass, aluminum, and polished metal surfaces. In case of exposure, wash off immediately to avoid etching.

.2 Ensure that new concrete has been cured at least seven days prior to commencing polishing operations.

.1 If slab has been cured with film-forming curing compounds, completely remove residue, using cleaning materials recommended by curing compound manufacturer and/or by mechanical means, if necessary.

.3 Remove loose material by hand or mechanically, in accordance with standard practice.

.4 Ensure that air, liquid materials, and surface temperature is at least 5 degrees C and rising prior to beginning application.

.5 If concrete has been treated with an acid-based stain, follow densifier/finish manufacturer's recommendation for surface preparation.

3.3 POLISHING CONCRETE

.1 Perform all polishing procedures to ensure a consistent appearance from wall to wall.

.2 Initial Grinding:

.1 Use grinding equipment with metal or semi-metal bonded tooling.

.2 Begin grinding in one direction using sufficient size equipment and diamond tooling to meet specified aggregate exposure class.

.3 Make sequential passes with each pass perpendicular to previous pass using finer grit tool with each pass, up to 100 grit metal bonded tooling.

.4 Achieve maximum refinement with each pass before proceeding to finer grit tools.

.5 Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

.6 Continue grinding until aggregate exposure matches approved field mock-ups.

.3 Treating Surface Imperfections:

.1 Mix patching compound or grout material with dust created by grinding operations, manufacturer’s tint, or sand to match color of adjacent concrete surfaces.

.2 Fill surface imperfections including, but not limited to, holes, surface damage, small and micro cracks, air holes, pop-outs, and voids with grout to eliminate micro pitting in finished work.

.3 Work compound and treatment until color differences between concrete surface and filled surface imperfections are not readily noticeable when viewed from 3 meters away under lighting conditions that will be present during final occupancy.

.4 Grout Grinding:

.1 Use grinding equipment and appropriate grit and bond diamond tooling.

.2 Apply grout, forced into the pore structure of the concrete substrate, to fill surface imperfections.

.3 Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

.5 Honing:

.1 Use grinding equipment with hybrid or resin bonded tooling.

.2 At grinding level specified elsewhere, apply liquid densifier. Allow liquid products to dry before resuming grinding.

.3 Hone concrete in one direction starting with a 100 grit tooling and make as many sequential passes as required to remove scratches, each pass perpendicular to previous pass, up to 400 grit tooling, reaching maximum refinement with each pass before proceeding to finer grit tooling.

.4 Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

.6 Polishing:

.1 Use polishing equipment with resin-bonded tooling.

.2 Apply finish and protector at polishing level recommended by manufacturer.

.3 Begin polishing in one direction starting with 800 grit tooling.

.4 Make sequential passes with each pass perpendicular to previous pass using finer grit tooling with each pass until the specified level of gloss has been achieved.

.5 Achieve maximum refinement with each pass before proceeding to finer grit pads.

.6 Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

.7 Final Polish: Using burnishing equipment and finest grit abrasive pads, burnish to uniform reflective sheen matching approved field mock-up.

.7 Final Polished Concrete Floor Finish:

.1 Aggregate Exposure Class A – Standard Finish: No Intentional effort to produce any aggregate exposure.

.2 Finished Gloss Level 1 – Flat Low Gloss Finish:

.1 Procedure: Recommended not less than 4 step process with full refinement of each diamond tool with one application of densifier.

3.4 LIQUID MATERIALS APPLICATION

.1 General: Follow all manufacturer's recommendations and written instructions when applying densifier and sealer materials.

.1 Follow manufacturer's safety and personal protective equipment recommendations.

.2 Mixing: Thoroughly mix materials prior to each use.

.1 Mix finish and protector gently to avoid formation of bubbles.

.3 Sodium Silicate Densifier Application:

.1 Apply densifier immediately after coloring, prior to subsequent grinding.

.1 If acid-based stain has been used, neutralize the surface prior to proceeding.

.2 Apply densifier after grinding level that uses a 200-grit tooling.

.3 Apply using HVLP, hand pump-up sprayer, brush, or roller.

.1 Application Rate:

1) First Coat: 4.9 sq. m/l.
2) Second Coat (if needed): 7.3 – 9.8 sq. m/l.

.4 Scrub material into surface using soft bristle brush or mechanical scrubber.

.1 Work into surface for 15 – 30 minutes, depending on drying characteristics, until product begins to thicken.

.2 Rewet with water, then work an additional 5 – 10 minutes.

.5 Do not allow material to dry while working; reapply product, if necessary.

.6 Thoroughly rinse and brush- or squeegee dry after application.

.7 Repeat, if necessary due to surface porosity.

.4 Finish and Protector Application: Apply liquid surface finish and protector after all construction activity on the slab surface has ceased and immediately after slab cleaning.

.1 Allow new concrete to cure a minimum of 28 days prior to sealer application.

.2 Mix finish and protector gently to avoid formation of bubbles.

.3 Apply finish and protector using pump sprayer or HVLP sprayer. Limit area applied at one time to maximum area recommended by manufacturer. Spread with pre-moistened microfiber pad. Do not work material into surface.

.1 Application Rate: 36.8 – 73.7 sq. m/l, depending on surface porosity.

.4 When dry, buff surface using high-speed burnisher and soft buffing pad.

.5 Apply second coat of finish and protector after first coat has dried.

.1 Application Rate: 73.7 – 98.2 sq. m/l.

.6 Buff second coat using same technique as first.

3.5 CLEANING

.1 Clean overspray, spillage, and accidental exposure of material from adjacent surfaces.

.2 Remove all debris and excess materials from the job site and dispose of in accordance with all applicable regulations for waste disposal.

.1 Do not dispose of liquid materials into sanitary sewers or storm drains.

3.6 PROTECTION

.1 Protect densified concrete from spills, stains, and damage during construction, prior to finish and protector application.

.2 Do not clean, scrub, or allow liquids on surface for a minimum of 72 hours following application of finish and protector.

.3 Do not cover surface for a minimum of 7 days following application of finish and protector.

.4 Do not allow standing water on surface for a minimum of 7 days following application of Durable Floor System.

.5 Provide temporary floor protective covering in construction traffic paths and where potentially damaging construction activity will occur.

.6 At the end of construction, thoroughly clean and buff polished floors to gloss level indicated.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 43 39 – Mock Up Requirements.

1.2 REFERENCES

.1 ASTM International (ASTM)

.1 ASTM A1064/A1064M, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

.2 Canadian Standards Association (CSA)

.1 CAN/CSA-A165 SERIES, CSA Standards on Concrete Masonry Units (Consists of A165.1 Concrete Block Masonry Units, A165.2 Concrete Brick Masonry Units, A165.3 Prefaced Concrete Masonry Units).

.2 CAN/CSA-A179, Mortar and Grout for Unit Masonry.

.3 CAN/CSA-A370, Connectors for Masonry.

.4 CAN/CSA A371, Masonry Construction for Buildings.

.5 CSA G30.18, Carbon Steel Bars for Concrete Reinforcement.

.6 CSA S304.1, Design of Masonry Structures.

1.3 SUBMITTALS

.1 Product Data

.1 Submit manufacturer s instructions, printed product literature and data sheets for unit masonry products, mortar and grout, connectors, anchorage and reinforcing, and accessories. Include product characteristics, performance criteria, physical size, finish and limitations.

.2 Samples

.1 Two of each type of concrete masonry unit specified.

.2 Submit duplicate full size samples of each type masonry units, mortar, connector, anchorage and reinforcing, and accessory.

.3 Manufacturer’s Instructions

.1 Submit manufacturer’s installation instructions.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer s name and address.

.3 Store materials off ground, in dry location and in accordance with manufacturer s recommendations in clean, dry, well-ventilated area.

.4 Store and protect masonry products from nicks, scratches, and blemishes.

.5 Replace defective or damaged materials with new.

1.5 COLD WEATHER REQUIREMENTS

.1 Supplement requirements of CAN3-A371 as follows:

.1 Maintain temperature of mortar between 5°C and 50°C until used.

1.6 HOT WEATHER REQUIREMENTS

.1 Supplement requirements of CAN3-A371 as follows:

.1 Protect freshly laid masonry from drying too rapidly by means of waterproof, non-staining coverings.

1.7 QUALITY ASSURANCE

.1 Mock-up

.1 Construct mock-up in accordance with Section 01 43 39 – Mock Up Requirements.

.2 Construct mock-up 10 m^2 minimum of brick unit masonry in area designated by Owner before proceeding with brick unit masonry work.

.2 Test reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.4 Pre-installation meeting: conduct pre-installation meeting to verify project requirements manufacturer's instructions and manufacturer's warranty requirements.

1.8 QUALIFICATIONS

.1 Manufacturer: company specializing in manufacturing products of this section with minimum 10 years experience.

.2 Installer: company specializing in performing work of this section approved by manufacturer. Minimum 5 years experience.

.3 Design structural installations under direct supervision of Professional Engineer experienced in structural design of concrete masonry installation and registered in the Province of Newfoundland and Labrador.

PART 2 PRODUCTS

2.1 MASONRY UNITS

.1 Standard concrete block units: to CAN/CSA-A165, Series (CAN/CSA-A165.1)

- .1 Classification: H/10/A/M
- .2 Size: modular.
- .3 Special shapes: provide bull nosed units for exposed corners. Provide purpose-made shapes for lintels and bond beams. Provide additional special shapes as indicated.

.2 Acoustical concrete block units: to CAN/CSA-A165 Series (CAN/CSA-A165.1) purpose made with slots to provide the acoustical characteristics specified.

- .1 Classification: H/10/C/M
- .2 Size: modular
- .3 Special shapes: provide special shapes indicated. Provide purpose made shapes for lintels and bond beams.

.3 Split-face concrete block units Type 1: to CAN/CSA-A165 Series-04 (CSA-A165.1). Decorative face treatment: split face ashlar/centre scored.

- .1 Classification: S/20/A/M.
- .2 Size: modular as indicated on drawings.
- .3 Special shapes: provide square units for exposed corners. Provide purpose-made shapes for lintels and bond beams. Provide additional special shapes as indicated.
- .4 Colour: as selected by Owner from manufacturer's standard colour range.

.4 Face brick: Burned clay brick: to CAN/CSA A82.

- .1 Type: FBX.
- .2 Grade: SW.
- .3 Size: Modular.
- .4 Colour and texture: to match approved sample.

.5 Back-up brick: Burned clay brick: to CAN/CSA A82.

- .1 Type: II.
- .2 Grade: same as face brick.
- .3 Size: same as face brick.

2.2 REINFORCEMENT AND CONNECTORS

.1 Bar reinforcement: to CSA-A371, and CAN/CSA G30.18, Grade 400.

.2 Wire reinforcement: to CSA-A371, and CSA S304.1, two wire ladder or truss type, galvanized.

.3 Ties:

.1 For metal stud or wood stud and masonry construction: to CSA-A370 and CSA-S304, 1.6 mm thick side mounting, stainless steel flat plate, c/w 5.8 mm ø holes for veneer tire wire attachment, 4.76 mm ø veneer ties with polyethylene insulation supports. Total length of flat plate to suit stud width, sheathing, air space and insulation.

.2 For cast-in-place concrete and masonry construction: to CSA-A370 and CSA-S304, 1.6 mm thick stainless steel L-Plate, c/w 5.8 mm ø holes for veneer tire wire attachment, 4.76 mm ø veneer ties with polyethylene insulation supports.

.3 For concrete block and masonry construction: to CSA-A370 and CSA-S304, 1.6 mm thick stainless steel connector plate, c/w 5.8 mm ø holes for veneer tire wire attachment, 4.76 mm ø veneer ties with polyethylene insulation supports. Total length of connector plate to suit block width, air space and insulation.

.4 Corrosion protection for wire reinforcement: to CSA S304.1, galvanized to CSA S304.1 and CSA-A370.

2.3 MORTAR AND GROUT

.1 Mortar: to CAN/CSA-A179.

.2 Mortar mixes:

.1 Mortar for exterior masonry above grade:

.1 Loadbearing: Type S based on proportion specifications.

.2 Non-Loadbearing: Type N based on proportion specifications.

.2 Mortar for interior masonry:

.1 Loadbearing: Type S based on proportion specifications.

.2 Non-Loadbearing: Type N based on proportion specifications.

.3 Mortar for Parapet walls, chimneys, unprotected walls: Type S based on proportion specifications.

.4 Pointing Mortar: CAN/CSA A179, Type N using property specification with maximum 2 percent ammonium stearate or calcium stearate per cement weight.

.5 Stain Resistant Pointing Mortar: one part Portland cement, 1/8 part hydrated lime, and two parts graded (80 mesh) aggregate, proportioned by volume. Add aluminum tristearate, calcium stearate, or ammonium stearate to 2 percent of Portland cement by weight.

.6 Mortar for Glass Block Masonry: CAN/CSA A179, Type S, using the property specification.

.7 Pointing Mortar For Glass Block Masonry: CAN/CSA A179, Type S, using the property specification; with maximum 2 percent ammonium stearate or calcium stearate per cement weight.

.8 Parging mortar: Type N to CAN/CSA A179.

.9 Mortar for foundation walls, manholes, sewers, pavements, walks, patios and other exterior masonry at or below grade: Type M based on proportion specifications.

.10 Following applies regardless of mortar types and uses specified above:

.1 Mortar for calcium silicate brick and concrete brick: Type N based on proportion specifications.

.2 Mortar for stonework: Type N based on proportion specifications.

.3 Mortar for grouted reinforced masonry: Type S based on proportion specifications.

.3 Grout Mixes:

.1 Bond Beams: minimum grout mix 10 to 12.5 MPa strength at 28 days or as otherwise indicated on drawings; 200-250 mm slump; mixed in accordance with CAN/CSA A179.

.2 Lintels: minimum grout mix 10 to 12.5 MPa strength at 28 days or as otherwise indicated on drawings; 200-250 mm slump; mixed in accordance with CAN/CSA A179.

.3 Grout: minimum compressive strength of 12.5 MPa at 28 days or as otherwise indicated on drawings. Maximum aggregate size and grout slump: CAN/CSA A179.

2.4 ACCESSORIES

.1 Weep hole vents: purpose-made PVC.

.2 Cavity screening: three dimensional random weave plastic mesh, thickness to match cavity, minimum height 3 brick masonry courses.

.3 Anchor Bolts: 12 mm diameter x 150 mm long with embedded ends bent 50 mm at 90 degrees, exposed ends threaded with washer and nut.

.4 Embedded Flexible Flashings: Self-adhering sheet 1.0 mm thick consisting of rubberized asphalt compound banded to high density cross laminated polyethylene film, complete with manufacturer's recommended primer.

.5 Loose steel lintels: in accordance with Section 05 50 00 - Metal Fabrications.

2.5 CLEANING COMPOUNDS

.1 Use VOC products to limits listed in Section 01 35 21 - LEED® Requirements.

.2 Compatible with substrate and acceptable to masonry manufacturer for use on products.

.3 Cleaning compounds compatible with concrete unit masonry and in accordance with manufacturer's written recommendations and instructions.

2.6 TOLERANCES

.1 Tolerances for standard concrete unit masonry tolerances in accordance with CAN/CSA A165.1, supplemented as follows:

.1 Maximum variation between units within specific job lot not to exceed 2.0 mm.

.2 No parallel edge length, width or height dimension for individual unit to differ by more than 2.0 mm.

.3 Out of square tolerance not to exceed 2.0 mm.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Do masonry work in accordance with CAN/CSA-A371 except where specified otherwise.

.2 Concrete block units.

- .1 Bond: running
- .2 Coursing height: 200 mm for one block and one joint
- .3 Jointing: concave where exposed or where paint or other finish coating is specified

.3 Special Shapes:

- .1 Install special units to form corners, returns, offsets, reveals and indents without cut ends being exposed and without losing bond or module.
- .2 Install reinforced concrete block lintels over openings in masonry where steel or reinforced concrete lintels are not indicated.
- .3 End bearing: not less than 200 mm.

.4 Acoustical Concrete Unit Masonry:

- .1 Bond: running.
- .2 Coursing height: 200 mm for one block and one joint.
- .3 Jointing: concave where exposed or where paint or finish coating is specified.

.5 Build masonry plumb, level, and true to line, with vertical joints in alignment.

.6 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

3.2 CONSTRUCTION

.1 Exposed masonry:

- .1 Remove chipped, cracked, and otherwise damaged units, in exposed masonry and replace with undamaged units.
- .2 Cut out for electrical switches, outlet boxes, and other recessed or built-in objects. Make cuts straight, clean, and free from uneven edges.

.2 Building-in:

- .1 Install masonry connectors and reinforcement where indicated on drawings.
- .2 Build in items required to be built into masonry.
- .3 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
- .4 Brace door jambs to maintain plumb. Fill spaces between jambs and masonry with mortar.

.5 Install loose steel lintels centered over openings where indicated, with minimum 200 end bearing.

.3 Concrete block lintels:

.1 Install reinforced concrete block lintels over openings in masonry where steel or reinforced concrete lintels are not indicated.

.2 End bearing: not less than as indicated on drawings.

.4 Construct masonry walls using running bond unless otherwise noted.

.5 Provision for movement:

.1 Leave 6.0 mm space below shelf angles.

.2 Leave 6.0 mm space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.

.3 Built masonry to tie in with stabilizers, with provision for vertical movement.

.4 Build expansion and control joints where and as indicated.

.5 Install movement joints and keep free of mortar where indicated.

.6 Interface with other work:

.1 Cut openings in existing work as indicated.

.2 Openings in walls: approved by Owner.

.3 Make good existing work. Use materials to match existing.

.7 Build in flashings in masonry in accordance with CAN/CSA-A371.

.1 Install flashings under exterior masonry bearing on foundation walls, slabs, shelf angles, and steel angles over openings. Install flashings under weep hole courses and as indicated. Seal laps, penetrations and terminations to resist water penetration.

.2 In cavity walls and veneered walls, carry flashings from front edge of masonry, under outer wythe, then up backing not less than 250 mm, and as follows:

.1 For self-adhesive flashing, apply primer and firmly press sheet against backing. Lap under sheathing paper. Seal penetrations with recommended sealant or mastic. Installation shall be free of wrinkles, fish-mouths and punctures.

.2 Provided turned up end dams minimum 50 mm high at ends of all flashings.

.3 For masonry backing embed flashing 25 mm in joint.

.4 For concrete backing, insert flashing into reglets.

.5 For wood frame backing, staple flashing to walls behind sheathing paper.

.6 For gypsum board backing, bond to wall using manufacturer s recommended adhesive.

.3 Lap joints 150 mm and seal with adhesive or mastic.

.8 Install weep hole vents in vertical joints immediately over flashings, in exterior wythes of cavity wall and masonry veneer wall construction, at maximum horizontal spacing of 610 mm on center.

.9 Place drainage mesh in cavity as indicated as construction progresses.

.10 Hollow Units: spread mortar setting bed from outside edge of face shells. Gauge amount of mortar on top and end of unit to create full joints, equivalent to shell thickness. Avoid excess mortar.

.11 Solid Units: apply mortar over entire vertical and horizontal surfaces. Avoid bridging of airspace between brick veneer and backup wall with mortar.

.12 Ensure compacted head joints. Use full or face-shell joint as indicated.

.13 Tamp units firmly into place.

.14 Do not adjust masonry units after mortar has set. Where resetting of masonry is required, remove, clean and reset units in new mortar.

.15 Tool exposed joints concave; strike concealed joints flush.

.16 After mortar has achieved initial set up, tool joints.

.17 Do not interrupt bond below or above openings.

3.3 REINFORCING AND CONNECTING

.1 Install masonry connectors and reinforcement in accordance with CAN/CSA-A370, CAN/CSA-A371 and CSA S304.1 unless indicated otherwise.

.2 Prior to placing concrete, grout, mortar, obtain Owner's approval of placement of reinforcement and connectors.

3.4 BONDING AND TYING

.1 Bond walls of two or more wythes using metal connectors in accordance with CAN/CSA-A371, and as indicated.

.2 Tie masonry veneer to backing in accordance with National Building Code of Canada (NBC), CAN/CSA-A371, CSA S304.1 and as indicated.

3.5 MODIFICATIONS TO EXISTING MASONRY

.1 Match existing bond and coursing height of adjacent masonry to remain.

.2 Tooth new masonry into existing masonry in run of wall and at intersections with existing partitions.

.3 At new openings in masonry walls, remove units, clean and re-install rotated to conceal cut and expose finish surface.

.4 Clean bond areas of adjacent masonry to remain, remove loose material and prepare masonry to receive new masonry toothed in.

.5 Install reinforcement as necessary to provide continuity of reinforcing and stability between existing and new masonry work.

.6 Provide repair anchors as necessary to stabilize existing masonry adjacent to and affected by the Work.

3.6 REINFORCED LINTELS AND BOND BEAMS

.1 Reinforce masonry lintels and bond beams as indicated.

.2 Place and grout reinforcement in accordance with CAN/CSA-A179, CAN/CSA-A371.

3.7 GROUTING

.1 Grout masonry in accordance with CAN/CSA-A179, CAN/CSA-A371 and as indicated.

3.8 ANCHORS

.1 Supply and install metal anchors as indicated.

3.9 LATERAL SUPPORT AND ANCHORAGE

.1 Supply and install lateral support and anchorage in accordance with CSA S304.1 and as indicated.

3.10 SITE TOLERANCES

.1 Tolerances of CAN/CSA-A371 apply.

3.11 CLEANING

.1 Standard block: Allow mortar droppings on masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block and finally by brushing.

.2 Upon completion of installation remove surplus materials, rubbish, tools and equipment barriers.

3.12 PROTECTION

.1 Brace and protect concrete unit masonry in accordance with Section 04 05 00 - Common Work Results for Masonry.

.2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect from wind-driven rain until masonry work is completed and protected by flashings or other permanent construction.

.3 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.

.4 Repair damage to adjacent materials caused by masonry products installation.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

.1 Types of items described in this Section:
- .1 Casework as follows:
  - .1 Wood cabinets.
  - .2 Plastic-laminate cabinets.
  - .3 Thermoset decorative panel (mcp) cabinets
- .2 Countertops as follows:
  - .1 Plastic-laminate countertops.
  - .2 Solid-surfacing-material countertops.
  - .3 Galvanized steel countertops.
  - .4 Linoleum countertops.
- .3 Swing gates incorporated into millwork.
- .4 Shop finishing of interior woodwork.

.2 Types of items you will not find described in this Section:
- .1 Countertops as follows:
  - .1 Wood countertops.
  - .2 Stainless steel countertops.
  - .3 Epoxy countertops.
  - .4 Laminated-plastic laboratory tops.
  - .5 Stone countertops.
- .2 Casework as follows:
  - .1 Residential type kitchen and bathroom vanity cabinets.
  - .2 Metal casework.
  - .3 Laboratory-type casework.
- .3 Wood panelling as follows:
  - .1 Flush wood panelling and wainscoting.
  - .2 Pre-manufactured / proprietary wood panelling system.
  - .3 Board paneling.
  - .4 Plastic-laminate-clad flush paneling.
  - .5 Stile and rail wood paneling.
- .4 Other items as follows:
  - .1 Clothes closet shelving and closet rods.
  - .2 Interior standing and running trim.
  - .3 Interior frames and jambs.
  - .4 Interior ornamental work.
  - .5 Stairwork and rails.
  - .6 Wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.

1.3 DEFINITIONS

.1 Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.

.2 Exposed Surfaces of Casework: Surfaces visible when doors and drawers are closed, including bottoms of cabinets more than 1200 mm above floor, and visible surfaces in open cabinets or behind glass doors.
- .1 Ends of cabinets indicated to be installed directly against and completely concealed by walls or other cabinets are defined as *concealed*.

.3 Semi-exposed Surfaces of Casework: Surfaces behind opaque doors, such as cabinet interiors, shelves, and dividers; interiors and sides of drawers; and interior faces of doors. Tops of cabinets 1980 mm or more above floor are defined as *semi-exposed*.

.4 Concealed Surfaces of Casework: Include sleepers, web frames, dust panels, and other surfaces not usually visible after installation.

1.4 SUBMITTALS

.1 Product Data
- .1 For each type of product indicated.

.2 Shop Drawings
- .1 Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
  - .1 Show details full size.
  - .2 Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
  - .3 Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.

.3 Samples for Verification
- .1 Lumber with or for transparent finish, not less than 125 mm wide by 600 mm long, for each species and cut, finished on 1 side and 1 edge.
- .2 Veneer-faced panel products with or for transparent finish, 200 by 250 mm, for each species and cut. Include at least one face-veneer seam and finish as specified.
- .3 Lumber and panel products with shop-applied opaque finish, 300 sq. cm for lumber and 200 by 250 mm for panels, for each finish system and colour, with 1/2 of exposed surface finished.
- .4 Plastic laminates, 200 by 250 mm, for each type, colour, pattern, and surface finish, with 1 sample applied to core material and specified edge material applied to 1 edge.
- .5 Thermoset decorative-panels, 200 by 250 mm, for each type, colour, pattern, and surface finish, with edge banding on 1 edge.
- .6 Solid-surfacing materials, 150 mm square.
- .7 Linoleum sheet flooring materials, 150 mm square.
- .8 Galvanized steel sheet materials, 150 mm square
- .9 Corner pieces as follows:
  - .1 Cabinet-front frame joints between stiles and rails, as well as exposed end pieces, 450 mm high by 450 mm wide by 150 mm deep.
  - .2 Miter joints for standing trim.
- .10 Exposed cabinet hardware and accessories, one unit for each type and finish.

.4 Sustainability Submittals
- .1 Product Data for installation adhesives, including printed statement of VOC content.

.2 Product Data
  .1 For each composite-wood product used, documentation indicating that the bonding agent contains no urea formaldehyde.
  .2 For each adhesive used, documentation indicating that the adhesive contains no urea formaldehyde.
.3 Product Data for products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content
  .1 Include statement indicating costs for each product having recycled content.
.4 Certificates
  .1 Chain-of-custody certificates certifying that products specified to be made from certified wood comply with forest certification requirements. Include evidence that mill is certified for chain of custody by an FSC-accredited certification body.

1.5 QUALITY ASSURANCE

.1 Fabricator Qualifications
  .1 Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

.2 Installer Qualifications
  .1 Fabricator of products.

.3 Quality Standard
  .1 Unless otherwise indicated, comply with AWMAC's *Architectural Woodwork Quality Standards* for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.

.4 Forest Certification
  .1 Provide interior architectural woodwork produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, *FSC Principles and Criteria for Forest Stewardship*.

.5 Mock-ups
  .1 Build mock-ups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  .2 Reviewed mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.

.6 Preinstallation Conference
  .1 Conduct conference at Project site to comply with requirements in Division 01 Section *Project Management and Coordination*.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in *Project Conditions* Article.

1.7 PROJECT CONDITIONS

.1 Environmental Limitations

.1 Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

.2 Field Measurements
- .1 Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- .2 Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.
- .3 Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

.1 Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 General
- .1 Provide materials that comply with requirements of AWMAC's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

.2 Lumber for Exposed and Semi-Exposed-to-View Locations
- .1 Forestry Stewardship Council (FSC) certified.
- .2 Wood Species for Transparent Finish:
  - .1 Refer to drawings.
  - .2 If wood species is not indicated on drawings, then provide maple.
- .3 Wood Species for Opaque Finish:
  - .1 Refer to drawings.
  - .2 If wood species is not indicated on drawings, then provide any closed-grain hardwood.

.3 Lumber for Concealed Locations
- .1 Forest Stewardship Council (FSC) certified.
- .2 Softwood lumber: to CAN/CSA-O141.
  - .1 Wood species: Pine.
- .3 Hardwood lumber: to National Hardwood Lumber Association (NHLA)

.4 Medium-Density Fiberboard
- .1 To ANSI A208.2, Grade MD.
- .2 Made with binder containing no urea formaldehyde.
- .3 Provide products made from not less than 80% recycled wood fibre.

.5 Particleboard
- .1 ANSI A208.1, Grade M-2-Exterior Glue.

.2 Made with binder containing no urea formaldehyde.
.3 Provide products made from not less than 80% recycled wood fibre.

.6 Hardboard
.1 To CAN/CGSB-11.3.
.2 Made with binder containing no urea formaldehyde.
.3 Forestry Stewardship Council (FSC) certified.

.7 Veneer-Faced Panel Products (Hardwood Plywood)
.1 To HPVA HP-1.
.2 Made with adhesive containing no urea formaldehyde.
.3 Forestry Stewardship Council (FSC) certified.
.4 Items exposed-to-view and scheduled for a transparent finish
.1 Grade
.1 Grade A or better veneer, unless otherwise noted.
.2 Cut & Matching: Any one of the following
.1 Plain sliced, book match.
.2 Rotary cut, whole piece face.
.3 Or approved alternate.
.5 Items semi-exposed-to-view and scheduled for a transparent finish
.1 Grade: Grade B or better veneer for, unless otherwise noted.

.8 Baltic Plywood
.1 Birch or other closed grain hardwood veneer.
.1 Baltic/Russian/Finland Hardwood Plywood consisting of multiple thin, solid veneer layers.
.2 Europly as marketed by Columbia Forest Products;
.3 Or approved alternate.

.9 Softwood Plywood
.1 Canadian softwood plywood (CSP) to CSA O151, standard construction or better.
.2 Made with adhesive containing no urea formaldehyde.
.3 Forestry Stewardship Council (FSC) certified.

.10 Thermoset Decorative Panels
.1 Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
.2 Colours, Patterns, and Finish
.1 Refer to drawings.
.2 If not indicated on drawings, then selected by Owner's Representative from manufacturer’s full line of standard colours, patterns, and finishes.
.3 Provide 2-4 mm thick PVC edge banding on components with exposed or semi exposed edges.
.1 Colour
.1 Refer to drawings.
.2 If not indicated on drawings, then provide colour to match thermoset decorative panel.

.11 High-Pressure Decorative Laminate
.1 NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.
.2 Colours, Patterns, and Finish
.1 Refer to drawings.
.2 If not indicated on drawings, then selected by Owner's Representative from manufacturer’s full line of standard colours, patterns, and finishes.

.12 Solid-Surfacing Material
- .1 Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.
- .2 Type
  - .1 Standard type, unless Special Purpose type is indicated.
- .3 Colours and Patterns
  - .1 Refer to drawings.
  - .2 If not indicated on drawings, then selected by Owner's Representative from manufacturer's full line of standard colours and patterns.

.13 Sheet Metal
- .1 Commercial grade steel to ASTM A924-97 (M-97), galvanized to ASTM A 653/A 653M, Z275 coating designation.
- .2 Thickness: 1.3 mm (18 gauge nominal).

.14 Linoleum Sheet Flooring
- .1 Refer to drawings.
- .2 If not described on drawings, then provide manufacturer's standard linoleum sheet flooring, colour selected by Owner's Representative from manufacturer's full line of standard colours.
- .3 Adhesive: Manufacturer's standard.
- .4 Welding Rods: manufacturer's standard, colour to match flooring.

.15 Float Glass for Cabinet Doors
- .1 To CAN/CGSB-12.3, clear, transparent, not less than 4.0 mm thick.

.16 Safety Glass, when specifically noted
- .1 To CAN/CGSB 12.1-M90, clear, transparent, not less than 4.0 mm thick. Provide one of the following, unless otherwise noted.
  - .1 Laminated glass.
  - .2 Tempered glass.

2.2 CABINET HARDWARE AND ACCESSORIES

.1 General
- .1 Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 08 Section *Door Hardware*.

.2 Drawer and Door Handles
- .1 Refer to drawings.
- .2 If handles are not described on drawings provide
  - .1 Richelieu 3487181, 14 mm round x 261 mm long stainless steel pull
  - .2 Or equivalent.

.3 Frameless Concealed Hinges (European Type)
- .1 To BHMA A156.9, B01602, 135 degrees of opening, self-closing.

.4 Adjustable Shelf Standards and Supports
- .1 To BHMA A156.9, B04071; with shelf rests, B04081.

.5 Shelf Rests
- .1 To BHMA A156.9, B04013; metal.

.6 Closet Rods and Flanges
- .1 Clothes Rods of 33diameter chrome-plated steel tubes.
- .2 Rod Flanges of chrome-plated steel or stainless steel.

.7 Drawer Slides
- .1 To BHMA A156.9, B05091.
- .2 For cabinets used as part of a domestic kitchen cabinet arrangement or kitchenette arrangement in staff rooms, lunch rooms, board rooms, and other similar locations:
  - .1 Standard Duty (Grade 1, Grade 2, and Grade 3): Side mounted and extending under bottom edge of drawer; partial-extension type; epoxy-coated steel with polymer rollers.
  - .2 Trash Bin Slides: Grade 1HD-200; for trash bins not more than 500 mm high and 400 mm wide.
- .3 For all other millwork: side mounted; full-extension type; zinc-plated steel ball-bearing slides
  - .1 Box Drawer Slides: Grade 1; for drawers not more than (150 mm) high and (600 mm) wide.
  - .2 File Drawer Slides: Grade 1HD-100; for drawers more than 150 mm high or 600 mm wide.
  - .3 Pencil Drawer Slides: Grade 1; for drawers not more than 75 mm high and 600 mm wide.
  - .4 Keyboard Slides: Grade 1; for computer keyboard shelves.
  - .5 Trash Bin Slides: Grade 1HD-200; for trash bins not more than 500 mm high and 400 mm wide.
  - .6 All Other Drawers: Grade 1HD-100.

.8 Swing Gate Hardware
- .1 Single Direction Swing Hinges
  - .1 Toilet partition hardware - surface hinge in stainless, Richelieu #71130-170/71230-170; or equivalent.
- .2 Latch
  - .1 Reversible secret latch, Richelieu 600100; or equivalent.

.9 Locks
- .1 For Door: BHMA A156.11, E07121.
- .2 For Drawer: BHMA A156.11, E07041.
- .3 Master key all locks located in each millwork item (i.e. reception desk, bar, kitchenette, etc.)
- .4 Provide 2 keys per lock.

.10 Grommets for Cable Passage through Countertops
- .1 51mm OD, black, moulded-plastic grommets and matching plastic caps with slot for wire passage.

.11 Cutlery Tray
- .1 Moulded polystyrene cutlery tray, custom cut to fit drawer size.

.12 Hardware Finishes
- .1 Exposed Hardware
  - .1 Refer to drawings.
  - .2 If finish is not indicated on drawings, then provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
    - .1 Satin Stainless Steel: BHMA 630.
- .2 Concealed Hardware
  - .1 Provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

.13 Door and Drawer Bumpers
- .1 Plastic, polyurethane, neoprene or similar bumper, c/w tack or similar, but not of the self-adhesive type.

2.3 MISCELLANEOUS MATERIALS

.1 Furring, Blocking, Shims, and Hanging Strips
.1 Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.

.2 Anchors
.1 Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

.3 Adhesives, General
.1 Do not use adhesives that contain urea formaldehyde.
.2 VOC Limits for Installation Adhesives and Glues
.1 Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
.1 Wood Glues: 30 g/L.
.2 Contact Adhesive: 250 g/L.

2.4 FABRICATION, GENERAL

.1 AWMAC Interior Woodwork Grade
.1 Refer to drawings.
.2 If grade is not indicated on drawings, then provide AWMAC Custom grade interior woodwork.

.2 Wood Moisture Content
.1 Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

.3 Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
.1 Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 19 mm Thick or Less: 1.5 mm.
.2 Edges of Rails and Similar Members More Than 19 mm Thick: 3 mm.
.3 Corners of Cabinets and Edges of Solid-Wood (Lumber) Members and Rails: 1.5 mm.

.4 Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
.1 Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.

.5 Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
.1 Seal edges of openings in countertops with a coat of varnish.

.6 Edge Banding
.1 Refer to drawings for type of edge banding on exposed and semi-exposed edges of composite wood panel products.
.1 Where drawings do not indicate edge banding, provide:
.1 Provide 2-3 mm PVC edge banding on MCP panels and panels with plastic laminate finish.

.2 Provide solid wood edging on wood-veneered panels.

.7 Install glass to comply with applicable requirements in Division 08 Section *Glazing* and in GANA's "*Glazing Manual*." For glass in wood frames, secure glass with removable stops.

.8 Provide all hardware shown and all hardware required for complete and functional assembly.

2.5 CABINETS – IN GENERAL

.1 Type of Cabinet Construction
- .1 Refer to drawings.
- .2 If cabinet construction is not indicated on drawings, then provide flush overlay.

.2 Drawer Construction
- .1 Refer to drawings.
- .2 If drawings do not describe drawer construction, provide drawers constructed to one of the following requirements:
  - .1 Wood Drawer Bodies
    - .1 Drawer Sides and Backs: 15.5 mm Baltic plywood or 12.5 mm hardwood; with glued dovetail joints.
    - .2 Drawer Bottoms: 6.4 mm hardwood plywood glued and dadoed into front, back, and sides of drawers. Use 12.7 mm material for drawers more than 600 mm wide.
    - .3 Complete with clear transparent finish throughout, unless otherwise noted.
  - .2 Steel Drawer Bodies
    - .1 Steel drawer pans formed from 0.9 mm thick metal, metallic phosphate treated, and finished with manufacturer's standard 2-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat with a minimum dry film thickness of 0.025 mm for topcoat and 0.05 mm for system.

.3 Provide dust panels of 6.4 mm plywood above compartments and drawers, unless located directly under tops.

.4 Provide drawer and door bumpers on all drawer and cabinet doors.

2.6 WOOD CABINETS FOR TRANSPARENT FINISH

.1 Wood Species Exposed Surfaces: Refer to drawings.
- .1 If wood species is not indicated on drawings, then provide maple.
- .2 Grain Direction: Vertically for drawer fronts, doors, and fixed panels.

2.7 WOOD CABINETS FOR OPAQUE FINISH

.1 Wood Species
- .1 Refer to drawings.
- .2 If wood species is not indicated on drawings, then provide any closed-grain hardwood.

.2 Species for Exposed Lumber Surfaces
- .1 Refer to drawings.
- .2 If wood species is not indicated on drawings then provide any closed-grain hardwood.

.3 Panel Product for Exposed Surfaces
- .1 Refer to drawings.

.2 If panel product is not indicated on drawings then provide medium-density fiberboard.

2.8 PLASTIC-LAMINATE CABINETS

.1 Laminate Cladding for Exposed Surfaces
.1 High-pressure decorative laminate complying with the following requirements:
.1 Horizontal Surfaces Other Than Tops: Grade HGS.
.2 Postformed Surfaces: Grade HGP.
.3 Vertical Surfaces: Grade VGS.

.2 Concealed Backs of Panels with Exposed Plastic Laminate Surfaces
.1 High-pressure decorative laminate, Grade BKL.

.3 Colours, Patterns, and Finishes
.1 Refer to drawings.
.2 If not indicated on drawings, then selected by Owner's Representative from manufacturer's full range.

2.9 THERMOSET DECORATIVE PANEL (MCP) CABINETS

.1 Colours, Patterns, and Finishes
.1 Refer to drawings.
.2 If not indicated on drawings, then selected by Owner's Representative from manufacturer's full range.

2.10 PLASTIC-LAMINATE COUNTERTOPS

.1 High-Pressure Decorative Laminate Grade
.1 HGS for flat countertops and HGP for Postformed countertops.

.2 Colours, Patterns, and Finishes
.1 Refer to drawings.
.2 If not indicated on drawings, then selected by Owner's Representative from manufacturer's full range.

.3 Grain Direction, if applicable
.1 Parallel to cabinet fronts.

.4 Edge Treatment
.1 Refer to drawings.

.5 Core Material
.1 Particleboard or plywood.

.6 Core Material at Sinks
.1 Particleboard made with exterior glue or exterior-grade plywood.

.7 Paper Backing
.1 Provide paper backing on underside of countertop substrate.

2.11 SOLID-SURFACING-MATERIAL COUNTERTOPS

.1 Solid-Surfacing-Material Thickness
.1 13 mm, unless otherwise noted.

.2 Colours, Patterns, and Finishes
.1 Refer to drawings.
.2 If not indicated on drawings, then selected by Owner's Representative from manufacturer's full range.

.3 Fabricate tops in one piece, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.
.1 Fabricate tops with shop-applied edges of materials and configuration indicated.
.2 Fabricate tops with loose back-splashes and end-splashes for field application.

.4 Install integral sink bowls in countertops in shop.

.5 Drill holes in countertops for plumbing fittings and soap dispensers in shop.

2.12 GALVANIZED STEEL COUNTERTOPS

.1 Material
.1 Galvanized sheet metal. Use largest practical sheet sizes. Layout sheets so seems are located symmetrically about the entire countertop. Butt seems tight together. Protect surface from construction damage.

.2 Core Material
.1 Plywood.

.3 Edge Treatment
.1 Fold top down to form boxed edge, with hemmed edges. File all edges smooth and free of burrs.

2.13 LINOLEUM COUNTERTOPS

.1 Material
.1 Linoleum sheet flooring, adhered to core material, with heat welded seams, as per manufacturer’s installation instructions. Layout material so seems are located symmetrically about the entire countertop. Protect surface from construction damage.

.2 Core Material
.1 Plywood.

.3 Edge Treatment
.1 Refer to drawings.
.2 If not indicated on drawings then provide maple edge, profiled.

2.14 SHOP FINISHING

.1 Grade
.1 Provide finishes of same grades as items to be finished.

.2 General
.1 Finish architectural woodwork at fabrication shop as specified in this Section. Defer only final touch-up, cleaning, and polishing until after installation.

.3 Preparation for Finishing

.1 Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.

.2 Backpriming

.1 Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling and to end-grain surfaces. Concealed surfaces of plastic-laminate-clad woodwork do not require backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative panels.

.4 Transparent Finish

.1 Provide anyone of the following finishes for woodwork intended for a transparent finish.

.1 AWMAC Finish System: Synthetic penetrating oil.
.2 AWMAC Finish System: Nitrocellulose lacquer.
.3 AWMAC Finish System: Catalyzed lacquer.
.4 AWMAC Finish System: Acrylic lacquer.
.5 AWMAC Finish System: Conversion varnish.
.6 AWMAC Finish System: Catalyzed vinyl.

.2 Staining

.1 Refer to drawings to determine if staining is required, and if so, colours required.
.2 If staining is not referred to in drawings, no staining is required.

.3 Wash Coat for Stained Finish

.1 Apply wash-coat sealer to woodwork made from closed-grain wood before staining and finishing.

.4 Filled Finish for Open-Grain Woods

.1 After staining (if any), apply paste wood filler to open-grain woods and wipe off excess. Tint filler to match stained wood.
.2 Apply wash-coat sealer after staining and before filling.

.1 Sheen

.1 Refer to drawings.
.2 If sheen is not indicated on drawings then provide satin, 31-45 gloss units measured on 60-degree gloss meter per ASTM D 523.

.5 Opaque Finish

.1 Provide anyone of the following finishes for woodwork intended for an opaque finish.

.1 AWMAC Finish System: Nitrocellulose lacquer.
.2 AWMAC Finish System: Catalyzed lacquer.
.3 AWMAC Finish System: Acrylic lacquer.
.4 AWMAC Finish System: Conversion varnish.
.5 AWMAC Finish System: Catalyzed vinyl.

.2 Colour

.1 Refer to drawings.
.2 If colours are not indicated on drawings then selected by Owner's Representative from manufacturer's full range.

.3 Sheen

.1 Refer to drawings.
.2 If sheen is not indicated on drawings then provide satin, 31-45 gloss units measured on 60-degree gloss meter per ASTM D 523.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Before installation, condition woodwork to average prevailing humidity conditions in installation areas.

.2 Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

.1 Grade
  .1 Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.

.2 Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.

.3 Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 3 mm in 2400 mm.

.4 Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

.5 Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

.6 Cabinets
  .1 Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
  .2 Install cabinets with no more than 3 mm in 2400mm sag, bow, or other variation from a straight line.
  .3 Maintain veneer sequence matching of cabinets with transparent finish.
  .4 Fasten wall cabinets through back, near top and bottom, at ends and not more than 400 mm o.c. with No. 10 wafer-head screws sized for 25mm penetration into wood framing, blocking, or hanging strips.
  .5 For cabinets used as part of a domestic kitchen cabinet arrangement or kitchenette arrangement in staff rooms, lunch rooms, board rooms, and other similar locations, provide one cutlery tray in the drawer closets to the sink.

.7 Countertops
  .1 Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
  .2 Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in colour to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
  .3 Install countertops with no more than 3 mm in 2400mm sag, bow, or other variation from a straight line.
  .4 Secure backsplashes and to walls with adhesive.
  .5 Calk space between backsplash and wall with sealant specified in Division 07 Section *Joint Sealants*.

.8 Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

3.3 ADJUSTING AND CLEANING

.1 Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

.2 Clean, lubricate, and adjust hardware.

.3 Clean woodwork on exposed and semi exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:
- .1 Steel frame products including frames, transom frames (glazed or paneled), sidelight and window assemblies, fire-rated and non-rated.
- .2 Steel panels, fixed or removable, flush or rebated, similar in construction to steel doors, for use in steel frame product.
- .3 Steel doors, swing type, flush, with or without embossed face sheets, with or without glazed or louvered openings, fire-rated, with or without temperature rise ratings, and non-rated.

.2 Types of items you will not find described in this Section:
- .1 Unit Masonry for embedding anchors for hollow metal work into masonry construction.
- .2 Hollow metal doors and frames manufactured from stainless steel.
- .3 Detention Doors and Frames.
- .4 Sound Control Door Assemblies for packaged, acoustical hollow metal door and frame assemblies with STC ratings of 35 or more.
- .5 Door Hardware.
- .6 Field painting hollow metal doors and frames.
- .7 Lead-lined, hollow metal doors and frames.
- .8 Electrical connections including conduit and wiring for door controls and operators.

1.2 DEFINITIONS

.1 Minimum Thickness: Minimum thickness of base metal without coatings.

1.3 SUBMITTALS

.1 Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, and finishes.

.2 Shop Drawings: Include the following:
- .1 Elevations of each door design.
- .2 Details of doors, including vertical and horizontal edge details and metal thicknesses.
- .3 Frame details for each frame type, including dimensioned profiles and metal thicknesses.
- .4 Locations of reinforcement and preparations for hardware.
- .5 Details of each different wall opening condition.
- .6 Details of anchorages, joints, field splices, and connections.
- .7 Details of accessories.
- .8 Details of mouldings, removable stops, and glazing.
- .9 Details of conduit and preparations for power, signal, and control systems.

.3 Other Action Submittals:
- .1 Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

.4 Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labelled assemblies.

1.4 QUALITY ASSURANCE

.1 Except as otherwise specified, comply with requirements of Canadian Manufacturing Standards for Steel Doors and Frames published by the Canadian Steel Door and Frame Manufacturers' Association.

.2 Source Limitations: Obtain hollow metal work from single source from single manufacturer.

.3 Fire-Rated Door Assemblies: Assemblies complying with CAN4-S104-M that are listed and labelled by a qualified testing agency, for fire-protection ratings indicated.
.1 Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labelled fire-rated door assemblies except for size.

.4 Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with CAN4-S104-M that are listed and labelled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated. Label each individual glazed lite.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
.1 Provide additional protection to prevent damage to finish of factory-finished units.

.2 Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

.3 Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 102 mm high wood blocking. Do not store in a manner that traps excess humidity.
.1 Provide minimum 6 mm space between each stacked door to permit air circulation.

1.6 PROJECT CONDITIONS

.1 Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

.1 Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Steel
.1 Commercial grade steel to ASTM A924-97 (M-97), galvanized to ASTM A653-97 (M-97), Commercial Steel (CS), Type B, A40 (ZF120) minimum unless otherwise noted.
.2 Minimum steel thicknesses shall be in accordance with Appendix 1 of the CSDMA, *Recommended Specifications for Commercial Steel Door and Frame Products*.

.2 Door Core Materials
.1 Honeycomb: Structural small cell 25.4 mm maximum kraft paper 'honeycomb'. Weight: 36.3 kg per ream minimum, density: 16.5 kg/m^3 minimum, sanded to required thickness.
.2 Fibreglass: Loose batt type, density 24 kg/m^3 minimum, conforming to ASTM C553 or ASTM C592.
.3 Polystyrene: Rigid extruded, fire retardant, closed cell board, Type 1, density: 16 to 32 kg/m^3, thermal values: RSI 1.06 (R 6.0) minimum, conforming to ASTM C578.
.4 Polystyrene: Rigid extruded fire retardant, closed cell board. Density; 16 to 32 kg/m^3, thermal values; RSI 1.0 (R 6.0) minimum, Type 1, in accordance with ASTM C578.
.5 Polyisocyanurate: Rigid foam. closed cell, faced board, thermal value: RSI 2.17 (R12.3) minimum, conforming to ASTM C1289

2.2 MISCELLANEOUS

.1 Primers
.1 Rust inhibitive touch-up only.

.2 Door Silencers
.1 Single stud rubber/neoprene type.

.3 Exterior Top Caps
.1 Rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19MA.

.4 Frame Thermal Breaks
.1 Rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19MA.

.5 Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

.6 Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.

.7 Grout: ASTM C 476, except with a maximum slump of 102 mm, as measured according to ASTM C 143/C 143M.

.8 Glazing: Comply with requirements in Division 08 Section *Glazing*.

.9 Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 0.4 mm dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibres, sulphur components, and other deleterious impurities.

2.3 FABRICATION – GENERAL

.1 Manufacturer door and frame products in accordance with the CSDMA's, *Recommended Dimensional Standards for Commercial Steel Doors and Frames*.

.2 Selected Door and Frame Requirements, unless noted otherwise (uno)

Item	Location		
	Interior, Unless noted otherwise	**Exterior, Unless noted otherwise**	**Steel Stiffened, where noted**
Steel Coating	A40 (ZF120) minimum; uno.	A40 (ZF120) minimum, uno. Provide G90 (Z275) coating where noted.	A40 (ZF120) minimum, uno. Provide G90 (Z275) coating where noted.
Doors			
Duty / Min. Steel Thickness	Medium duty / 1.3 mm (18 gauge nominal); uno.	Heavy duty / 1.6 mm (16 gauge nominal); uno.	Extra heavy duty / 2.0 mm (14 gauge nominal), uno.
Design	Flush panel, uno.	Flush panel, uno.	Flush panel, uno
Core,	Stiffened, insulated and sound deadened with honeycomb core laminated under pressure to each face sheet; uno.	Stiffened, insulated and sound deadened with polystyrene or polyisocyanurate core laminated under pressure to each face sheet; uno.	Internally reinforced with continuous interlocking steel stiffeners at 150 mm on centre, securely welded to each face sheet at 150 mm on centre maximum, with voids between stiffeners filled and sound deadened with 24 kg/m3 loose batt type fibreglass material.
Longitudinal Seams	Mechanically interlocked, adhesive assisted with edge seams tack welded, filled and sanded flush with no visible seam; uno.	Mechanically interlocked, adhesive assisted with edge seams tack welded, filled and sanded flush with no visible seam; uno.	Continuously welded the full height of the door filled and ground smooth with no visible seams.
Caps	None, uno.	PVC, uno. Provide steel caps where noted.	Steel cap.
Thermally Broken?	No	No, uno.	No.
Frames			
Duty / Min. Steel Thickness	Medium duty / 1.3 mm (18 gauge nominal); uno. Standard duty / 1.0 mm 20 gauge nominal) for hollow core doors.	Heavy duty / 1.6 mm (16 gauge nominal); uno.	Heavy duty / 1.6 mm (16 gauge nominal); uno.
Construction	Full face, punch-mitred, or saw mitred welded construction; uno.	Full face welded construction.	Full face welded construction.
Thermally Broken?	No	No, uno.	No.

2.4 FABRICATION - FRAME PRODUCTS

.1 General

.1 Provide frame mortised, blanked, reinforced, drilled, and tapped at the factory for templated hardware only, in accordance with the approved hardware schedule and templates provided by the hardware supplier.

.2 Protect mortised cut-outs with steel guard boxes except for dry wall applications.

.3 Reinforce frame where required, for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware.

.4 Provide anchorage appropriate to floor, wall, and frame construction. Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike

jamb. For rebate opening heights up to and including 1520 mm provide two anchors, and an additional anchor for each additional 760 mm of height or fraction thereof, except as indicated below. Frames in previously placed concrete, masonry, or structural steel shall be provided with anchors located not more than 150 mm from the top and bottom of each jamb, and intermediate anchors at 660 mm on centre maximum. Fasteners for such anchors shall be provided by others.

.5 Provide minimum reinforcing, anchor and other component gauges in accordance with Table 1 of the CSDMA, *Recommended Specifications for Commercial Steel Door and Frame Products*.

.6 Prepare each door opening for single stud rubber door silencers, three 3 for single

.7 Provide fire-rated frame products for those openings requiring fire protection. Provide frames, transom and sidelight assemblies listed for conformance with CAN4-S104. Provide window assemblies listed for conformance with CAN4-S106. Ensure all fire-rated frame products bear the label of, and be listed by a nationally recognized testing agency having a factory inspection service. Labelling shall be in accordance with NFPA 80, the listing authority's policies and label materials, and identify the manufacturer. Construct fire-rated frame products as listed for labelling in the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers.

.8 For each grade frame indicated form from a steel sheet having a minimum thickness of:

.1 Standard Duty grade frames: 1.0 mm
.2 Medium Duty grade frames: 1.3 mm
.3 Heavy Duty and Extra Heavy Duty grade frames: 1.6 mm

.2 Welded Type

.1 Accurately mitre or mechanically join frame products.

.2 Ensure frame product perimeter corner joints shall be as defined in Appendix 2 of the CSDMA, *Recommended Specifications for Commercial Steel Door and Frame Products*, and as follows

.1 Profile welded; punch-mitred - continuously welded on the profile faces, rabbets, returns and soffit intersections, or saw-mitred - continuously welded on the profile faces, rabbets, returns, stops and soffit intersections. Punch or saw-mitred, at the manufacturer's discretion. All profile welded frame product exposed faces shall be filled and ground to a smooth, uniform, seamless surface.
.2 Face welded; continuously welded on the profile faces, with exposed faces filled and ground to a smooth, uniform, seamless surface.
.3 Tack welded; welded on the faces and returns, with exposed hairline joint intersections.

.3 Ensure joints at mullions, sills and center rails are:

.1 Coped accurately, butted and tightly fitted.
.2 At intersecting flush profile faces, securely welded, filled and ground to a smooth, uniform, seamless surface.
.3 At intersecting recessed profile faces, securely welded to concealed reinforcements, with exposed hairline face seams.
.4 At all other intersecting profile elements have exposed hairline face seams.

.4 Welding: to CSA W59.

.5 Ensure a floor anchor is securely attached to the inside of each jamb profile where frame product is to be installed prior to the adjacent partition. Provide each floor anchor s with two holes for securing to the floor. For conditions that do not permit the use of a floor anchor, substitute with an additional wall anchor, located within 150 mm of the base of the jamb.

.6 Weld in two temporary jamb spreaders per door opening to maintain proper alignment during shipment and handling. Do not be used for installation.

.7 Form glazing stops from steel channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.

.8 When required due to site access or due to shipping limitations, fabricate frame product for large openings in sections as designated on the submittal drawings, with splice joints for field assembly and welding.

.9 Prior to shipment, mark each frame product with an identification number as shown on submittal drawings.

.3 Knocked-Down Type

.1 Ship knocked-down type frames unassembled.

.2 Ensure frames have mechanical joints which inter-lock securely and provide functionally satisfactory performance when assembled and installed in accordance with the manufacturer's published instructions.

.3 Where frame product is to be installed prior to the adjacent partition, securely attach a floor anchor to the inside of each jamb profile. Provide each floor anchor with two 2 holes for securing to the floor. For conditions that do not permit the use of a floor anchor, substitute with an additional wall anchor, located within 150 mm of the base of the jamb.

.4 Prior to shipment, mark each frame product with an identification number as shown on submittal drawings.

2.5 FABRICATION - DOORS

.1 General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with requirements of Canadian Manufacturing Standards for Steel Doors and Frames published by the Canadian Steel Door and Frame Manufacturers' Association except as noted.

.1 Longitudinal Edge Profile:

.1 Vertical Edges for Single-Acting Doors: Manufacturer's standard.

.2 Vertical Edges for Double-Acting Doors: Round vertical edges with 54 mm radius.

.2 Provide doors mortised, blanked, reinforced, drilled and tapped at the factory for templated hardware only, in accordance with the approved hardware schedule and templates provided by the hardware supplier.

.3 Factory prepare holes 12.7 mm diameter and larger, except for mounting and through-bolt holes.. Factory-prepare holes less than 12.7 mm when required for the function of the device (for knob, lever, cylinder, thumb or turn pieces) or when these holes over-lap function holes.

.4 Reinforce doors where required for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware.

.5 Provide top and bottom of doors with inverted, recessed, welded steel channels.

.6 Provide minimum reinforcing and component gauges in accordance with Table 1 of the CSDMA, *Recommended Specifications for Commercial Steel Door and Frame Products*.

.7 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.

.8 Provide fire-rated doors for those openings requiring fire protection. Provide products listed for conformance with CAN4-S104. Provide fire-rated doors bearing label of, and be listed by a nationally recognized testing agency having a factory inspection service. Labelling shall be in accordance with NFPA 80, the listing authority's policies and label materials, and shall identify the manufacturer. Construct fire-rated doors as listed for labelling in the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers.

.9 Prior to shipment, mark each door with an identification number as shown on the submittal drawings.

.10 For each grade door indicated form both face sheets for doors from a steel sheet having a minimum thickness of:

.1 Standard Duty grade doors: 1.0 mm

.2 Medium Duty grade doors: 1.3 mm

.3 Heavy Duty grade doors: 1.6 mm

.4 Extra Heavy Duty grade doors: 2.0 mm

2.6 HOLLOW METAL PANELS

.1 Provide hollow metal panels of same materials, construction, and finish as specified for adjoining hollow metal doors.

2.7 FRAME ANCHORS

.1 Jamb Anchors:

.1 Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 1.0 mm thick, with corrugated or perforated straps not less than 50 mm wide by 250 mm long; or wire anchors not less than 4.5 mm thick.

.2 Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 1.0 mm thick.

.3 Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.

.4 Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 9.5 mm diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

.2 Floor Anchors: Formed from same material as frames, not less than 1.0 mm thick, and as follows:

.1 Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

.2 Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 50 mm height adjustment. Terminate bottom of frames at finish floor surface.

2.8 STOPS AND MOULDINGS

.1 Mouldings for Glazed Lites in Doors: Minimum 0.8 mm thick, fabricated from same material as door face sheet in which they are installed.

.2 Fixed Frame Mouldings: Formed integral with hollow metal frames, a minimum of 16 mm high unless otherwise indicated.

.3 Loose Stops for Glazed Lites in Frames: Minimum 0.8 mm thick, fabricated from same material as frames in which they are installed.

.4 Terminated Stops: Where indicated on interior door frames, terminate stops 152 mm above finish floor with a 45-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.

.1 Provide terminated stops only where indicated.

2.9 LOUVERS

.1 Provide louvers for interior doors, where indicated, with blades or baffles formed of 0.5 mm thick, cold-rolled steel sheet set into 0.8 mm thick steel frame.

.1 Sightproof Louver: Stationary louvers constructed with inverted V-shaped or Y-shaped blades.

.2 Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labelled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same testing and inspecting agency that established fire-resistance rating of door assembly.

2.10 ACCESSORIES

.1 Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

.2 Ceiling Struts: Minimum 6.4 mm thick by 25.4 mm wide steel.

.3 Grout Guards: Formed from same material as frames, not less than 0.4 mm thick.

2.11 FABRICATION

.1 Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

.2 Hollow Metal Doors:

.1 Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.

.2 Glazed Lites: Factory cut openings in doors.

.3 Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 19 mm beyond edge of door on which astragal is mounted.

.3 Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

.1 Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
.2 Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
.3 Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
.4 Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
.5 Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
.6 Jamb Anchors: Provide number and spacing of anchors as follows:

.1 Masonry Type: Locate anchors not more than 457 mm from top and bottom of frame. Space anchors not more than 813 mm o.c. and as follows:

.1 Two anchors per jamb up to 1524 mm high.
.2 Three anchors per jamb from 1524 to 2286 mm high.
.3 Four anchors per jamb from 2286 to 3048 mm high.
.4 Four anchors per jamb plus 1 additional anchor per jamb for each 610 mm or fraction thereof above 3048 mm high.

.2 Stud-Wall Type: Locate anchors not more than 457 mm from top and bottom of frame. Space anchors not more than 813 mm o.c. and as follows:

.1 Three anchors per jamb up to 1524 mm high.
.2 Four anchors per jamb from 1524 to 2286 mm high.
.3 Five anchors per jamb from 2286 to 2438 mm high.
.4 Five anchors per jamb plus 1 additional anchor per jamb for each 610 mm or fraction thereof above 2438 mm high.
.5 Two anchors per head for frames above 1066 mm wide and mounted in metal-stud partitions.

.3 Compression Type: Not less than two anchors in each jamb.
.4 Postinstalled Expansion Type: Locate anchors not more than 152 mm from top and bottom of frame. Space anchors not more than 660 mm o.c.

.7 Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.

.1 Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
.2 Double-Door Frames: Drill stop in head jamb to receive two door silencers.

.4 Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

.5 Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cut-outs, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section *Door Hardware*.

.1 Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
.2 Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
.3 Coordinate locations of conduit and wiring boxes for electrical connections with Electrical sections.

.6 Stops and Mouldings: Provide stops and mouldings around glazed lites indicated. Form corners of stops and mouldings with butted or mitred hairline joints.

.1 Single Glazed Lites: Provide fixed stops and mouldings welded on secure side of hollow metal work.
.2 Multiple Glazed Lites: Provide fixed and removable stops and mouldings so that each glazed lite is capable of being removed independently.
.3 Provide fixed frame mouldings on outside of exterior and on secure side of interior doors and frames.
.4 Provide loose stops and mouldings on inside of hollow metal work.
.5 Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
.2 Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
.3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
.2 Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:

.1 Squareness: Plus or minus 1.6 mm, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
.2 Alignment: Plus or minus 1.6 mm, measured at jambs on a horizontal line parallel to plane of wall.
.3 Twist: Plus or minus 1.6 mm, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
.4 Plumbness: Plus or minus 1.6 mm, measured at jambs on a perpendicular line from head to floor.

.3 Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

.1 General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
.2 Hollow Metal Frames: Install hollow metal frames of size and profile indicated.

.1 Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

.1 At fire-protection-rated openings, install frames according to NFPA 80.
.2 Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
.3 Install frames with removable glazing stops located on secure side of opening.
.4 Install door silencers in frames before grouting.
.5 Remove temporary braces necessary for installation only after frames have been properly set and secured.
.6 Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
.7 Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.

.2 Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

.1 Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

.3 Metal-Stud Partitions: Solidly pack mineral-fibre insulation behind frames.

.4 Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.

.5 Concrete Walls: Solidly fill space between frames and concrete with grout, but only when specifically noted. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.

.6 In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

.7 In-Place Gypsum Board Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

.8 Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.

.9 Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

.1 Squareness: Plus or minus 1.6 mm, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

.2 Alignment: Plus or minus 1.6 mm, measured at jambs on a horizontal line parallel to plane of wall.

.3 Twist: Plus or minus 1.6 mm, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

.4 Plumbness: Plus or minus 1.6 mm, measured at jambs at floor.

.3 Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

.1 Non-Fire-Rated Standard Steel Doors:

.1 Jambs and Head: 3 mm plus or minus 1.6 mm.

.2 Between Edges of Pairs of Doors: 3 mm plus or minus 1.6 mm.

.3 Between Bottom of Door and Top of Threshold: Maximum 9.5 mm.

.4 Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 19 mm.

.2 Fire-Rated Doors: Install doors with clearances according to NFPA 80.

.4 Glazing: Comply with installation requirements in Division 08 Section *Glazing* and with hollow metal manufacturer's written instructions.

.1 Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 230 mm o.c. and not more than 50 mm o.c. from each corner.

3.4 ADJUSTING AND CLEANING

.1 Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

.2 Remove grout and other bonding material from hollow metal work immediately after installation.

.3 Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

.1 Types of items described in this Section:
- .1 Solid-core doors with wood-veneer faces.
- .2 Hollow-core doors with hardboard or MDF faces.
- .3 Shop priming and factory finishing flush wood doors.

.2 Types of items you will not find described in this Section:
- .1 Solid-core doors with hardboard, MDF, or plastic-laminate faces.
- .2 Hollow-core doors with wood-veneer and plastic-laminate faces.
- .3 Wood door frames including fire-rated wood door frames.
- .4 Factory fitting flush wood doors to frames and factory machining for hardware.
- .5 Requirements for veneers from the same flitches for both flush wood doors and wood paneling.
- .6 Exterior painting, interior painting and staining and transparent finishing for field finishing doors.
- .7 Lead-lined flush wood doors.
- .8 Glass view panels in flush wood doors.

1.3 SUBMITTALS

.1 Product Data: For each type of door indicated. Include details of core and edge construction, louvers, and trim for openings.

.2 Sustainability Submittals:
- .1 Chain-of-custody certificates certifying that flush wood doors comply with forest certification requirements. Include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.
- .2 For adhesives and composite wood products, indicating that product contains no urea formaldehyde.

.3 Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
- .1 Indicate dimensions and locations of cut-outs.
- .2 Indicate doors to be factory finished and finish requirements.
- .3 Indicate fire-protection ratings for fire-rated doors.

.4 Samples for Verification:
- .1 Factory finishes applied to actual door face materials, approximately 200 by 250 mm, for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of colour and grain to be expected in the finished work.

.5 Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

.1 Non-Rated Wood Flush Doors: complying with CAN/CSA-O132.2 Series 90.

.2 Fire-Rated Wood Doors: Doors complying with CAN4-S104-M that are listed and labelled by a qualified testing agency, for fire-protection ratings indicated. .

.1 Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labelled fire-rated door assemblies except for size.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Comply with requirements of referenced standard and manufacturer's written instructions.

.2 For wood veneer doors, package doors individually in plastic bags or cardboard cartons.

1.6 PROJECT CONDITIONS

.1 Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

.2 Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 16 and 32 deg C and relative humidity between 43 and 70 percent during the remainder of the construction period.

1.7 WARRANTY

.1 Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

.1 Failures include, but are not limited to, the following:

.1 Warping (bow, cup, or twist) more than 6.4 mm in a 1067-by-2134 mm section.

.2 Telegraphing of core construction in face veneers exceeding 0.25 mm in a 76.2 mm span.

.2 Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.

.3 Warranty Period for Solid-Core Interior Doors: Life of installation.

.4 Warranty Period for Hollow-Core Interior Doors: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 DOOR CONSTRUCTION, GENERAL

.1 Low-Emitting Materials: provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.

.2 Particleboard-Core Doors: to CAN/CSA-O132.2 Series 90

.1 Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.

.2 Provide doors with either glued-wood-stave or structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.

.3 Mineral-Core Doors:

.1 Tested in accordance with CAN4 S104 or NFPA 252 to achieve rating as specified.

.2 Core: Non-combustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.

.3 Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.

.4 Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

.5 Pairs: Provide fire-retardant stiles that are listed and labelled for applications indicated without formed-steel edges and astragals. Comply with specified requirements for exposed edges.

.4 Hollow-Core Doors:

.1 Moulded residential-type panel doors fabricated moulded wood fibre facing, wood or MDF stiles and rails, and corrugated cell, bonded together to form a 3-ply structural attachment, internally reinforced for hardware, factory-machined to accommodate scheduled hardware, and primed with latex primer.

.1 Overall thickness: 35 mm.

2.2 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

.1 Interior Solid-Core Doors:

.1 Grade: Hardwood Veneer Grade II (Good).

.2 Species: Select white maple; unless otherwise noted.

.3 Cut: Quarter sliced, unless otherwise noted

.4 Match between Veneer Leaves: Slip match.

.5 Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.

.6 Exposed Vertical Edges: Same species as faces or a compatible species.

.7 Core: Particleboard.

.1 Substitute particleboard core with mineral core when required to achieve the fire rating specified.

.8 Construction: Seven plies, either bonded or non-bonded construction.

2.3 DOORS FOR OPAQUE FINISH

.1 Interior Solid-Core Doors:

.1 Grade: Sound (paint).

.2 Faces: Any closed-grain hardwood of mill option.

.3 Exposed Vertical Edges: Any closed-grain hardwood.

.4 Core: Particleboard.

.1 Substitute particleboard core with mineral core when required to achieve the fire rating specified.

.5 Construction: Five or seven plies. Stiles and rails are bonded to core, and then entire unit abrasive planed before veneering. Faces are bonded to core using a hot press.

.2 Interior Hollow-Core Doors:

.1 Panel design: see door elevation drawings.

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

.1 Masonite Corporation.

.2 Or approved alternate.

2.4 LOUVERS AND LIGHT FRAMES

.1 Wood Louvers: Provide door manufacturer's standard solid-wood louvers, unless otherwise indicated.

.1 Wood Species: Species compatible with door faces.

.2 Metal Louvers: Provide metal louvers only when specifically indicated.

.1 Blade Type: Vision-proof, inverted Y.

.2 Metal and Finish: Hot-dip galvanized steel, 1.0 mm thick, with baked-enamel- or powder-coated finish.

.3 Louvers for Fire-Rated Doors: Provide metal louvers with fusible link and closing device, listed and labelled for use in doors with fire-protection rating of 1-1/2 hours and less.
.1 Metal and Finish: Hot-dip galvanized steel, 1.0 mm thick, with baked-enamel- or powder-coated finish.

.4 Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads as follows, unless otherwise indicated.
.1 Wood Species: Species compatible with door faces.
.2 Profile: Manufacturer's standard shape.
.3 At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

.5 Metal Frames for Light Openings in Fire-Rated Doors: Provide manufacturer's standard frame formed of 1.2 mm thick, cold-rolled steel sheet; with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating greater than 20 minutes.

2.5 FABRICATION

.1 Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
.1 Comply with requirements in NFPA 80 for fire-rated doors.

.2 Openings: Cut and trim openings through doors in factory.
.1 Light Openings: Trim openings with mouldings of material and profile indicated.
.2 Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Division 08 Section *Glazing*.
.3 Louvers: Factory-install louvers in prepared openings.

2.6 FACTORY FINISHING

.1 General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
.1 Finish faces, all four edges, edges of cut-outs, and mortises. Stains and fillers may be omitted on bottom edges, edges of cut-outs, and mortises.

.2 Factory finish doors only when specifically indicated.

.3 Transparent Factory Finish:
.1 Grade: Custom.
.2 Finish: AWI conversion varnish or catalyzed polyurethane system.
.3 Effect: Semi filled finish, produced by applying an additional finish coat to partially fill the wood pores.
.4 Staining: As selected by Owner's Representative from full range of manufacturer’s stain colour if not specifically indicated elsewhere.
.5 Sheen: Satin, unless otherwise noted.

.4 Opaque Factory Finish:
.1 Grade: Custom.
.2 Finish: AWI conversion varnish or catalyzed polyurethane system.
.3 Colour: As selected by Owner's Representative from full range of manufacturer’s colours if not specifically indicated elsewhere.
.4 Sheen: Semi gloss, unless otherwise noted.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Examine doors and installed door frames before hanging doors.
  .1 Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  .2 Reject doors with defects.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

.1 Hardware: For installation, see Division 08 Section *Door Hardware*.

.2 Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
  .1 Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

.3 Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cut-outs, and mortises after fitting and machining.
  .1 Clearances: Provide 3.2 mm at heads, jambs, and between pairs of doors. Provide 3.2 mm from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 6.4 mm from bottom of door to top of threshold unless otherwise indicated.
    .1 Comply with NFPA 80 for fire-rated doors.
  .2 Bevel non-fire-rated doors 3-1/2 degrees at lock and hinge edges.
  .3 Bevel fire-rated doors 3-1/2 degrees at lock edge; trim stiles and rails only to extent permitted by labelling agency.

.4 Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

.5 Doors indicated on drawing to be removed and reinstalled are to be stock piled on site as to avoid damage. Contractor to identify all doors to be reinstalled according to door schedule.

3.3 ADJUSTING

.1 Operation: Rehang or replace doors that do not swing or operate freely.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

.1 Types of items described in this Section:
- .1 Access doors and frames for walls and ceilings.
- .2 Floor access doors and frames, insulated and non-insulated.
- .3 Insulated attic access hatches, without access ladder.

.2 Types of items you will not find described in this Section:
- .1 Mortise or rim cylinder locks and master keying for access doors in walls and ceilings.
- .2 Connection of floor door drainage couplings to drains.
- .3 Blocking out openings for access doors and frames in concrete.
- .4 Anchoring and grouting access door frames set in masonry construction.
- .5 Roof hatches.
- .6 Suspended acoustical tile ceilings.
- .7 Heating and air-conditioning duct access doors.

.3 Precedent
- .1 This spec section shall take precedent over product specifications for similar access doors and frames found in Mechanical and Electrical Divisions for locations outlined in this Spec.

1.3 SUBMITTALS

.1 Product Data: For each type of access door and frame indicated. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

.2 Access Door and Frame Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

1.4 QUALITY ASSURANCE

.1 Source Limitations: Obtain each type of access door(s) and frame(s) through one source from a single manufacturer.

.2 Fire-Rated Access Doors and Frames: Units complying with CAN4-S104-M that are identical to access door and frame assemblies tested for fire-test-response characteristics and that are listed and labeled by ULC or another testing and inspecting agency acceptable to authorities having jurisdiction:

.3 Size Variations: Obtain Owner's Representative's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

1.5 COORDINATION

.1 Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical (including but not limited to all concealed valves, balancing arms and controls, fire flaps, and fire

dampers), electrical (including but not limited to all concealed junction boxes, controls), or other concealed work, and indicate in the schedule specified in *Submittals* Article.

PART 2 - PRODUCTS

2.1 STEEL MATERIALS

.1 Steel Sheet: Uncoated or electrolytic zinc-coated, ASTM A 591/A 591M with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

.2 Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS) with ZF180 zinc-iron-alloy (galvannealed) coating or Z180 mill-phosphatized zinc coating; stretcher-leveled standard of flatness; with minimum thickness indicated representing specified thickness according to ASTM A 924/A 924M.

.3 Drywall Beads: Edge trim formed from 0.76-mm zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

2.2 STAINLESS-STEEL MATERIALS

.1 Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304 or 316. Remove tool and die marks and stretch lines or blend into finish.
.1 Finish: Manufacturer's standard.

2.3 ACCESS DOORS AND GRAMES IN GENERAL

.1 Provide fire rated door assemblies when installed in fire rated assemblies
.1 Closing: automatic closing type.
.2 Ratings:
.1 45 minute assembly: 45 minute door rating.
.2 1 hour assembly: 45 minute door rating.
.3 1.5 hour assembly: 1 hour door rating.
.4 2 hour assembly: 1 ½ hour door rating.

2.4 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

.1 Door: Minimum 1.5 mm thick sheet metal.

.2 Frame: Minimum 1.5 mm thick sheet metal

.3 Hinges: one of the following:
.1 Spring-loaded, concealed-pin type.
.2 Continuous piano.

.4 Latch: Cam latch; slam latch; or self-latching bolt operated by one of the following:
.1 Hex head wrench.
.2 Pinned hex head wrench.
.3 Spanner head wrench.

.5 Doors in finished gypsum board wall and ceiling assemblies not otherwise having a tile finish.
.1 Type: Flush access doors and trimless frames
.2 Fabricated from one of the following:
.1 Steel sheet.

.2 Metallic-coated steel sheet.
.3 Stainless-steel sheet.
.3 Door: Set flush with surrounding finish surfaces.
.4 Frame: With drywall bead flange.
.5 Rating: Fire rated when installed in fire rated assemblies.
.1 Automatic Closer: Spring type.

.6 Doors in wall assemblies having a tiled finish.
.1 Type: Recessed access doors and trimless frames.
.2 Fabricated from one of the following:
.1 Steel sheet.
.2 Metallic-coated steel sheet.
.3 Stainless-steel sheet.
.3 Locations: Wall access doors.
.4 Door: In the form of a pan recessed 25 mm for gypsum board and tile infill.
.5 Frame: With drywall bead for gypsum board surfaces.

.7 Doors in all other assemblies.
.1 Type: Flush access doors and frames with exposed trim.
.2 Materials: Fabricated from:
.1 Stainless-steel sheet.
.3 Door: Set flush with exposed face flange of frame.
.4 Frame: With 25 mm or 32 mm wide, surface-mounted trim.

2.5 FLOOR ACCESS DOORS AND FRAMES

.1 Floor Doors, General: Equip each door with adjustable counterbalancing springs, heavy-duty hold-open arm that automatically locks door open at 90 degrees, release handle with red vinyl grip that allows for one-handed closure, and recessed lift handle.

.2 Aluminum Floor Door: Single-leaf opening. Extruded-aluminum angle frame with 6.4 mm thick, diamond-pattern, aluminum tread plate door; non-watertight; loading capacity to support 7.2-kN/sq. m pedestrian live load.
.1 Locations: When hatch is installed in non-fire rated floor assemblies.

.3 Steel Angle-Frame Floor Door: Single-leaf opening. Galvanized structural-steel frame with 4.8 or 6.4 mm thick, diamond-pattern, galvanized structural-steel tread plate door; non-watertight; loading capacity to support 7.2 kN/sq. m pedestrian live load.
.1 Fire-Resistance Rating: Not less than that indicated.
.2 Finish painted in yellow with wording *FIRE DOOR - DO NOT STORE MATERIALS ON SURFACE*.
.3 Locations: When hatch is installed in fire-rated floor assemblies.

.4 Watertight Aluminum Floor Door: Single-leaf opening. Extruded-aluminum gutter frame with DN 40 drainage coupling and 6.4-mm- thick, diamond-pattern, aluminum tread plate door; watertight; loading capacity to support 7.2-kN/sq. m pedestrian live load.
.1 Locations: Only if a water tight hatch is indicated, and then only in non-fire-rated floor assemblies.

.5 Watertight Steel Gutter-Frame Floor Door: Single-leaf opening. Galvanized structural-steel channel frame forming gutter with DN 40 drainage coupling and 4.8- or 6.4-mm- thick, diamond-pattern, galvanized structural-steel tread plate door; watertight; loading capacity to support 7.2-kN/sq. m pedestrian live load.
.1 Fire-Resistance Rating: Not less than that indicated.
.2 Finish painted in yellow with wording *FIRE DOOR - DO NOT STORE MATERIALS ON SURFACE*.
.3 Locations: Only if a water tight hatch is indicated, and then only in fire rated floor assemblies.

.6 Hardware: Provide the following:
- .1 Hinges: Heavy-duty, aluminum butt hinges with stainless-steel pins.
- .2 Latch: Stainless-steel slam latch.
- .3 Lock: Keyed deadlock bolt
- .4 Hardware Material: Stainless steel, including latch and lifting mechanism assemblies, hold-open arms, and all brackets, hinges, pins, and fasteners.

.7 Insulation: Urethane with liner pan.
- .1 Locations: When hatch is installed in insulated floor assemblies.

2.6 INSULATED ATTIC ACCESS HATCHES

.1 Access Hatch: pre-fabricated attic access hatch consisting of door frame and trim, complete with steel door with polyurethane core for manual lifting, complete with magnetic weather stripping, 550 x 900 mm nominally.

2.7 FABRICATION

.1 General: Provide access door and frame assemblies manufactured as integral units ready for installation.

.2 Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

.3 Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
- .1 Exposed Flanges: Nominal 25 to 38 mm wide around perimeter of frame.
- .2 For trimless frames with drywall bead, provide edge trim for gypsum board and gypsum base securely attached to perimeter of frames.
- .3 Provide mounting holes in frames for attachment of units to metal or wood framing.
- .4 Provide mounting holes in frame for attachment of masonry anchors. Furnish adjustable metal masonry anchors.

.4 Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.

.5 Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
- .1 For cylinder lock, furnish two keys per lock and key all locks alike.
- .2 For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

.6 Extruded Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

.1 Comply with manufacturer's written instructions for installing access doors and frames.

.2 Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.

.3 Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.2 INSULATED ATTIC ACCESS HATCH

.1 Ensure structural framing is used to create the rough opening for the hatch. Secure hatch to the structural framing as per manufacturer requirements.

.2 Seal the ceiling's air/vapour barrier to frame of attic access hatch. Fill void between frame and adjacent framing with spray foam sealant.

3.3 ADJUSTING AND CLEANING

.1 Adjust doors and hardware after installation for proper operation.

.2 Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:
- .1 Commercial door hardware for the following:
  - .1 Swinging doors.
  - .2 Non-fire-rated sliding doors.
  - .3 Other doors to the extent indicated.
- .2 Cylinders for doors specified in other Sections.
- .3 Electrified door hardware.

.2 Types of items you will not find described in this Section:
- .1 Commercial door hardware for the following:
  - .1 Non-fire-rated folding doors.
- .2 Astragals provided as part of fire-rated labelled assemblies and for door silencers provided as part of hollow-metal frames.
- .3 Door silencers provided as part of aluminum frames.
- .4 Astragals and integral intumescent seals provided as part of fire-rated labelled flush wood door assemblies.
- .5 Astragals and integral intumescent seals provided as part of fire-rated labelled stile and rail wood door assemblies.
- .6 Access door hardware.
- .7 Door hardware provided as part of overhead door assemblies.
- .8 Door hardware provided as part of overhead grille assemblies.
- .9 Door silencers provided as part of hollow-metal detention frames.
- .10 Hinges and gasketing provided as part of sound-rated door assemblies.
- .11 Specialized entrance door hardware for aluminum-framed entrances and storefronts
- .12 Specialized entrance door hardware for all-glass entrances and storefronts.
- .13 Specialized entrance door hardware for automatic entrances
- .14 Specialized entrance door hardware for intensive care unit/critical care unit (ICU/CCU) entrances.
- .15 Detention door hardware.
- .16 Door hardware for doors in wire mesh partitions.
- .17 Plastic door protection units that match wall protection units.
- .18 Radiation protection for lead-lined astragals provided as part of fire-rated labelled assemblies.
- .19 Connections to electrical power system and for low-voltage wiring work.
- .20 Access control devices installed at door openings and provided as part of a security access system.
- .21 Detection devices installed at door openings and provided as part of an intrusion detection system.
- .22 Connections to building fire alarm system.

.3 Products furnished, but not installed, under this Section include the following. Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.
- .1 Cylinders for locks specified in other Sections.

1.2 SUBMITTALS

.1 Product Data: Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.

.2 Shop Drawings: Details of electrified door hardware, indicating the following:
- .1 Wiring Diagrams: Power, signal, and control wiring. Include the following:
  - .1 System schematic.

.2 Point-to-point wiring diagram.
.3 Riser diagram.
.4 Elevation of each door.

.2 Detail interface between electrified door hardware and fire alarm, access control, security, and building control systems.

.3 Operation Narrative: Describe the operation of doors controlled by electrified door hardware.

.3 Qualification Data: For Architectural Hardware Consultant.

.4 Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.

.5 Warranty: Special warranty specified in this Section.

.6 Other Action Submittals:

.1 Door Hardware Sets: Prepared by or under the supervision of Architectural Hardware Consultant, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final door hardware sets with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

.1 Format: Comply with scheduling sequence and vertical format in DHI's *Sequence and Format for the Hardware Schedule*. Double space entries, and number and date each page.

.2 Content: Include the following information:

.1 Identification number, location, hand, fire rating, and material of each door and frame.

.2 Type, style, function, size, quantity, and finish of each door hardware item. Include description and function of each lockset and exit device.

.3 Complete designations of every item required for each door or opening including name and manufacturer.

.4 Fastenings and other pertinent information.

.5 Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.

.6 Explanation of abbreviations, symbols, and codes contained in schedule.

.7 Mounting locations for door hardware.

.8 Door and frame sizes and materials.

.9 Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.

.1 Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.

.10 List of related door devices specified in other Sections for each door and frame.

.3 Submittal Sequence: Submit the final door hardware sets at earliest possible date, particularly where approval of the door hardware sets must precede fabrication of other work that is critical in Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the door hardware sets.

.2 Keying Schedule: Prepared by or under the supervision of Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

1.3 QUALITY ASSURANCE

.1 Installer Qualifications: An employer of workers trained and approved by lock manufacturer.

.1 Installer's responsibilities include supplying and installing door hardware and providing a qualified Architectural Hardware Consultant available during the course of the Work to consult with Contractor, Owner's Representative, and Owner about door hardware and keying.
.2 Installer shall have warehousing facilities in Project's vicinity.
.3 Scheduling Responsibility: Preparation of door hardware and keying schedules.
.4 Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

.2 Architectural Hardware Consultant Qualifications: A person who is currently certified by DHI as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.
.1 Electrified Door Hardware Consultant Qualifications: A qualified Architectural Hardware Consultant who is experienced in providing consulting services for electrified door hardware installations.

.3 Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.
.1 Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

.4 Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labelled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

.5 Electrified Door Hardware: Listed and labelled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

.6 Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section *Project Management and Coordination*. Review methods and procedures related to electrified door hardware including, but not limited to, the following:
.1 Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.
.2 Review sequence of operation for each type of electrified door hardware.
.3 Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
.4 Review required testing, inspecting, and certifying procedures.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

.2 Tag each item or package separately with identification related to the final door hardware sets, and include basic installation instructions, templates, and necessary fasteners with each item or package.

.3 Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

.4 Deliver keys and permanent cores, when specified, to Owner by registered mail or overnight package service.
.1 Obtain name and mailing address from Owner's Representative.

1.5 COORDINATION

.1 Coordinate layout and installation of recessed pivots and closers with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Division 03.

.2 Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

.3 Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control system, security system, and building control system.

.4 Existing Openings: Where new hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide for proper operation.

1.6 WARRANTY

.1 Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fails in materials or workmanship within specified warranty period.
- .1 Failures include, but are not limited to, the following:
  - .1 Structural failures including excessive deflection, cracking, or breakage.
  - .2 Faulty operation of operators and door hardware.
  - .3 Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
- .2 Warranty Period: Three years from date of Substantial Completion, except as follows:
  - .1 Electromagnetic and Delayed-Egress Locks: Five years from date of Substantial Completion.
  - .2 Exit Devices: Two years from date of Substantial Completion.
  - .3 Manual Closers: 10 years from date of Substantial Completion.
  - .4 Concealed Floor Closers: 10 years from date of Substantial Completion.

1.7 MAINTENANCE SERVICE

.1 Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

.2 Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair, or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door hardware operation. Provide parts and supplies same as those used in the manufacture and installation of original products.

1.8 EXTRA MATERIALS

.1 Furnish full-size units of door hardware described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
- .1 Door Hardware: None required.
- .2 Electrical Parts: None required.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

.1 General: Provide door hardware for each door to comply with requirements in this Section.

.1 Door Hardware Sets: Provide quantity, item, size, finish or colour indicated, and products complying with BHMA standard referenced.
.2 Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.

.2 Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 *Door Hardware Groups* Article or on drawings. Products are identified by using door hardware designations, as follows:
.1 Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 Door Hardware Groups Article.
.2 References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.

.3 In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
.1 Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 HINGES, GENERAL

.1 Quantity: Provide the following, unless otherwise indicated:
.1 Two Hinges: For doors with heights up to 1524 mm.
.2 Three Hinges: For doors with heights 1549 to 2286 mm.
.3 Four Hinges: For doors with heights 2311 to 3048 mm.
.4 For doors with heights more than 3048 mm, provide 4 hinges, plus 1 hinge for every 750 mm of door height greater than 3048 mm.

.2 Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

.3 Hinge Weight: Unless otherwise indicated, provide the following:
.1 Entrance Doors: Heavy-weight hinges.
.2 Doors with Closers: Antifriction-bearing hinges.
.3 Interior Doors: Standard-weight hinges.

.4 Hinge Base Metal: Unless otherwise indicated, provide the following:
.1 Exterior Hinges: Stainless steel, with stainless-steel pin.
.2 Interior Hinges: Steel, with steel pin .
.3 Hinges for Fire-Rated Assemblies: Steel, with steel pin.

.5 Hinge Options: Where indicated in door hardware sets or on Drawings:
.1 Hospital Tips: Slope ends of hinge barrel.
.2 Maximum Security Pin: Fix pin in hinge barrel after it is inserted.
.3 Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for out swinging exterior doors .
.4 Corners: Square.

.6 Electrified Functions for Hinges: Comply with the following:
.1 Power Transfer: Concealed PTFE-jacketed wires, secured at each leaf and continuous through hinge knuckle.
.2 Monitoring: Concealed electrical monitoring switch.
.3 Power Transfer and Monitoring: Concealed PTFE-jacketed wires, secured at each leaf and continuous through hinge knuckle, and with concealed electrical monitoring switch.

.7 Fasteners: Comply with the following:
.1 Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
.2 Wood Screws: For wood doors and frames.
.3 Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
.4 Screws: Phillips flat-head; machine screws (drilled and tapped holes) for metal doors, wood screws for wood doors and frames. Finish screw heads to match surface of hinges.

2.3 HINGES

.1 Butts and Hinges: BHMA A156.1. Listed under Category A in BHMA's *Certified Product Directory*.

.2 Template Hinge Dimensions: BHMA A156.7.

.3 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
.1 Hager Companies (HAG).
.2 McKinney Products Company; an ASSA ABLOY Group company (MCK).
.3 Stanley Commercial Hardware; Div. of The Stanley Works (STH).
.4 Or approved alternate.

2.4 CONTINUOUS HINGES

.1 Standard: BHMA A156.26, Grade 1 .
.1 Listed under Category N in BHMA's *Certified Product Directory.*

.2 General: Minimum 3.0 mm thick, hinge leaves with minimum overall width of 102 mm; fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.
.1 Fire Pins: Steel pins to hold labelled fire doors in place if required by tested listing.

.3 Continuous, Barrel-Type Hinges: Hinge with knuckles formed around a pin that extends entire length of hinge.
.1 Base Metal for Exterior Hinges: Stainless steel.
.2 Base Metal for Interior Hinges: Aluminium.
.3 Base Metal for Hinges for Fire-Rated Assemblies: Steel.
.4 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
.1 Hager Companies (HAG).
.2 McKinney Products Company; an ASSA ABLOY Group company (MCK).
.3 Stanley Commercial Hardware; Div. of The Stanley Works (STH).
.4 Or approved alternate.

.4 Continuous, Gear-Type Hinges: Extruded-aluminium, pinless, geared hinge leaves; joined by a continuous extruded-aluminium channel cap; with concealed, self-lubricating thrust bearings.
.1 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
.1 Hager Companies (HAG).
.2 McKinney Products Company; an ASSA ABLOY Group company (MCK).
.3 Pemko Manufacturing Co. (PEM).
.4 Or approved alternate.

2.5 LOCKS AND LATCHES, GENERAL

.1 Accessibility Requirements: Where indicated to comply with accessibility requirements, comply with local accessibility regulations

.1 Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 22 N.

.2 Latches and Locks for Means of Egress Doors: Comply with NFPA 101. Latches shall not require more than 67 N to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.

.3 Electrified Locking Devices: BHMA A156.25.

.4 Lock Trim:
.1 Levers: Cast.
.1 **<Insert model number and description.>**
.2 Escutcheons (Roses): Cast.
.3 Dummy Trim: Match lever lock trim and escutcheons.
.4 Lockset Designs: **<Insert name(s) of manufacturer(s) and product name(s) designating lockset design(s) that other manufacturers must match>** or, if sets are provided by another manufacturer, provide designs that match those designated.

.5 Lock Throw: Comply with testing requirements for length of bolts required for labelled fire doors, and as follows:
.1 Bored Locks: Minimum 13 mm latch bolt throw.
.2 Mortise Locks: Minimum 19 mm latch bolt throw.
.3 Deadbolts: Minimum 25 mm bolt throw.

.6 Rebated Meeting Doors: Provide special rebated front and strike on locksets for rebated meeting stiles.

.7 Backset: 70 mm, unless otherwise indicated.

.8 Strikes: Manufacturer's standard strike with strike box for each latchbolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, and as follows:
.1 Strikes for Bored Locks and Latches: BHMA A156.2.
.2 Strikes for Mortise Locks and Latches: BHMA A156.13.
.3 Strikes for Interconnected Locks and Latches: BHMA A156.12.
.4 Strikes for Auxiliary Deadlocks: BHMA A156.5.
.5 Flat-Lip Strikes: For locks with three-piece antifriction latchbolt, as recommended by manufacturer.
.6 Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
.7 Aluminium-Frame Strike Box: Manufacturer's special strike box fabricated for aluminium framing.

2.6 MECHANICAL LOCKS AND LATCHES

.1 Lock Functions: Function numbers and descriptions indicated in door hardware sets comply with the following:
.1 Bored Locks: BHMA A156.2.
.2 Mortise Locks: BHMA A156.13.
.3 Interconnected Locks: BHMA A156.12.

.2 Bored Locks: BHMA A156.2, Grade 1 ; Series 4000. Listed under Category F in BHMA's *Certified Product Directory*.
.1 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
.1 Best Access Systems; Div. of The Stanley Works (BAS).
.2 Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
.3 SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
.4 Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).
.5 Yale Commercial Locks and Hardware; an ASSA ABLOY Group company (YAL).
.6 Or approved alternate.

.3 Mortise Locks: Stamped steel case with steel or brass parts; BHMA A156.13, Grade 1 ; Series 1000. Listed under Category F in BHMA's *Certified Product Directory.*

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

.1 Best Access Systems; Div. of The Stanley Works (BAS).
.2 Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
.3 SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
.4 Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).
.5 Yale Commercial Locks and Hardware; an ASSA ABLOY Group company (YAL).
.6 Or approved alternate

.4 Interconnected Locks: BHMA A156.12, Grade 1 ; Series 5000. Listed under Category F in BHMA's *Certified Product Directory.*

.1 .1 Manufacturers: Subject to compliance with requirements, provide products by one of the following:

.1 Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).

2.7 AUXILIARY LOCKS AND LATCHES

.1 Auxiliary Locks: BHMA A156.5, Grade 1 . Listed under Category E in BHMA's *Certified Product Directory.*

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

.1 Best Access Systems; Div. of The Stanley Works (BAS).
.2 SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
.3 Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).
.4 Yale Commercial Locks and Hardware; an ASSA ABLOY Group company (YAL).
.5 Or approved alternate.

2.8 ELECTROMECHANICAL LOCKS

.1 General: Grade 1for type of lock indicated; motor or solenoid driven.

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

.1 Best Access Systems; Div. of The Stanley Works (BAS).
.2 SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
.3 Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).
.4 Yale Commercial Locks and Hardware; an ASSA ABLOY Group company (YAL).
.5 Or approved alternate.

2.9 EXIT LOCKS AND EXIT ALARMS

.1 Exit Locks: BHMA A156.29, Grade 1, surface mounted, battery powered, housed in metal case; with red-and-white lettering reading *EMERGENCY EXIT PUSH TO OPEN--ALARM WILL SOUND*. Include the following features:

.1 Low-battery alert.
.2 Outside key control.
.3 Audible alarm that sounds when unauthorized use of door occurs.
.4 Silent alarm with remote signal capability for connection to remote indicating panel.

.2 Stand-Alone Exit Alarms: BHMA A156.29, Grade 1, surface mounted on door. Include the following features:

.1 Low-battery alert.
.2 Outside key control.
.3 Automatic rearming after authorized use, with adjustable time delay.
.4 Remote signal capability for connection to remote indicating panel.

.3 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
.1 Detex Corporation (DTX).
.2 SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
.3 Or approved alternate.

2.10 DOOR BOLTS

.1 Bolt Throw: Comply with testing requirements for length of bolts required for labelled fire doors, and as follows:
.1 Half-Round Surface Bolts: Minimum 22 mm throw.
.2 Interlocking Surface Bolts: Minimum 24 mm throw.
.3 Fire-Rated Surface Bolts: Minimum 25 mm throw; listed and labelled for fire-rated doors.
.4 Dutch-Door Bolts: Minimum 19 mm throw.
.5 Mortise Flush Bolts: Minimum 19 mm throw.

.2 Dustproof Strikes: BHMA A156.16, Grade 1.

.3 Surface Bolts: BHMA A156.16, Grade 1 .
.1 Flush Bolt Heads: Minimum of 13 mm diameter rods of brass, bronze, or stainless steel with minimum 305 mm long rod for doors up to 2134 mm in height. Provide longer rods as necessary for doors exceeding 2134 mm.
.2 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
.1 Glynn-Johnson; an Ingersoll-Rand Company (GJ).
.2 Hager Companies (HAG).
.3 IVES Hardware; an Ingersoll-Rand Company (IVS).
.4 Stanley Commercial Hardware; Div. of The Stanley Works (STH).
.5 Or approved alternate.

.4 Manual Flush Bolts: BHMA A156.16, Grade 1 ; designed for mortising into door edge.
.1 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
.1 Glynn-Johnson; an Ingersoll-Rand Company (GJ).
.2 Hager Companies (HAG).
.3 IVES Hardware; an Ingersoll-Rand Company (IVS).
.4 Stanley Commercial Hardware; Div. of The Stanley Works (STH).
.5 Or approved alternate.

.5 Automatic and Self-Latching Flush Bolts: BHMA A156.3, Grade 1 ; designed for mortising into door edge.
.1 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
.1 Glynn-Johnson; an Ingersoll-Rand Company (GJ).
.2 Hager Companies (HAG).
.3 IVES Hardware; an Ingersoll-Rand Company (IVS).
.4 Or approved alternate.

2.11 EXIT DEVICES

.1 Exit Devices: BHMA A156.3, Grade 1 . Listed under Category G in BHMA's *Certified Product Directory.*

.2 Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with local accessibility regulations.
.1 Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 22 N.

.3 Exit Devices for Means of Egress Doors: Comply with NFPA 101. Exit devices shall not require more than 67 N to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.

.4 Panic Exit Devices: Listed and labelled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

.5 Fire Exit Devices: Devices complying with NFPA 80 that are listed and labelled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.

.6 Removable Mullions: BHMA A156.3.

.7 Fire-Exit Removable Mullions: Provide removable mullions for use with fire exit devices complying with NFPA 80 that are listed and labelled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252. Mullions shall be used only with exit devices for which they have been tested.

.8 Dummy Push Bar: Non-functioning push bar matching functional push bar.
- .1 Operation: Movable.

.9 Outside Trim:
- .1 Material and finish to match locksets, unless otherwise indicated.
- .2 Heavy-duty commercial grade exterior trim based on style to match design for locksets and latchsets; unless otherwise indicated.

.10 Through Bolts: For exit devices and trim on metal doors, non-fire-rated wood doors, and fire-rated wood doors.

.11 Electronic Exit Bars: Non-latching electronic releasing device activated by an adjustable capacitance sensor, with no moving parts; listed and labelled as panic exit hardware. Fabricate bar from extruded aluminium, and provide door and frame transfer device and 4.9 m of cord to route wiring off the door frame.

.12 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- .1 DORMA Architectural Hardware; Member of The DORMA Group North America (DAH).
- .2 SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
- .3 Von Duprin; an Ingersoll-Rand Company (VD).
- .4 Or approved alternate.

2.12 LOCK CYLINDERS

.1 Standard Lock Cylinders: BHMA A156.5, Grade 1 .

.2 Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:
- .1 Number of Pins: Seven.
- .2 Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
- .3 Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
- .4 Bored-Lock Type: Cylinders with tailpieces to suit locks.
  - .1 High-Security Grade: BHMA A156.5, Grade 1A, listed and labelled as complying with pick- and drill-resistant testing requirements in UL 437 (Suffix A).

.3 Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:

.1 Removable Cores: Core insert, removable by use of a special key; for use only with core manufacturer's cylinder and door hardware.

.4 Construction Keying: Comply with the following:
.1 Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.

.5 Manufacturer: Same manufacturer as for locks and latches.

2.13 KEYING

.1 Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference, and as follows:
.1 Existing Buildings: Master key or grand master key locks to Owner's existing system.
.2 New Buildings: Provide master key system.

.2 Keys: Nickel silver.
.1 Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
.1 Notation: *DO NOT DUPLICATE*.
.2 Quantity: In addition to one extra key blank for each lock, provide the following:
.1 Cylinder Change Keys: Three.
.2 Master Keys: Five.
.3 Grand Master Keys: Five.
.4 Great-Grand Master Keys: Five.

2.14 KEY CONTROL SYSTEM

.1 Key Control Cabinet: BHMA A156.5, Grade 1; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, 2 sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150percent of the number of locks.
.1 Wall-Mounted Cabinet: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.

2.15 ELECTRIC STRIKES

.1 Standard: BHMA A156.31, Grade 1 .

.2 General: Use fail-secure electric strikes with fire-rated devices, unless otherwise noted.

.3 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
.1 Adams Rite Manufacturing Co. (ARM).
.2 Folger Adam Security Inc.; an ASSA ABLOY Group company (FAS).
.3 HES, Inc.; an ASSA ABLOY Group company (HES).
.4 Locknetics; an Ingersoll-Rand Company (LSE).
.5 Rutherford Controls Int'l. Corp. (RCI).
.6 Von Duprin; an Ingersoll-Rand Company (VD).
.7 Or approved alternate.

2.16 OPERATING TRIM

.1 Standard: BHMA A156.6.

.2 Materials: Fabricate from stainless steel, unless otherwise indicated.

.3 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
.1 Hager Companies (HAG).
.2 IVES Hardware; an Ingersoll-Rand Company (IVS).
.3 Or approved alternate.

2.17 CLOSERS

.1 Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with local accessibility regulations.
.1 Comply with the following maximum opening-force requirements:
.1 Interior, Non-Fire-Rated Hinged Doors: 22.2 N applied perpendicular to door.
.2 Sliding or Folding Doors: 22.2 N applied parallel to door at latch.
.3 Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

.2 Door Closers for Means of Egress Doors: Comply with NFPA 101. Door closers shall not require more than 133 N to set door in motion and not more than 67 N to open door to minimum required width.

.3 Hold-Open Closers/Detectors: Coordinate and interface integral smoke detector and closer device with fire alarm system.

.4 Flush Floor Plates: Provide finish cover plates for floor closers unless thresholds are indicated. Match door hardware finish, unless otherwise indicated.

.5 Recessed Floor Plates: Provide recessed floor plates with insert of floor finish material for floor closers unless thresholds are indicated. Provide extended closer spindle to accommodate thickness of floor finish.

.6 Power-Assist Closers: As specified in Division 08 Section *Automatic Door Operators* for access doors for people with disabilities or where listed in the door hardware sets.

.7 Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

.8 Surface Closers: BHMA A156.4 . Listed under Category C in BHMA's *Certified Product Directory.* Provide type of arm required for closer to be located on non-public side of door, unless otherwise indicated.
.1 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
.1 DORMA Architectural Hardware; Member of The DORMA Group North America (DAH).
.2 LCN Closers; an Ingersoll-Rand Company (LCN).
.3 Norton Door Controls; an ASSA ABLOY Group company (NDC).
.4 SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
.5 Yale Commercial Locks and Hardware; an ASSA ABLOY Group company (YAL).
.6 Or approved alternate.

.9 Concealed Closers: BHMA A156.4, Grade 1 . Listed under Category C in BHMA's *Certified Product Directory.*
.1 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
.1 DORMA Architectural Hardware; Member of The DORMA Group North America (DAH).
.2 LCN Closers; an Ingersoll-Rand Company (LCN).
.3 Norton Door Controls; an ASSA ABLOY Group company (NDC).
.4 SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).

.5 Or approved alternate.

.10 Closer Holder Release Devices: BHMA A156.15. Listed under Category C in BHMA's *Certified Product Directory.*
.1 Life-Safety Type: On release of hold open, door becomes self-closing. Automatic release is activated by smoke detection system or loss of power.
.2 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
.1 Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
.2 DORMA Architectural Hardware; Member of The DORMA Group North America (DAH).
.3 LCN Closers; an Ingersoll-Rand Company (LCN).
.4 Norton Door Controls; an ASSA ABLOY Group company (NDC).
.5 SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
.6 Or approved alternate.

.11 Coordinators: BHMA A156.3.

2.18 PROTECTIVE TRIM UNITS

.1 Size: 38 mm less than door width on push side and 13 mm less than door width on pull side, by height specified in door hardware sets.

.2 Fasteners: Manufacturer's standard machine or self-tapping screws.

.3 Metal Protective Trim Units: BHMA A156.6; bevelled top and 2 sides; fabricated from the following material:
.1 Material: 1.3 mm thick stainless steel.
.2 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
.1 Hager Companies (HAG).
.2 IVES Hardware; an Ingersoll-Rand Company (IVS).
.3 Or approved alternate.

2.19 STOPS AND HOLDERS

.1 Stops and Bumpers: BHMA A156.16, Grade 1 .
.1 Provide floor stops for doors unless wall or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic. Where floor or wall stops are not appropriate, provide overhead holders.

.2 Mechanical Door Holders: BHMA A156.16, Grade 1 .

.3 Combination Floor and Wall Stops and Holders: BHMA A156.8, Grade 1 .

.4 Combination Overhead Stops and Holders: BHMA A156.8, Grade 1 .

.5 Electromagnetic Door Holders: BHMA A156.15. Listed under Category C in BHMA's *Certified Product Directory.*
.1 Coordinate with fire detectors and interface with fire alarm system for labelled fire door assemblies.

.6 Silencers for Wood Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum 16 by 19 mm; fabricated for drilled-in application to frame.

.7 Silencers for Metal Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum diameter 13 mm; fabricated for drilled-in application to frame.

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

.1 DORMA Architectural Hardware; Member of The DORMA Group North America (DAH).
.2 Glynn-Johnson; an Ingersoll-Rand Company (GJ).
.3 Hager Companies (HAG).
.4 IVES Hardware; an Ingersoll-Rand Company (IVS).
.5 SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
.6 Stanley Commercial Hardware; Div. of The Stanley Works (STH).
.7 Or approved alternate.

2.20 DOOR GASKETING

.1 Standard: BHMA A156.22. Listed under Category J in BHMA's *Certified Product Directory.*

.2 General: Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.
.1 Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
.2 Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
.3 Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

.3 Air Leakage: Not to exceed 0.000774 cu. m/s per m of crack length for gasketing other than for smoke control, as tested according to ASTM E 283.

.4 Smoke-Labelled Gasketing: Assemblies complying with NFPA 105 that are listed and labelled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke-control ratings indicated, based on testing according to UL 1784.
.1 Provide smoke-labelled gasketing on 20-minute-rated doors and on smoke-labelled doors.

.5 Fire-Labelled Gasketing: Assemblies complying with NFPA 80 that are listed and labelled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

.6 Sound-Rated Gasketing: Assemblies that are listed and labelled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.

.7 Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

.8 Gasketing Materials: ASTM D 2000 and AAMA 701/702.

.9 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
.1 Hager Companies (HAG).
.2 National Guard Products (NGP).
.3 Pemko Manufacturing Co. (PEM).
.4 Zero International (ZRO).
.5 Or approved alternate.

2.21 THRESHOLDS

.1 Standard: BHMA A156.21. Listed under Category J in BHMA's *Certified Product Directory.*

.2 Accessibility Requirements: Where thresholds are indicated to comply with accessibility requirements, comply with local accessibility regulations

.1 Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 13 mm high.

.3 Thresholds for Means of Egress Doors: Comply with NFPA 101. Maximum 13 mm high.

.4 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
.1 Hager Companies (HAG).
.2 National Guard Products (NGP).
.3 Pemko Manufacturing Co. (PEM).
.4 Zero International (ZRO).
.5 Or approved alternate.

2.22 SLIDING DOOR HARDWARE

.1 Sliding Door Hardware: BHMA A156.14; consisting of complete sets including rails, hangers, supports, bumpers, floor guides, and accessories indicated.
.1 Manufacturers: Subject to compliance with requirements, .1 Manufacturers: Subject to compliance with requirements, provide products by one of the following offering products that may be incorporated into the Work include, but are not limited to, the following:
.1 Hager Companies.
.2 Stanley Commercial Hardware; Div. of The Stanley Works.
.3 Or approved alternate.

.2 Horizontal Sliding Door Hardware: Grade 1; rated for door weight, but not less than 205 kg.
.1 Material: Wrought steel.
.2 Rail: Box without mounting brackets.
.3 Rail Supports: Double sidewall style.
.1 Provide intermediate, end, and splice type track supports as required by rail configuration and door weight indicated.
.4 Hanger Configuration: Four-wheel truck hanger assembly with drop bolt.
.1 Wheel Assembly: Steel wheels with ball bearings.
.5 Accessories:
.1 Guide rail and guide rail brackets as required by rail configuration.
.2 Flush pull, minimum 100 by 140 by 19 mm, mortised into door.
.3 End guide and stop.
.4 Parallel door floor guides.
.5 Bumper shoe, minimum 1.5 mm thickness.

2.23 MISCELLANEOUS DOOR HARDWARE

.1 Boxed Power Supplies: Modular unit in NEMA ICS 6, Type 4 enclosure; filtered and regulated; voltage rating and type matching requirements of door hardware served; and listed and labelled for use with fire alarm systems.

.2 Monitor Strikes: Cast strike with toggle.

.3 Auxiliary Hardware: BHMA A156.16, Grade 1 .
.1 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
.1 Hager Companies (HAG).
.2 Stanley Commercial Hardware; Div. of The Stanley Works (STH).
.3 Or approved alternate.

2.24 FABRICATION

.1 Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Owner's Representative.
  .1 Manufacturer's identification is permitted on rim of lock cylinders only.

.2 Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.

.3 Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended, except aluminium fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
  .1 Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
  .2 Steel Machine or Wood Screws: For the following fire-rated applications:
    .1 Mortise hinges to doors.
    .2 Strike plates to frames.
    .3 Closers to doors and frames.
  .3 Steel Through Bolts: For the following fire-rated applications unless door blocking is provided:
    .1 Surface hinges to doors.
    .2 Closers to doors and frames.
    .3 Surface-mounted exit devices.
  .4 Spacers or Sex Bolts: For through bolting of hollow-metal doors.
  .5 Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, *Recommended Fasteners for Wood Doors*.

2.25 FINISHES

.1 Standard: BHMA A156.18, as indicated in door hardware sets.

.2 Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

.3 Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labelled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

.2 Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

.3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Steel Doors and Frames: Comply with DHI A115 Series.
  .1 Surface-Applied Door Hardware: Drill and tap doors and frames according to ANSI A250.6.

.2 Wood Doors: Comply with DHI A115-W Series.

3.3 INSTALLATION

.1 Mounting Heights: Mount door hardware units at heights indicated as follows unless otherwise indicated or required to comply with governing regulations.
  .1 Standard Steel Doors *and Frames: DHI's Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames*.
  .2 Wood Doors: DHI WDHS.3, *Recommended Locations for Architectural Hardware for Wood Flush Doors*.

.2 Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
  .1 Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
  .2 Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

.3 Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

.4 Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Owner's Representative.
  .1 Configuration: Provide the least number of power supplies required to adequately serve doors with electrified door hardware.

.5 Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 07 Section *Joint Sealants*.

3.4 FIELD QUALITY CONTROL

.1 Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
  .1 Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 ADJUSTING

.1 Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door

control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

.1 Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.

.2 Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

.3 Door Closers: Unless otherwise required by authorities having jurisdiction, adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 75 mm from the latch, measured to the leading edge of the door.

.2 Occupancy Adjustment: Approximately six months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust, including adjusting operating forces, each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.6 CLEANING AND PROTECTION

.1 Clean adjacent surfaces soiled by door hardware installation.

.2 Clean operating items as necessary to restore proper function and finish.

.3 Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.7 HARDWARE GROUPS

.1 Refer to schedule on drawings.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

.1 Types of items described in this Section:
  .1 Low-energy door operators for swinging doors.

.2 Types of items you will not find described in this Section:
  .1 Power door operators for swinging doors.
  .2 Power-assist door operators for swinging doors.
  .3 Automatic entrances for sliding, swinging, and folding entrances packaged with automatic door operators.
  .4 Manual ICU/CCU entrance packages.

1.3 DEFINITIONS

.1 Double Egress Doors: A pair of doors that simultaneously swing with the two doors moving in opposite directions with no mullion between them.

.2 Double Swing Doors: A pair of doors that swing with the two doors moving in opposite directions with a mullion between them; each door functioning as a single swing door.

1.4 SUBMITTALS

.1 Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for automatic door operators, including activation and safety devices. Include operating characteristics, electrical characteristics, and furnished accessories.

.2 Shop Drawings: For automatic door operators. Include plans, elevations, sections, details, and attachments to other work.
  .1 Indicate required clearances, method of field assembly, components, and location and size of each field connection.
  .2 Include locations and elevations of entrances showing activation and safety devices.
  .3 Wiring Diagrams: For power, signal, and activation- and safety-device wiring.
  .4 Include plans, elevations, sections, details, and attachments to other work for guide rails.

.3 Product Certificates: For each operator for fire-rated door assemblies, signed by product manufacturer. Certify that operator is listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for use on types and sizes of labeled fire doors required.

.4 Field quality-control reports.

.5 Maintenance Data: For automatic door operators, including activation and safety devices, to include in maintenance manuals.

.6 Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

.1 Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation and maintenance of units required for this Project.
  .1 Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

.2 Source Limitations: Obtain automatic door operators, including activation and safety devices, from single source from single manufacturer.

.3 Electrical Components, Devices, and Accessories: Listed and labelled as defined in National Electrical Code of Canada by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

.4 Exit-Door Requirements: Comply with requirements of authorities having jurisdiction for doors with automatic door operators serving as a component of a required means of egress.

1.6 PROJECT CONDITIONS

.1 Field Measurements: Verify actual dimensions of door frames by field measurements before fabrication of exposed covers for automatic door operators.

1.7 COORDINATION

.1 Templates: Obtain and distribute, to the parties involved, templates for doors, frames, operators, and other work specified to be factory prepared and reinforced for installing automatic door operators. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing automatic door operators to comply with indicated requirements.

.2 Electrical System Roughing-in: Coordinate layout and installation of automatic door operators, including activation and safety devices, with connections to power supplies and to access-control system.

1.8 WARRANTY

.1 Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of automatic door operators that fail in materials or workmanship within specified warranty period.
  .1 Failures include, but are not limited to, the following:
    .1 Faulty or sporadic operation of automatic door operator, including activation and safety devices.
    .2 Deterioration of metals, metal finishes, and other materials beyond normal weathering or use.
  .2 Warranty Period: Two years from date of Substantial Completion.

1.9 MAINTENANCE SERVICE

.1 Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of automatic door operator Installer. Include planned and preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door operation. Provide parts and supplies the same as those used in the manufacture and installation of original equipment.
  .1 Perform maintenance, including emergency callback service, during normal working hours.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

.1 Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
.1 Besam Automated Entrance Systems, Inc.; an ASSA ABLOY Group company.
.2 DORMA Architectural Hardware.
.3 DORMA Automatics.
.4 Horton Automatics; a division of Overhead Door Corporation.
.5 Stanley Access Technologies; Division of The Stanley Works.

2.2 MATERIALS

.1 Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with standards indicated below:
.1 Sheet: ASTM B 209M.
.2 Extrusions: ASTM B 221M.

.2 Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, stretcher-leveled standard of flatness, in manufacturer's standard thickness.

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

2.3 AUTOMATIC DOOR OPERATORS, GENERAL

.1 General: Provide operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated; and complying with UL 325. Coordinate operator mechanisms with door operation, hinges, and activation and safety devices.
.1 Fire-Rated Doors: Provide door operators for fire-rated door assemblies that comply with NFPA 80 for fire-rated door components and are listed and labeled by a qualified testing agency.
.2 Wind Load: Provide door operators on exterior doors that will open and close doors and maintain them in fully closed position when subjected to wind load as prescribed for locality in the National Building Code of Canada.

.2 Electromechanical Operating System: Self-contained unit powered by permanent-magnet dc motor; with closing speed controlled mechanically by gear train and dynamically by braking action of electric motor, connections for power and activation- and safety-device wiring, and manual operation including spring closing when power is off.

.3 Hinges: See Division 08 Section *Door Hardware* for type of hinge for each door that door operator shall accommodate.

.4 Cover for Surface-Mounted Operators: Fabricated from 3.2 mm thick extruded or formed aluminum ; continuous over full width of operator-controlled door opening; with enclosed end caps, provision for maintenance access, and fasteners concealed when door is in closed position.

.5 Brackets and Reinforcements: Manufacturer's standard, fabricated from aluminum with nonstaining, nonferrous shims for aligning system components.

.6 Fire-Door Package: Consisting of UL-listed latch mechanism, power-reset box, and caution signage for fire-rated doors. Latch mechanism shall allow door to swing free during automatic operation; when fire is detected, latch actuator shall cause exit hardware to latch when door closes. Provide latch actuators with fail-secure design.

2.4 LOW-ENERGY DOOR OPERATORS

.1 Standard: BHMA A156.19.

.2 Performance Requirements:
- .1 Opening Force if Power Fails: Not more than 67 N required to release a latch if provided, not more than 133 N required to manually set door in motion, and not more than 67 N required to fully open door.
- .2 Entrapment Protection: Not more than 67 N required to prevent stopped door from closing or opening.

.3 Configuration: Operator to control single swinging door unless otherwise noted.
- .1 Traffic Pattern: Two way.
- .2 Operator Mounting: Surface, unless otherwise noted.

.4 Operation: Power opening and power-assisted spring closing. Provide time delay for door to remain open before initiating closing cycle as required by BHMA A156.19. When not in automatic mode, door operator shall function as manual door closer, with or without electrical power.

.5 Operating System: Electromechanical.

.6 Microprocessor Control Unit: Solid-state controls.

.7 Features:
- .1 Adjustable opening and closing speed.
- .2 Adjustable opening and closing force.
- .3 Adjustable backcheck.
- .4 Adjustable hold-open time from zero to 30 seconds.
- .5 Adjustable time delay.
- .6 Adjustable acceleration.
- .7 Obstruction recycle.
- .8 On-off/hold-open switch to control electric power to operator; key operated.
- .9 .

.8 Exposed Finish: Finish exposed components with finish matching door and frame.

2.5 FABRICATION

.1 Factory fabricate automatic door operators to comply with indicated standards.

.2 Fabricate exterior components to drain water passing joints and condensation and moisture occurring or migrating within operator enclosure to the exterior.

.3 Form aluminum shapes before finishing.

.4 Use concealed fasteners to greatest extent possible. Where exposed fasteners are required, use countersunk Phillips flat-head machine screws, finished to match operator.

2.6 ACCESSORIES

.1 Signage: As required by cited BHMA standard for the type of operator.
  .1 Application Process: Door manufacturer's standard process.
  .2 Provide sign materials with instructions for field application when operators are installed.

2.7 GENERAL FINISH REQUIREMENTS

.1 Comply with NAAMM's *Metal Finishes Manual for Architectural and Metal Products* for recommendations for applying and designating finishes.

.2 Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

.3 Apply organic and anodic finishes to formed metal after fabrication unless otherwise indicated.

.4 Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.8 ALUMINUM FINISHES

.1 Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

.2 Colour Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

.3 Baked-Enamel or Powder-Coat Finish: AAMA 2603. Comply with coating manufacturer's written instructions for cleaning, conversion coating, application, and baking.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Examine conditions, with Installer present, for compliance with requirements for installation tolerances, door and frame preparation and reinforcements, and other conditions affecting performance of automatic door operators.

.2 Examine roughing-in for electrical systems to verify actual locations of power connections before automatic door operator installation.

.3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

.1 General: Install complete automatic door operators according to manufacturer's written instructions, including activation and safety devices, control wiring, and remote power units if any; connection to the building's power supply; and signage.
  .1 Do not install damaged components. Fit joints to produce hairline joints free of burrs and distortion.
  .2 Install operators true in alignment with established lines and door geometry without warp or rack. Anchor securely in place.
  .3 Low-Energy Door Operator Installation Standard: BHMA A156.19.

.2 Power Connection: See Division 26 Sections for connection to electrical power distribution system.

.3 Access-Control System: Connect operators to access-control system if specified and then in accordance with Division 28 Section *Access Control*.

.4 Signage: Apply on both sides of each door as required by cited BHMA standard for type of door operator and direction of pedestrian travel.

3.3 ADJUSTING

.1 Adjust automatic door operators to function smoothly, and lubricate as recommended by manufacturer; comply with requirements of applicable BHMA standards.
.1 Adjust operators on exterior doors for weather tight closure.

.2 After completing installation of exposed, factory-finished automatic door operators, inspect exposed finishes on doors and operators. Repair damaged finish to match original finish.

.3 Readjust automatic door operators after repeated operation of completed installation equivalent to three days' use by normal traffic (100 to 300 cycles).

.4 Occupancy Adjustment: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.4 DEMONSTRATION

.1 Engage a certified inspector to train Owner's maintenance personnel to adjust, operate, and maintain automatic door operators.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

.1 Types of items described in this Section:
- .1 Glass Tinting.
- .2 Reflective Glass Coating.
- .3 Low-E Glass Coating or Film.
- .4 Annealed Float Glass.
- .5 Heat Treated Float Glass.
- .6 Spandrel Glass.
- .7 Safety Glass.
- .8 Rated Glass.
- .9 Insulated glass units.

.2 Types of locations described in this Section where items products are installed:
- .1 Windows.
- .2 Doors.
- .3 Glazed curtain walls.
- .4 Glazed entrances.
- .5 Interior borrowed lites.
- .6 Storefront framing.

.3 Types of items and locations you will not find described in this Section:
- .1 Glass panels in railings.
- .2 All-glass entrances and storefronts.
- .3 Automatic entrances.
- .4 Revolving door entrances.
- .5 Structural-sealant-glazed curtain walls.
- .6 Decorative glass glazing.
- .7 Mirrors.
- .8 Security glazing resistant to ballistic attacks, blunt- and sharp-tool attacks, chemical threats, windborne debris and air blasts.

1.3 DEFINITIONS

.1 Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

.2 Glass Thicknesses: Indicated by thickness designations in millimetres according to ASTM C 1036.

.3 Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

.4 Deterioration of Coated Glass: Defects developed from normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to

manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

.5 Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

.6 Deterioration of Laminated Glass: Defects developed from normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1.4 PERFORMANCE REQUIREMENTS

.1 General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

.2 Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

.1 Glass Thicknesses: Select minimum glass thicknesses to comply with CAN/CGSB-12.20-M, according to the following requirements:

.1 Specified Design Wind Loads: Calculated as per the National Building Code of Canada for project location, type of building and adjacent site conditions, but in no case be less than 1.4 KPa.

.2 Specified Design Snow Loads: As per the National Building Code of Canada for project location, type of building and adjacent site conditions.

.3 Maximum Lateral Deflection: For the following types of glass supported on all 4 edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 25 mm, whichever is less.

.1 For monolithic-glass lites heat treated to resist wind loads.

.2 For insulating glass.

.3 For laminated-glass lites.

.4 Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.

.5 Thickness of Tinted and Heat-Absorbing Glass: Provide the same thickness for each tint colour indicated throughout Project.

.3 Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and night-time-sky heat loss.

.1 Temperature Change (Range): 67 deg C, ambient; 100 deg C, material surfaces.

1.5 SUBMITTALS

.1 Product Data: For each glass product and glazing material indicated.

.2 Samples: For the following products, in the form of 300 mm square Samples for glass.

.1 Each colour of tinted glass.

.2 Coated glass.
.3 Spandrel glass.
.4 Each colour of tinted and coated insulating glass unit.

.3 Product Test Reports: For each of the following types of glazing products:
.1 Tinted glass.
.2 Coated glass.
.3 Insulated glass units.

.4 Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

.1 Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

.2 Source Limitations for Glass Sputter-Coated with Solar-Control Low-E Coatings: Where solar-control low-e coatings of a primary glass manufacturer that has established a certified fabricator program is specified, obtain sputter-coated solar-control low-e-coated glass in fabricated units from a manufacturer that is certified by coated-glass manufacturer.

.3 Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.

.4 Safety Glazing Products: Comply with testing requirements in CAN/CGSB 12.1-M90 and, for wired glass, CAN/CGSB 12.11-M76.
.1 Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of manufacturer acceptable to authorities having jurisdiction.

.5 Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
.1 GANA Publications: GANA Laminated Division's *Laminated Glass Design Guide* and GANA's *Glazing Manual*.
.2 IGMA Publication for Insulating Glass: SIGMA TM-3000, *Glazing Guidelines for Sealed Insulating Glass Units*.

.6 Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the testing and inspecting agency:

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

.2 For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.8 PROJECT CONDITIONS

.1 Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
.1 Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 4.4 deg C.

1.9 WARRANTY

.1 Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form, made out to Owner and signed by coated-glass manufacturer agreeing to replace coated-glass units that deteriorate as defined in *Definitions* Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
.1 Warranty Period: Manufacturer’s standard or 10 years from date of Substantial Completion; whichever is greater.

.2 Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form, made out to Owner and signed by laminated-glass manufacturer agreeing to replace laminated-glass units that deteriorate as defined in *Definitions* Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
.1 Warranty Period: Manufacturer’s standard or five years from date of Substantial Completion; whichever is greater.

.3 Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form, made out to Owner and signed by insulating-glass manufacturer agreeing to replace insulating-glass units that deteriorate as defined in *Definitions* Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
.1 Warranty Period: Manufacturer’s standard or 10 years from date of Substantial Completion; whichever is greater.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS

.1 Glass Tinting:
.1 Refer to drawings to ascertain if and what type of glass tinting is required.

.2 Reflective Glass Coating:
.1 Refer to drawings to ascertain if and what type of reflective glass coating is required.

.3 Low-E Glass Coating or Film:
.1 Type: Pyrolytic or sputtered coating or low-e-coated film suspended in the interspace.

.4 Annealed Float Glass: to CAN/CGSB-12.3-M91.

.5 Heat-Treated Float Glass: to CAN/CGSB-12.1-M90.

.6 Spandrel Glass: Float glass complying with other requirements specified and with the following:
.1 Fallout Resistance: Provide spandrel units identical to those passing the fallout-resistance test for spandrel glass specified in ASTM C 1048.
.2 Factory apply manufacturer's standard opacifier of the following material to coated second surface of lites, with resulting products complying with Specification No. 89-1-6 in GANA Tempering Division's *Engineering Standards Manual*.
.1 Manufacturer's standard opacifier material.

.7 Safety Glass: to CAN/CGSB 12.1-M90, transparent. 6mm Thickness.
.1 Type 1: Laminated Glass.
.2 Type 2: Tempered Glass.

.8 Fire Rated Glass: to NFPA 80, NFPA 257, CAN/ULC-S104, and CAN/ULC-S106.
.1 Type 1: **5mm** thick fire-rated ceramic glazing material.
.1 Suitable locations: Transoms and Borrowed Lites.

.2 Type 2: **8mm** thick laminated fire-rated, and impact safety-rated ceramic glazing material.
.1 Suitable locations: Doors, Sidelites, Transoms, and Borrowed Lites.

.9 Insulating-Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with CAN/CGSB-12.8-97 and with requirements specified in this Section.
.1 Fabricate using safety glass when located in doors and in lites located within 900 mm of the floor.
.2 Fabricate using heat-strengthened float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 *Performance Requirements* Article.
.3 Overall Unit Thickness and Thickness of Each Lite: 25 and 6 mm.
.4 Sealing System: Dual seal, with primary and secondary sealants as follows:
.1 Manufacturer's standard sealants.
.5 Spacer Specifications: Manufacturer's standard spacer material and construction.
.6 Interspace Content: Argon, unless noted otherwise.
.7 Glass Tinting: Refer to drawings to ascertain if and what type of glass tinting is required.
.8 Reflective Glass Coating:
.1 For renovation projects, provide Low E coating or film if adjacent glazed units have similar coating; unless otherwise noted on drawings.
.2 For building extensions and new building projects, provide Low E coating or film, unless otherwise noted on drawings.

2.2 GLAZING GASKETS

.1 Dense Compression Gaskets: Moulded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
.1 Neoprene, ASTM C 864.
.2 EPDM, ASTM C 864.
.3 Silicone, ASTM C 1115.
.4 Thermoplastic polyolefin rubber, ASTM C 1115.
.5 Any material indicated above.

.2 Soft Compression Gaskets: Extruded or moulded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:
.1 Neoprene.
.2 EPDM.
.3 Silicone.
.4 Thermoplastic polyolefin rubber.
.5 Any material indicated above.

2.3 GLAZING TAPES

.1 Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and non-migrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
   .1 AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
   .2 AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.4 MISCELLANEOUS GLAZING MATERIALS

.1 General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

.2 Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

.3 Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

.4 Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

.5 Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

2.5 FABRICATION OF GLAZING UNITS

.1 Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

.2 Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with outdoor and indoor faces.

.3 Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Examine framing glazing, with Installer present, for compliance with the following:
   .1 Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
   .2 Presence and functioning of weep system.
   .3 Minimum required face or edge clearances.
   .4 Effective sealing between joints of glass-framing members.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GLAZING, GENERAL

.1 Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

.2 Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

.3 Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

.4 Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

.5 Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

.6 Provide spacers for glass lites where length plus width is larger than 1270 mm as follows:
- .1 Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
- .2 Provide 3-mm minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

.7 Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

.8 Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

.9 Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

.10 Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

.1 Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

.2 Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

.3 Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

.4 Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

.5 Do not remove release paper from tape until just before each glazing unit is installed.

.6 Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

3.5 GASKET GLAZING (DRY)

.1 Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

.2 Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints mitre cut and bonded together at corners.

.3 Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weather tight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

.4 Install gaskets so they protrude past face of glazing stops.

3.6 CLEANING AND PROTECTION

.1 Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

.2 Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.

.3 Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

.4 Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

3.7 SCHEDULE – GLASS PRODUCTS

.1 Install glass products as per drawings. In the absence of this information:
- .1 Install wired glass units when located in fire-rated assemblies.
- .2 Install insulated glass units when located in the exterior building envelope.
- .3 Install safety glass units in all other locations, unless otherwise indicated.

3.8 SCHEDULE – GLAZING METHOD

.1 Install glass products using the following glazing methods:
- .1 Use gasket glazing whenever possible.
- .2 Use tape glazing only when gasket glazing is not possible.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Moisture testing of substrates.

.2 Surface preparation of substrates as required for acceptance of paint, including cleaning, small crack repair, patching, caulking, and making good surfaces and areas to limits defined under MPI Repainting Maintenance Manual requirements.

.3 Specific pre-treatments noted herein or specified in the MPI Repainting Maintenance Manual.

.4 Sealing/touch-up, spot priming, and/or full priming surfaces for repainting in accordance with MPI Repainting Maintenance Manual requirements.

.5 Provision of safe and adequate ventilation as required where toxic and/or volatile/flammable materials are being used over and above temporary ventilation supplied by others.

1.2 REFERENCES

.1 Maintenance Repainting Manual by the Master Painters Institute (MPI), including Identifiers, Evaluation, Systems, Preparation and Approved Product List.

.2 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).

.3 National Fire Code of Canada.

1.3 QUALITY ASSURANCE

.1 Contractor shall have a minimum of five years proven satisfactory experience. Provide a list of last three comparable jobs including, job name and location, specifying authority, and project manager.

.2 Qualified journeymen who have a "Tradesman Qualification Certificate of Proficiency" shall be engaged in repainting work. Apprentices may be employed provided they work under the direct supervision of a qualified journeyman in accordance with applicable trade regulations.

.3 Conform to latest MPI requirements for interior repainting work including cleaning, preparation and priming.

.4 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) shall be in accordance with the latest edition of the MPI Approved Product List and shall be from a single manufacturer for each system used.

.5 Paint materials such as linseed oil, shellac, turpentine, etc. shall be the highest quality product of an approved manufacturer listed in MPI Maintenance Repainting Manual and shall be compatible with other coating materials as required.

.6 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Owner’s Representative.

.7 Standard of Acceptance: When viewed using final lighting source surfaces shall indicate the following:

.1 Walls: No defects visible from a distance of 1000 mm at 90° to surface.

.2 Ceilings: No defects visible from floor at 45° to surface.

.3 Final coat to exhibit uniformity of colour and sheen across full surface area.

1.4 ENVIRONMENTAL PERFORMANCE REQUIREMENTS

.1 Provide paint products meeting MPI "Environmentally Friendly" E2 or E3 ratings based on VOC (EPA Method 24) content levels.

1.5 SCHEDULING OF WORK

.1 Submit work schedule for various stages of painting to Owner's Representative for approval. Submit schedule a minimum of two (2) working days in advance of proposed operations.

.2 Paint occupied facilities in accordance with approved schedule. Schedule operations to approval of Owner's Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

.3 Obtain written authorization from Owner's Representative for changes in work schedule.

.4 Schedule repainting operations to prevent disruption by other trades if applicable and by occupants in and about the building.

1.6 SUBMITTALS

.1 Submit full range colour sample chips for review and selection. Indicate where colour availability is restricted.

.2 Submit product data and manufacturer's installation/application instructions for paints and coating products to be used.

.3 Submit WHMIS MSDS - Material Safety Data Sheets for paint and coating materials to be used.

.4 Upon completion, submit records of products used. List products in relation to finish system and include the following:

.1 Product name, type and use (i.e. materials and location).

.2 Manufacturer's product number.

.3 Colour code numbers.

.4 MPI Environmentally Friendly classification system rating.

.5 Manufacturer's Material Safety Data Sheets (MSDS).

.5 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating, with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards submitted on the following substrate materials:

.1 3 mm plate steel for finishes over metal surfaces.

.2 13 mm birch plywood for finishes over wood surfaces.

.3 50 mm concrete block for finishes over concrete or concrete masonry surfaces.

.4 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.

.6 When approved, samples shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.

1.7 QUALITY CONTROL

.1 Provide a mock-up in accordance with requirements of Section 01 45 00 - Quality Control to Owner's Representative.

.2 Prepare and repaint mock-up designated interior room, surface or item to requirements specified herein, with specified paint or coating showing selected colours, gloss/sheen, textures and workmanship to MPI Maintenance Repainting Manual standards for review and approval.

.3 When approved, repainted room, surface and/or item shall become acceptable standard of finish quality and workmanship for similar on-site interior repainting work.

1.8 DELIVERY, HANDLING AND STORAGE

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver and store materials in original containers, sealed, with labels intact.

.3 Labels shall clearly indicate:

.1 Manufacturer's name and address.

.2 Type of paint or coating.

.3 Compliance with applicable standard.

.4 Colour number in accordance with established colour schedule.

.4 Remove damaged, opened and rejected materials from site.

.5 Observe manufacturer's recommendations for storage and handling.

.6 Store materials and equipment in a secure, dry, well-ventilated area with temperature range between 7°C to 30°C. Store materials and supplies away from heat generating devices and sensitive products above minimum temperature as recommended by manufacturer.

.7 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Owner's Representative. After completion of operations, return areas to clean condition to approval of Owner's Representative.

.8 Remove paint materials from storage in quantities required for same day use.

.9 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.10 Fire Safety Requirements:

.1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.9 SITE REQUIREMENTS

.1 Heating, Ventilation and Lighting:

.1 Ventilate enclosed spaces.

.2 Perform no repainting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10°C for 24 hours before, during and after paint application and until paint has cured sufficiently.

.3 Where required, provide continuous ventilation for seven days after completion of application of paint.

.4 Provide temporary ventilating and heating equipment where permanent facilities are not available.

.5 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate lighting facilities shall be provided by General Contractor.

.2 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Unless specifically pre-approved by Owner's Representative and applied product manufacturer, perform no repainting work when:

.1 Ambient air and substrate temperatures are below 10°C.

.2 Substrate temperature is over 32°C unless paint is specifically formulated for application at high temperatures.

.3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.

.4 Relative humidity is above 85% or when dew point is less than 3°C variance between air/surface temperature.

.5 Rain or snow is forecast to occur before paint has thoroughly cured.

.6 It is foggy, misty, raining or snowing at site.

.2 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except use a simple "cover patch test" on concrete floors to be repainted.

.3 Perform no repainting work when maximum moisture content of substrate exceeds:

.1 12% for concrete and masonry (clay and concrete brick/block).

.2 15% for wood.

.3 12% for plaster and gypsum board.

.4 Test painted concrete, masonry and plaster surfaces for alkalinity as required.

.3 Application Requirements:

.1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when ventilation conditions are such that airborne particles will not affect quality of finished surface.

.2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.

.3 Apply paint when previous coat of paint is dry or adequately cured, unless otherwise pre-approved by the specific coating manufacturer.

.4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.

.5 Do not apply paint when:

.1 Temperature is expected to drop below 10°C before paint has thoroughly cured.

.2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.

.3 Surface to be painted is wet, damp or frosted.

.6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.

.7 Schedule repainting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.

.8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Place materials defined as hazardous or toxic in designated containers.

.4 Ensure emptied containers are sealed and stored safely.

.5 Unused paint, coating materials must be disposed of at official hazardous material collections site as approved by Owner’s Representative.

.6 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.

.7 Materials that cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.8 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.9 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:

.1 Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case shall equipment be cleaned using free draining water.

.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.

.3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.

.4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.

.10 Empty paint cans are to be dry prior to disposal or recycling (where available).

.11 Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Paint materials listed in the latest edition of the MPI Approved Product List (APL) are acceptable for use on this project.

.2 Paint materials for repaint systems shall be products of a single manufacturer.

.3 Low odour products: whenever possible, select products exhibiting low odour characteristics. If two products are otherwise equivalent, select the product with the lowest odour. Only qualified products with E2 or E3 "Environmentally Friendly" rating are acceptable for use on this project.

.4 Paints, coatings, thinners, solvents, cleaners and other fluids used in repainting, shall:

.1 Be water-based, water soluble, water clean-up.

.2 Be non-flammable.

.3 Not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.

.4 Be manufactured without compounds which contribute to ozone depletion in the upper atmosphere.

.5 Be manufactured without compounds which contribute to smog in the lower atmosphere.

.6 Be manufactured in a manner where matter generating a 'Biochemical Oxygen Demand' (BOD) in undiluted production plant effluent discharged to a natural watercourse or a sewage treatment facility lacking secondary treatment does not exceed 15 mg/L.

.7 Be manufactured in a manner where the total suspended solids (TSS) content in undiluted production plant effluent discharged to a natural watercourse or a sewage treatment facility lacking secondary treatment does not exceed 15 mg/L.

.5 Paints and coatings must be manufactured and transported in a manner that steps of processes, including disposal of waste products arising therefrom, will meet requirements of applicable governmental acts, by-laws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).

.6 Paints and coatings must not be formulated or manufactured with formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavelant chromium or their compounds.

.7 Water-borne paints and stains, and water borne varnishes must meet a minimum "Environmentally Friendly" E2 rating.

2.2 COLOURS

.1 Owner’s Representative will provide Colour Schedule after Contract award.

.2 Selection of colours will be from manufacturers full range of colours.

.3 Where specific products are available in a restricted range of colours, selection will be based on the limited range.

.4 Second coat in a three coat repaint system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

.1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed with Owner's Representative written permission.

.2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.

.3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or such organic solvents to thin water-based paints.

.4 Thin paint for spraying according in strict accordance with paint manufacturer' instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Owner's Representative.

.5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

.1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following MPI gloss / sheen standard values:

Gloss Level Category	Units @ 60°	Units @ 85°
G1 - matte finish	0 to 5	maximum 10
G2 - velvet finish	0 to 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	minimum 35
G5 - semi-gloss finish	35 to 70	
G6 - gloss finish	70 to 85	
G7 - high gloss finish	> 85	

.2 Gloss level ratings of repainted surfaces shall be as specified herein.

2.5 INTERIOR PAINTING SYSTEMS

.1 The following paint formulas requires a two coat finish as indicated in the MPI Repainting Maintenance Manual.

.2 RIN 2.1 - Asphalt Surfaces: (zone/traffic marking on interior drive and parking areas, etc.).

.1 RIN 2.1B - Alkyd Zone/Traffic Marking.

.3 RIN 3.1 - Concrete Vertical Surfaces: (including soffits).

.1 RIN 3.1A - Latex G4 finish.

.4 RIN 3.2 - Concrete Horizontal Surfaces: (floors and stairs, etc.).

.1 RIN 3.2A - Latex Floor Enamel G4.

.5 RIN 4.1 - Clay Masonry Units: (pressed and extruded brick).

.1 RIN 4.1A - Latex G4 finish.

.6 RIN 4.2 - Concrete Masonry Units: (Concrete Block and Concrete Brick).

.1 RIN 4.2A - Latex G4 finish.

.7 RIN 5.1 - Structural Steel and Metal Fabrications.

.1 RIN 5.1K - 2 Component Epoxy finish.

.8 RIN 5.3 - Galvanized Metal: (High Contact/High Traffic Areas (Doors, Frames, Railings, Pipes, Handrails, etc.). Low Contact/Low traffic areas (Overhead Decking, Pipes, Ducts, etc.)

.1 RIN 5.3C - Alkyd G5 finish.

.9 RIN 6.2 - Dimension Lumber: (Columns, Beams, Exposed Joists, Underside of Decking, etc.)

.1 RIN 6.2A - Latex G4 (over latex primer).

.10 RIN 6.3 - Dressed Lumber: (Including Doors, Door and Window Frames, Mouldings, etc.)

.1 RIN 6.3A - Latex G5 finish.

.11 RIN 6.4 - Wood Panelling and Casework: (Partitions, Panels, Shelving, Millwork, etc.).

.1 RIN 6.4B – Latex G4 finish.

.12 RIN 6.5 - Wood Floors and Stairs: (Including Hardwood Flooring).

.1 RIN 6.5A - Alkyd Floor Enamel G4 (over primer).

.13 RIN 9.2 - Plaster and Gypsum Board: (gypsum wallboard, drywall, "sheet rock type material", etc.,

.1 RIN 9.2A - Latex G5 (over latex sealer) for walls.

.2 RIN 9.2A - Latex G1 (over latex sealer) for ceilings.

.14 RIN 10.1 - Canvas and Cotton Coverings:

.1 RIN 10.1B - Alkyd G5 finish.

PART 3 EXECUTION

3.1 GENERAL

.1 Perform preparation and operations for interior painting in accordance with MPI Maintenance Repainting Manual requirements except where otherwise specified.

.2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.2 EXISTING CONDITIONS

.1 Prior to commencing work, thoroughly examine site conditions and existing interior substrates to be repainted. Report in writing to Owner’s Representative damages, defects, or unsatisfactory or unfavourable conditions or surfaces that will adversely affect this work.

.2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, except test concrete floors for moisture using a simple "cover patch test" and report findings to Owner's Representative. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

.3 Maximum moisture content as follows:

.1 Concrete: 12%.

.2 Clay and Concrete Block/Brick: 12%.

.3 Wood: 15%.

.4 No repainting work shall commence until such adverse conditions and defects have been corrected and surfaces and conditions are acceptable to the Painting Subcontractor and Inspection Agency. Commencement of work shall not be held to imply acceptance of surfaces except as qualified herein.

.5 Degree of surface deterioration (DSD) shall be assessed using MPI Identifiers and Assessment criteria indicated in the MPI Maintenance Repainting Manual. MPI DSD ratings and descriptions are as follows:

Condition	Description
DSD-0	Sound Surface (includes visual (aesthetic) defects that do not affect film's protective properties).
DSD-1	Slightly Deteriorated Surface (indicating fading; gloss reduction, slight surface contamination, minor pin holes scratches, etc.).
DSD-2	Moderately Deteriorated Surface (small areas of peeling, flaking, slight cracking, staining, etc.).
DSD-3	Severely Deteriorated Surface (heavy peeling, flaking, cracking, checking, scratches, scuffs, abrasion, small holes and gouges).
DSD-4	Substrate Damage (repair or replacement of surface required by others).

3.3 PROTECTION

.1 Protect existing surfaces and adjacent fixtures and furnishings from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Owner's Representative.

.2 Cover or mask windows and other ornamental hardware adjacent to areas being painted to prevent damage and to protect from paint drops and splatters. Use non-staining coverings.

.3 Protect items that are permanently attached such as Fire Labels on doors and frames.

.4 Protect factory finished products and equipment.

.5 Protect general public and building occupants in and about the building.

.6 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and surface mounted equipment, fittings and fastenings prior to undertaking re-painting operations. Items shall be securely stored and re-installed after painting is completed.

.7 Move and cover furniture and portable equipment as necessary to carry out repainting operations. Replace as painting operations progress.

.8 As repainting operations progress, place "WET PAINT" signs in occupied areas to approval of Owner's Representative.

3.4 CLEANING AND PREPARATION

.1 Clean and prepare interior surfaces to be repainted in accordance with MPI Maintenance Repainting Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:

.1 Remove dust, dirt, and surface debris by vacuuming, wiping with dry, clean cloths or compressed air.

.2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and surface contaminants.

.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.

.4 Allow surfaces to drain completely and to dry thoroughly. Allow sufficient drying time and test surfaces using an electronic moisture meter before commencing work.

.5 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.

.6 Many water-based paints cannot be removed with water once dried. Minimize the use of kerosene or such organic solvents to clean up water-based paints.

.2 Where required, pressure wash exterior surfaces prior to repainting in accordance with MPI standards for type of surfaces and recommended pressures to ensure complete removal of loose paint, stains, dirt, and foreign matter. This work to be carried out by qualified tradesman experienced in pressure water cleaning. Use of spray equipment such as water hose cleaning will not be considered satisfactory unless specified herein. Allow sufficient drying time and test surfaces using an electronic moisture meter before commencing work.

.3 Clean metal surfaces to be repainted by removing rust, dirt, oil, grease and foreign substances in accordance with MPI requirements. Remove such contaminates from surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/vacuum cleaning as required.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pre-treatment as soon as possible after cleaning and before deterioration occurs.

.5 Do not apply paint until prepared surfaces have been accepted by Owner's Representative.

.6 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

3.5 APPLICATION

.1 Method of application to be as approved by Owner's Representative. Apply paint by brush, roller, air sprayer, airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.

.2 Brush and Roller Application:

.1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.

.2 Work paint into cracks, crevices and corners.

.3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.

.4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy.

.5 Remove runs, sags and brush marks from finished work and repaint.

.3 Spray Application:

.1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.

.2 Keep paint ingredients properly mixed in containers during paint application by either continuous mechanical agitation or intermittent agitation frequently as necessary.

.3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.

.4 Back roll spray applications and brush out runs and sags immediately.

.5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.

.4 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Owner's Representative.

.5 Apply paint coats in a continuous manner and allow surfaces to dry and properly cure between coats for minimum time period as recommended by manufacturer. Minimum dry film thickness of coats shall not be less than that recommended by the manufacturer. Repaint thin spots or bare areas before next coat of paint is applied.

.6 Sand and dust between coats to remove visible defects.

.7 Repaint surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.

.8 Repaint top, bottom, and vertical edges of doors to be repainted.

.9 Repaint inside of cupboards and cabinets as specified for outside surfaces.

.10 Repaint closets and alcoves to match existing, unless otherwise scheduled or noted.

3.6 MECHANICAL / ELECTRICAL EQUIPMENT

.1 Unless otherwise noted, repainting shall also include exposed to view / previously painted mechanical and electrical equipment and components (panels, conduits, piping, hangers, ductwork, etc.).

.2 Touch up scratches and marks and repaint such mechanical and electrical equipment and components with colour, and sheen finish to match existing unless otherwise noted or scheduled.

.3 Do not paint over name plates or instruction labels.

.4 Leave unfinished exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish.

.5 Keep sprinkler heads free of paint.

.6 Do not paint interior transformers and substation equipment.

3.7 FIRE SEPARATIONS

.1 Contractor to stencil on both sides of fire rated partitions the fire rating for that assembly (i.e.: 1 HR FIRE SEPARATION).

.2 Stenciled fire ratings to be minimum 100 mm high RED letters, minimum 150 mm above finished ceilings, and minimum 2400 mm o.c. along partition.

3.8 FIELD QUALITY CONTROL

.1 Field inspection of exterior painting operations to be carried out by Owner's Representative.

.2 Advise Owner's Representative when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.3 Co-operate with Owner's Representative and provide access to areas of work.

3.9 CLEAN-UP

.1 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

.2 Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.

.3 Remove combustible rubbish materials and empty paint cans each day and safely dispose of same in accordance with requirements of authorities having jurisdiction.

.4 Clean equipment and dispose of wash water used for water borne materials, solvents used for oil based materials as well as other cleaning and protective materials (e.g. rags, drop cloths, masking papers, etc.), paints, thinners, paint removers/strippers in accordance with the safety requirements of authorities having jurisdiction and as noted herein.

.5 Painting equipment shall be cleaned in leak-proof containers that will permit particulate matter to settle out and be collected. Sediment remaining from cleaning operations shall be recycled or disposed of in a manner acceptable to authorities having jurisdiction.

.6 Paint and coatings in excess of repainting requirements shall be recycled as noted herein.

3.10 RESTORATION

.1 Clean and re-install hardware items removed before undertaken painting operations.

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Remove paint splashings on affected exposed surfaces. Remove smears and spatter immediately as operations progress, using compatible solvent.

.4 Protect freshly completed surfaces from paint droppings and dust to approval of Owner's Representative. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Owner's Representative.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

.1 Types of items described in this Section:
  .1 Non-load-bearing steel framing members for the following applications:
    .1 Interior framing systems (e.g., supports for partition walls, framed soffits, furring, etc.).
    .2 Interior suspension systems (e.g., supports for ceilings, suspended soffits, etc.).
  .2 Sheet steel security linear panel.

.2 Types of items you will not find described in this Section:
  .1 Wind-bearing steel stud framing.
  .2 Insulation.
  .3 Head-of-wall joint systems installed with non-load-bearing steel framing.
  .4 Non-load-bearing metal shaft-wall framing, gypsum panels, and other components of shaft-wall assemblies.

1.3 SUBMITTALS

.1 Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

.1 Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to CAN/ULC-S101 by an independent testing agency.

.2 STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

PART 2 - PRODUCTS

2.1 NON-LOAD-BEARING STEEL FRAMING, GENERAL

.1 Framing Members, General: Comply with ASTM C 754 for conditions indicated.
  .1 Steel Sheet Components: Comply with ASTM C 645 requirements for metal, unless otherwise indicated.
  .2 Protective Coating: G60 Coating with equivalent corrosion resistance of ASTM A 653/A 653M, Z120, hot-dip galvanized, unless otherwise indicated.

2.2 SUSPENSION SYSTEM COMPONENTS

.1 Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 1.59 mm diameter wire, or double strand of 1.21 mm diameter wire.

.2 Hanger Attachments to Concrete:

.1 Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.

.2 Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.

.3 Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 4.12 mm diameter.

.4 Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 1.37 mm and minimum 12.7 mm wide flanges.

.5 Furring Channels (Furring Members):
.1 Cold-Rolled Channels: 1.37 mm bare-steel thickness, with minimum 12.7 mm wide flanges, 19.1 mm deep.
.2 Steel Studs: ASTM C 645.
.1 Minimum Base-Metal Thickness: 0.45 mm.
.2 Depth: As indicated on Drawings.
.3 Hat-Shaped, Rigid Furring Channels: ASTM C 645, 22.2 mm deep.
.1 Minimum Base Metal Thickness: 0.45 mm.
.4 Resilient Furring Channels: 12.7 mm deep members designed to reduce sound transmission.
.1 Configuration: Asymmetrical or hat shaped.

2.3 STEEL FRAMING FOR FRAMED ASSEMBLIES

.1 Steel Studs and Runners: ASTM C 645.
.1 Minimum Base-Metal Thickness: 0.45 mm.
.2 Depth: As indicated on Drawings.

.2 Slip-Type Head Joints: At underside of floor and roof decks and underside of structural framing, provide one of the following:
.1 Single Long-Leg Runner System: ASTM C 645 top runner with 50.8 mm deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 305 mm of the top of studs to provide lateral bracing.
.2 Double-Runner System: ASTM C 645 top runners, inside runner with 50.8 mm deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
.3 Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

.3 Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

.4 Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
.1 Minimum Base-Metal Thickness: 0.79 mm.

.5 Cold-Rolled Channel Bridging: 1.37 mm bare-steel thickness, with minimum 12.7 mm wide flanges.

.6 Hat-Shaped, Rigid Furring Channels: ASTM C 645.

.7 Resilient Furring Channels: 12.7 mm deep, steel sheet members designed to reduce sound transmission.

.8 Cold-Rolled Furring Channels: 1.37 mm bare-steel thickness, with minimum 12.7 mm wide flanges.

2.4 SHEET METAL SECURITY LINEAR PANEL

.1 Linear Panel: sheet metal of 1.99 mm minimum bare metal thickness, commercial quality consisting of one of the following:
.1 Zinc coated sheet steel to ASTM A 653/A 653M, with Z275 designation zinc coating;
.2 Aluminum-zinc alloy coated sheet steel to ASTM A 792/A 792M, grade 33 or 37 with AZ150 coating, regular spangle surface, not chemically treated for paint finish.

2.5 AUXILIARY MATERIALS

.1 General: Provide auxiliary materials that comply with referenced installation standards.
.1 Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

.2 Isolation Strip at Exterior Walls: Provide the following:
.1 Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 3.2 mm thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.
.1 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

.2 Coordination with Sprayed Fire-Resistive Materials, if material is used on this project:
.1 Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 600 mm o.c.
.2 After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

.1 Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.
.1 Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

.2 Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

.3 Install bracing at terminations in assemblies.

.4 Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING SUSPENSION SYSTEMS

.1 Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.

.2 Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

.3 Suspend hangers from building structure as follows:
- .1 Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
  - .1 Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
- .2 Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
  - .1 Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
- .3 Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
- .4 Do not connect or suspend steel framing from ducts, pipes, or conduit.

.4 Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

.5 Installation Tolerances: Install suspension systems that are level to within 3 mm in 3.6 m measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.5 INSTALLING FRAMED ASSEMBLIES

.1 Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

.2 Install studs so flanges within framing system point in same direction.

.3 Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
- .1 Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
- .2 Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
  - .1 Install two studs at each jamb, unless otherwise indicated.
  - .2 Frame around door openings intended for doors greater than 90 kg in weight using studs having minimum thickness of 0.79 mm
  - .3 Install cripple studs at head adjacent to each jamb stud, with a minimum 12.7 mm clearance from jamb stud to allow for installation of control joint in finished assembly.
  - .4 Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

.3 Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

.4 Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

.1 Firestop Track: Install to maintain continuity of fire-resistance-rated assembly indicated.

.5 Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

.6 Curved Partitions:

.1 Bend track to uniform curve and locate straight lengths so they are tangent to arcs.

.2 Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of not less than 2 studs at ends of arcs, place studs 150 mm o.c.

.4 Direct Furring:

.1 Screw to wood framing.

.2 Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 610 mm o.c.

.5 Installation Tolerance: Install each framing member so fastening surfaces vary not more than 3 mm from the plane formed by faces of adjacent framing.

3.6 SHEET METAL SECURITY LINEAR PANEL

.1 Install sheet metal security linear panels in locations indicated.

.2 Prepare sheet metal security linear panel with 9.5 mm holes for installation, plug welded to the room-exterior side of metal studs vertically or screw-fasten to the room-exterior side of wood studs; at 400 mm o.c. and horizontally at 300 mm o.c. maximum.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:
- .1 Interior gypsum board.
- .2 Tile backing panels.
- .3 Cementitious backer units (cement board).

.2 Types of items you will not find described in this Section:
- .1 Exterior gypsum board for ceilings and soffits.
- .2 Cement board as a substrate for exterior cement board stucco system.
- .3 Load-bearing steel framing that supports gypsum board.
- .4 Wood framing and furring that supports gypsum board.
- .5 Gypsum sheathing.
- .6 Insulation and vapour retarders installed in assemblies that incorporate gypsum board.
- .7 Fire Stop Systems for head-of-wall assemblies that incorporate gypsum board.
- .8 Non-structural framing and suspension systems that support gypsum board.
- .9 Metal shaft-wall framing, gypsum shaft liners, and other components of shaft-wall assemblies.
- .10 Gypsum base for veneer plaster and for other components of gypsum-veneer-plaster finishes.
- .11 Primers applied to gypsum board surfaces.

1.2 SUBMITTALS

.1 Product Data: For each type of product indicated.

1.3 QUALITY ASSURANCE

.1 Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to CAN/ULC-S101 by an independent testing agency.

.2 STC -Rated Assemblies: For STC-rated assemblies provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

1.4 STORAGE AND HANDLING

.1 Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.5 PROJECT CONDITIONS

.1 Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

.2 Do not install interior products until installation areas are enclosed and conditioned.

.3 Do not install panels that are wet, those that are moisture damaged, and those that are mould damaged.
- .1 Indications that panels are wet or moisture damaged include, but are not limited to, discolouration, sagging, or irregular shape.

.2 Indications that panels are mould damaged include, but are not limited to, fuzzy or splotchy surface contamination and discolouration.

PART 2 - PRODUCTS

2.1 PANELS, GENERAL

.1 Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD (Also referred on drawings as **GYP BD**)

.1 General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.
.1 Regular Type.
.2 Type X.
.3 Flexible Type: Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.
.4 Ceiling Type: Manufactured to have more sag resistance than regular-type gypsum board.
.5 Abuse-Resistant Type: Manufactured to produce greater resistance to surface indentation, through-penetration (impact resistance), and abrasion than standard, regular-type and Type X gypsum board.
.6 Moisture- and Mould-Resistant Type: With moisture- and mould-resistant core and surfaces, regular type and Type X gypsum board.

2.3 TILE BACKING PANELS (Also referred on drawings as **TILE BACKER**)

.1 Glass-Mat, Water-Resistant Backing Board: Any of the following:
.1 Complying with ASTM C 1178/C 1178M.
.1 Product: Subject to compliance with requirements, provide *DensShield Tile Guard* by G-P Gypsum; or approved alternate.
.2 Product: Subject to compliance with requirements, provide *GlasRoc Tile Backer Regular* by CertainTeed; or approved alternate.
.2 Complying with ASTM C1177/C 1177M.
.1 Product: Subject to compliance with requirements, provide *DensArmor Plus Interior Guard* by G-P Gypsum; or approved alternate.

2.4 CEMENTITIOUS BACKER UNITS (Also referred on drawings as **CBU** or **Cement Board**)

.1 Cementitious Backer Units: ANSI A118.9.
.1 Thickness: As indicated on Drawings.

2.5 TRIM ACCESSORIES

.1 Interior Trim: ASTM C 1047.
.1 Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
.2 Shapes:
.1 Corner bead.
.2 Bullnose bead.
.3 LC-Bead: J-shaped; exposed long flange receives joint compound.
.4 L-Bead: L-shaped; exposed long flange receives joint compound.
.5 U-Bead: J-shaped; exposed short flange does not receive joint compound.

.6 Expansion (control) joint.
.7 Curved-Edge Corner bead: With notched or flexible flanges.
.8 Other profiles as indicated or required.

2.6 JOINT TREATMENT MATERIALS

.1 General: Comply with ASTM C 475/C 475M.

.2 Joint Tape:
.1 Interior Gypsum Wallboard: Paper.
.2 Tile Backing Panels: As recommended by panel manufacturer.

.3 Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
.1 Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
.2 Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
.1 Use setting-type compound for installing paper-faced metal trim accessories.
.3 Fill Coat: For second coat, use setting-type, sandable topping compound.
.4 Finish Coat: For third coat, use setting-type, sandable topping compound.
.5 Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound or high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

.4 Joint Compound for Tile Backing Panels:
.1 Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

.5 Joint Compound for Cementitious Backer Units:
.1 Cementitious Backer Units: As recommended by backer unit manufacturer.

2.7 AUXILIARY MATERIALS

.1 General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

.2 Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

.3 Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
.1 Use screws complying with ASTM C 954 for fastening panels to steel members from 0.84 to 2.84 mm thick.
.2 For fastening cementitious backer units, use non-corrosive screws of type and size recommended by panel manufacturer.

.4 Acoustical Sealant: As specified in Division 07 Section *Joint Sealants*.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.

.2 Examine panels before installation. Reject panels that are wet, moisture damaged, and mould damaged.

.3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

.1 Comply with ASTM C 840.

.2 Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

.3 Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1.5 mm of open space between panels. Do not force into place.

.4 Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

.5 Form control and expansion joints with space between edges of adjoining gypsum panels.

.6 Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
.1 Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 0.7 sq. m in area.
.2 Fit gypsum panels around ducts, pipes, and conduits.
.3 Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 6.4 to 9.5 mm wide joints to install sealant.

.7 Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 6.4 to 12.7 mm wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

.8 Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

.9 Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members, or provide control joints to counteract wood shrinkage.

.10 STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

3.3 APPLYING INTERIOR GYPSUM BOARD

.1 Install interior gypsum board in the following locations:
.1 Regular Type: Apply on vertical surfaces, unless otherwise indicated.
.2 Type X: Apply where required for fire-resistance-rated assembly.

.3 Flexible Type: Apply in double layer at curved assemblies.
.4 Ceiling Type: Apply at ceiling and horizontal surfaces.
.5 Abuse-Resistant Type: Apply where indicated on Drawings.
.6 Moisture- and Mould-Resistant Type: Apply to inside of all exterior walls, in janitor's closets, in locker rooms, and in shower areas, provided the surface does not serve as a substrate for tile; and other locations indicated on Drawings.

.2 Single-Layer Application:
.1 On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
.2 On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
.1 Stagger abutting end joints not less than one framing member in alternate courses of panels.
.2 At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
.3 On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
.4 Fastening Methods: Apply gypsum panels to supports with steel drill screws.

.3 Multilayer Application:
.1 On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints 1 framing member, 400 mm minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
.2 On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
.3 On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
.4 Fastening Methods: Fasten base layers and face layers separately to supports with screws.

.4 Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

.5 Curved Surfaces:
.1 Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 300-mm- long straight sections at ends of curves and tangent to them.
.2 For double-layer construction, fasten base layer to studs with screws 400 mm o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 300 mm o.c.

3.4 APPLYING TILE BACKING PANELS

.1 Install tile backing panels in the following locations:
.1 Regular type: As substrate for tile finishes, except as noted.
.1 Use Type X as substrate for tile finish where required for fire-resistance-rated assembly.

.2 Glass-Mat, Water-Resistant Backing Panel: Comply with manufacturer's written installation instructions. Install with 6.4 mm gap where panels abut other construction or penetrations.

.3 Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 APPLY CEMENTITIOUS BACKER UNITS

.1 Install cementitious backer units in the following locations:
  .1 Only at locations specifically indicated to receive cementitious backer units.

.2 Cementitious Backer Units: install to ANSI A108.11.

3.6 INSTALLING TRIM ACCESSORIES

.1 General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

.2 Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Engineer for visual effect.

.3 Interior Trim: Install in the following locations:
  .1 Corner bead: Use at outside corners.
  .2 Bullnose Bead: Use where indicated.
  .3 LC-Bead: Use at exposed panel edges.
  .4 Curved-Edge Corner bead: Use at curved openings.

3.7 FINISHING GYPSUM BOARD

.1 General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

.2 Prefill open joints and damaged surface areas.

.3 Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

.4 Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
  .1 Level 1: Ceiling plenum areas, concealed areas, and where indicated.
  .2 Level 2: Panels that are substrate for tile.
  .3 Level 3: Where indicated on Drawings.
  .4 Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated.
    .1 Primer and its application to surfaces are specified in other Division 09 Sections.
  .5 Level 5: Where indicated on Drawings.
    .1 Primer and its application to surfaces are specified in other Division 09 Sections.

.5 Glass-Mat, Water-Resistant Backing Panels: Finish according to manufacturer's written instructions.

.6 Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.8 PROTECTION

.1 Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

.2 Remove and replace panels that are wet, moisture damaged, and mould damaged.

.1 Indications that panels are wet or moisture damaged include, but are not limited to, discolouration, sagging, or irregular shape.

.2 Indications that panels are mould damaged include, but are not limited to, fuzzy or splotchy surface contamination and discolouration.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

.1 Types of items described in this Section:
- .1 Ceramic tile for interior installation.
- .2 Shower stall base, curb, and drain.
- .3 Waterproof membrane.
- .4 Crack isolation membrane.
- .5 Metal edge strips.
- .6 Stair and landing nosings.

.2 Types of items you will not find described in this Section:
- .1 Ceramic tile for exterior installation.
- .2 Ceramic tile installations intended to be kept submerged continuously under water.
- .3 Glass-mat, water-resistant backer board.
- .4 Stone tiling.

1.3 DEFINITIONS

.1 General
- .1 Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

.2 ANSI A108 Series
- .1 ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in *American National Standard Specifications for Installation of Ceramic Tile*.

1.4 PERFORMANCE REQUIREMENTS

.1 Static Coefficient of Friction
- .1 For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
  - .1 Level Surfaces: Minimum 0.5 dry.
  - .2 Step Treads: Minimum 0.6 dry.
  - .3 Ramp Surfaces: Minimum 0.6 dry.
- .2 Where specific tiles are specified, notify Owner's Representative when product does not meet the static coefficient of friction criteria prior to purchasing products.

1.5 SUBMITTALS

.1 Product Data
- .1 For each type of product indicated.

.2 Sustainability Submittal
.1 For sealants, including printed statement of VOC content.

.3 Samples for Verification
.1 Full-size units of each type and composition of tile and for each colour and finish required. For ceramic mosaic tile in colour blend patterns, provide full sheets of each colour blend.
.2 Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each colour and finish required. Make samples at least 300 mm square, but not fewer than 4 tiles. Use grout of type and in colour or colours approved for completed Work.
.3 Full-size units of each type of trim and accessory for each colour and finish required.
.4 Metal edge strips in 150 mm lengths.

1.6 QUALITY ASSURANCE

.1 Source Limitations for Tile
.1 Obtain tile of each type and colour or finish from one source or producer.
.1 Obtain tile of each type and colour or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

.2 Source Limitations for Setting and Grouting Materials
.1 Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.

.3 Source Limitations for Other Products
.1 Obtain each of the following products specified in this Section from a single manufacturer for each product:
.1 Waterproof membrane.
.2 Crack isolation membrane.
.3 Joint sealants.
.4 Metal edge strips.

.4 Mock-ups
.1 Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
.1 Build mock-up of each type of floor tile installation.
.2 Build mock-up of each type of wall tile installation.
.3 Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

.5 Preinstallation Conference
.1 Conduct conference at Project site.
.2 Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labelling tile packages.

.2 Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

.3 Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

.4 Store liquid materials in unopened containers and protected from freezing.

.5 Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.8 PROJECT CONDITIONS

.1 Environmental Limitations
.1 Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.9 EXTRA MATERIALS

.1 Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
.1 Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, colour, pattern, and size indicated.
.2 Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and colour indicated.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

.1 ANSI Ceramic Tile Standard
.1 Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
.2 Provide tile complying with Standard grade requirements unless otherwise indicated.

.2 ANSI Standards for Tile Installation Materials
.1 Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TTMAC installation methods specified in tile installation schedules, and other requirements specified.

.3 Factory Blending
.1 For tile exhibiting colour variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colours as those taken from other packages and match approved Samples.

.4 Mounting
.1 For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
.2 Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

.5 Factory-Applied Temporary Protective Coating
.1 Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.2 TILE PRODUCTS

.1 Refer to drawings for tile selection; or approved alternate.

.2 Trim Units
.1 Utilize matching tile trim pieces, if manufactured, as is appropriate for the particular tile installation, including but not limited to:
.1 Base, including inside and outside corners.
.2 Bullnose trim.
.3 Stair nosing.
.4 Stair treads with serrated edging.

2.3 SHOWER STALL BASE, CURB, AND DRAIN

.1 Schluter brand Kerdi Shower system, or approved alternate, consisting of:
.1 Kerdi Shower ST pre-sloped shower pan.
.2 Kerdi Shower SC curb.
.3 Kerdi Drain, stainless steel.
.4 Kerdi 10M waterproofing membrane.
.5 Kerdi-Band seaming material.
.6 Kerdi band Kereck inside and outside waterproofing corners.

2.4 WATERPROOF MEMBRANE

.1 General
.1 Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

.2 Polyethylene Sheet
.1 Polyethylene faced on both sides with fleece webbing; 0.203 mm nominal thickness.
.2 Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
.1 Schluter Systems L.P.; KERDI.

2.5 CRACK ISOLATION MEMBRANE

.1 General
.1 Manufacturer's standard product, selected from the following, which complies with ANSI A118.12 for high performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

.2 Polyethylene Sheet
.1 Polyethylene faced on both sides with fleece webbing; 0.203 mm nominal thickness.
.2 Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
.1 Schluter Systems L.P.; KERDI.

.3 Corrugated Polyethylene
.1 Corrugated polyethylene with dovetail-shaped corrugations and with anchoring webbing on the underside; 4 mm nominal thickness.
.2 Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

.1 Schluter Systems L.P.; DITRA.

2.6 SETTING MATERIALS

.1 Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.
.1 For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

.2 EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar (Thin Set): ANSI A118.11.

2.7 GROUT MATERIALS

.1 Polymer-Modified Tile Grout: ANSI A118.7.

.2 Water-Cleanable Epoxy Grout: ANSI A118.3.
.1 Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to (60 deg C) and (100 deg C), respectively, and certified by manufacturer for intended use.

.3 Grout for Pregrouted Tile Sheets: Same product used in factory to pregrout tile sheets.

2.8 ELASTOMERIC SEALANTS

.1 General
.1 Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Division 07 Section *Joint Sealants*.
.1 Use sealants that have a VOC content of 250 g/L or less.
.2 Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.

.2 Colours
.1 Provide colours of exposed sealants to match colours of grout in tile adjoining sealed joints unless otherwise indicated.

.3 One-Part, Mildew-Resistant Silicone Sealant
.1 ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

.4 Multipart, Pourable Urethane Sealant for Use T
.1 ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.

2.9 STAIR AND LANDING NOSINGS

.1 Nosings
.1 Stair and landing nosing, 50 mm wide, height to match tile and setting-bed thickness, stainless steel with contrasting colour serrated thermoplastic insert, designed specifically for stair and landing nosing applications;. Colour of insert selected by Owner's Representative from manufacturer’s full line of colours.
.2 Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
.1 Schluter Systems TREP-SE.

2.10 MISCELLANEOUS MATERIALS

.1 Trowelable Underlayments and Patching Compounds
.1 Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

.2 Metal Edge Strips
.1 Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring and wall applications; nickel silver exposed-edge material unless otherwise noted.

.3 Temporary Protective Coating
.1 Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
.1 Petroleum paraffin wax, fully refined and odourless, containing at least 0.5 percent oil with a melting point of 49 to 60 deg C per ASTM D 87.
.2 Retain subparagraph above for either factory or field application; retain subparagraph below if acceptable for field application in lieu of wax.
.3 Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

.4 Tile Cleaner
.1 A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

.5 Grout Sealer
.1 Manufacturer's standard silicone product for sealing grout joints and that does not change colour or appearance of grout.

2.11 MIXING MORTARS AND GROUT

.1 Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

.2 Add materials, water, and additives in accurate proportions.

.3 Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
.1 Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
.2 Verify that concrete substrates for tile floors installed with thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
.1 Verify that surfaces that received a steel trowel finish have been mechanically scarified.
.2 Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

.3 Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.

.4 Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Owner's Representative.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable levelling and patching compound specifically recommended by tile-setting material manufacturer.

.2 Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1:50 toward drains.

.3 Blending

.1 For tile exhibiting colour variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colours as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

.4 Field-Applied Temporary Protective Coating

.1 If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 TILE INSTALLATION

.1 Comply with TTMAC 's *Handbook for Ceramic Tile Installation* for TTMAC installation methods. Comply with parts of the ANSI A108 Series *Specifications for Installation of Ceramic Tile* that are referenced in TTMAC installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

.1 For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:

.1 Exterior tile floors.

.2 Tile floors in wet areas.

.3 Tile swimming pool decks.

.4 Tile floors in laundries.

.5 Tile floors composed of tiles 200 by 200 mm or larger.

.6 Tile floors composed of rib-backed tiles.

.2 Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

.3 Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

.4 Jointing Pattern

.1 Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

.1 Retain first subparagraph below for mounted tile.

.2 For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

.3 Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.

.4 Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

.5 Joint Widths

.1 Unless otherwise indicated, install tile with the following joint widths:

.1 Ceramic Mosaic Tile: 1.6 mm.

.2 Quarry Tile: 6.35 mm.

.3 Paver Tile: 6.35 mm.

.4 Glazed Wall Tile: 1.6 mm.

.5 Decorative Thin Wall Tile: 1.6 mm.

.6 Expansion Joints

.1 Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

.1 Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

.2 Prepare joints and apply sealants to comply with requirements in Division 07 Section *Joint Sealants*.

.7 Metal Edge Strips

.1 Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

.2 Install where exposed edge of tile terminates anywhere other than at an inside corner where no matching bull-nose tile profile exists, or in the case of an outside corner, no matching outside corner tile exists.

.8 Stair and Landing Nosing

.1 Install full length of all tiled stair threads and top and intermediate stair and floor landings, where contrasting colour stair nosing tile is not available.

.9 Grout Sealer

.1 Apply grout sealer to grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 WATERPROOFING INSTALLATION

.1 Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.

.2 Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.5 CRACK ISOLATION MEMBRANE INSTALLATION

.1 Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.

.2 Do not install tile or setting materials over crack isolation membrane until membrane has cured.

3.6 CLEANING AND PROTECTING

.1 Cleaning
  .1 On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
    .1 Remove latex-portland cement grout residue from tile as soon as possible.
    .2 Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
    .3 Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

.2 Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

.3 Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

.4 Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.7 SHOWER STALL INSTALLATION

.1 Install in accordance with manufacturer’s installation instructions.

.2 Install waterproofing membrane behind tile installed in shower enclosure and on adjacent surfaces subject to wetting.

.3 Install shower curb along full entrance into showers tall, unless otherwise noted

3.8 INTERIOR TILE INSTALLATION SCHEDULE

.1 General
  .1 Surfaces
    .1 floors,
    .2 walls.
  .2 Substrates
    .1 concrete,
    .2 masonry,
    .3 exterior grade plywood,
    .4 gypsum board,
    .5 cementitious backer units,
    .6 coated glass-mat, water-resistant gypsum backer board,
    .7 cement fibre underlay.
  .3 Tile Type: See drawings.
  .4 Installation Type: Thin-set.
    .1 Use crack isolation membrane as required and for tiles 400 mm or greater in any one direction.
    .2 Use waterproofing membrane only where indicated.
  .5 Mortar
    .1 Plywood substrates: EGP latex-portland cement mortar.
    .2 All other substrates: latex portland cement mortar.

.6 Grout Type:
.1 Use epoxy grout in public washrooms, commercial kitchens, and in other locations specifically indicated.
.2 Use Polymer modified in all other locations.
.1 Grout lines 3.2 mm or wider: unsanded grout.
.2 All other: sanded grout.

.2 Shower Stall Enclosures
.1 Use shower installation kit, complete with waterproofing membranes and drains.
.2 Tile Type: See drawings.
.3 Installation Type: Thin-set.
.4 Mortar
.1 latex portland cement mortar.
.5 Grout Type: Polymer modified.
.1 Grout lines 3.2 mm or wider: unsanded grout.
.2 All other: sanded grout.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:
- .1 Acoustical ceiling panels.
- .2 Exposed suspension systems for ceilings, having narrow and wide capped steel faces.

.2 Types of items you will not find described in this Section:
- .1 Exposed suspension systems having extra-wide faces.
- .2 Exposed face suspension systems of aluminum construction.
- .3 Clean room suspension systems.
- .4 Ceilings consisting of mineral-base acoustical tiles used with concealed suspension systems, stapling, or adhesive bonding.
- .5 Acoustical Metal Pan Ceilings.
- .6 Linear Metal Ceilings.
- .7 Suspended Decorative Grids.

.3 Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete at ceilings.

1.2 DEFINITIONS

.1 AC: Articulation Class.

.2 CAC: Ceiling Attenuation Class.

.3 LR: Light Reflectance coefficient.

.4 NRC: Noise Reduction Coefficient.

1.3 SUBMITTALS

.1 Product Data: For each type of product indicated.

.2 Samples for Initial Selection: For components with factory-applied colour finishes.

.3 Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
- .1 Acoustical Panel: Set of 150 mm square Samples of each type, colour, pattern, and texture.
- .2 Exposed Suspension System Members, Mouldings, and Trim: Set of 300 mm long Samples of each type, finish, and colour.

.4 Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each acoustical panel ceiling.

.5 Maintenance Data: For finishes to include in maintenance manuals.

1.4 QUALITY ASSURANCE

.1 Source Limitations:

.1 Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
.2 Suspension System: Obtain each type through one source from a single manufacturer.

.2 Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:
.1 Fire-Resistance Characteristics: Where indicated, provide acoustical panel ceilings identical to those of assemblies tested for fire resistance per CAN/ULC-S101 by ULC or another testing and inspecting agency acceptable to authorities having jurisdiction.
.1 Fire-Resistance Ratings: Indicated by design designations from ULC's *Fire Resistance Directory* or from the listings of another testing and inspecting agency.
.2 Identify materials with appropriate markings of applicable testing and inspecting agency.
.2 Surface-Burning Characteristics: Provide acoustical panels with the following surface-burning characteristics complying with CAN/ULC S102:
.1 Flame Spread Rating: 25 or less.
.2 Smoke-Developed Rating: 50 or less.

.3 Mock-ups: Build mock-ups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
.1 Approved mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.

.4 Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section *Project Management and Coordination*.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

.2 Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

.3 Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.6 PROJECT CONDITIONS

.1 Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
.1 Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

1.7 COORDINATION

.1 Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.8 EXTRA MATERIALS

.1 Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
.1 Acoustical Ceiling Panels: Full-size panels equal to 2.0 percent of quantity installed.

PART 2 - PRODUCTS

2.1 ACOUSTICAL PANELS, GENERAL

.1 Recycled Content
.1 Provide acoustical panels with recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content constitutes a minimum of 25 percent by weight.

.2 Acoustical Panel Standard
.1 Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

.3 Acoustical Panel Colours and Patterns
.1 Match appearance characteristics indicated for each product type.
.2 Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Owner's Representative from each manufacturer's full range that comply with requirements indicated for type, pattern, colour, light reflectance, acoustical performance, edge detail, and size.

.4 Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment
.1 For acoustical panels indicated, treat with manufacturer's standard antimicrobial formulation that inhibits fungus, mould, mildew, and gram-positive and gram-negative bacteria and showing no mould, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.2 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING

.1 General
.1 Provide panels complying with ASTM E 1264 for type, form, and pattern indicated and as outlined below.
.2 Fire Rating
.1 Required when installed in a fire rated assembly.
.3 Colour
.1 White, unless otherwise noted.
.4 Edge Detail
.1 Square edge, unless otherwise noted.
.5 Thickness
.1 15 mm unless otherwise indicated or required for fire rating.
.6 Modular Size
.1 610 x 610 and 610 x 1220 mm as implied by grid shown on drawings.
.7 Flame Spread Rating: 25 of less.
.8 Smoke Developed: 50 or less.

.2 Acoustical Panel **AP1**; if required (typical)
.1 Type and Form: Type III, mineral base with painted finish; Form 2, water felted.
.2 Pattern: CD (perforated small holes and fissured).
.3 Light Reflectance (LR): Not less than 0.80.
.4 Noise Reduction Coefficient (NRC): Range of 0.55 to 0.65
.5 Ceiling Attenuation Class (CAC): Not less than 35.
.6 Thickness: 15mm
.7 Colour: White

.8 Acceptable Products:
.1 "USG Radar Basic, Item No. 2110" (610 x 610) by USG CGC or approved alternate.
.2 "USG Radar Basic, Item No. 2310" (610 x 1220) by USG CGC or approved alternate.

.3 Acoustical Panel **AP2**; if required (high performance for open office environments)
.1 Type and Form: Type XII, glass-fibre base with membrane-faced overlay; Form 2, cloth.
.2 Pattern: E (lightly textured).
.3 Light Reflectance (LR): Not less than 0.90.
.4 Noise Reduction Coefficient (NRC): Not less than 0.95.
.5 Thickness: 25 mm

.4 Acoustical Panels **AP3, AP4, AP5**…; if required
.1 Refer to drawings.

2.3 METAL SUSPENSION SYSTEMS, GENERAL

.1 Recycled Content: Provide products made from steel sheet with average recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

.2 Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.

.3 Finishes and Colours, General: Comply with NAAMM's *Metal Finishes Manual for Architectural and Metal Products* for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
.1 High-Humidity Finish: Comply with ASTM C 635 requirements for *Coating Classification for Severe Environment Performance* where high-humidity finishes are indicated.

.4 Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, *Direct Hung*, unless otherwise indicated.
.1 Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to times that imposed by ceiling construction, as determined by testing per ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
.1 Type: any one of the following:
.1 Cast-in-place
.2 Postinstalled expansion
.3 Postinstalled bonded anchors.
.2 Corrosion Protection: any one of the following:
.1 Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
.2 Stainless-steel components complying with ASTM F 593 and ASTM F 594, Group 1 Alloy 304 or 316 for bolts; Alloy 304 or 316 for anchor.
.3 Components fabricated from nickel-copper-alloy rods complying with ASTM B 164 for UNS No. N04400 alloy.
.2 Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.

.5 Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

.1 Material: any one of the following:
.1 Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
.2 Stainless-Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
.3 Nickel-Copper-Alloy Wire: ASTM B 164, nickel-copper-alloy UNS No. N04400.

.6 Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

.7 Angle Hangers: Angles with legs not less than 22 mm wide; formed with 1 mm thick, galvanized steel sheet complying with ASTM A 653/A 653M, Z275 coating designation; with bolted connections and 8 mm diameter bolts.

2.4 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING

.1 Use wide-face suspension system unless otherwise indicated.
.1 Use narrow-face suspension system only when specifically indicated.

.2 Wide-Face, Capped, Double-Web, Hot-Dip Galvanized, Z180, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, hot-dip galvanized according to ASTM A 653/A 653M, Z180 coating designation, with prefinished, cold-rolled, 24 mm wide, aluminum caps on flanges.
.1 Fire Rating: required when installed in a fire rated assembly.
.2 Structural Classification: Intermediate-duty system.
.3 Face Design: Flat, flush.
.4 Cap Finish: Painted white, unless otherwise noted.

.3 Narrow-Face, Steel-Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than Z90 coating designation, with prefinished, cold-rolled, 15 mm wide metal caps on flanges.
.1 Fire Rating: required when installed in a fire rated assembly.
.2 Structural Classification: Intermediate-duty system.
.3 Face Design: Flat, flush.
.4 Cap Finish: Painted white, unless otherwise noted.

2.5 METAL EDGE MOLDINGS AND TRIM

.1 Roll-Formed, Sheet-Metal Edge Mouldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard mouldings; formed from sheet metal of same material, finish, and colour as that used for exposed flanges of suspension system runners.
.1 Provide manufacturer's standard edge mouldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners, unless otherwise indicated.
.2 For lay-in panels with reveal edge details, provide stepped edge moulding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
.3 For circular penetrations of ceiling, provide edge mouldings fabricated to diameter required to fit penetration exactly.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

.1 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

.1 General: Install acoustical panel ceilings to comply with ASTM C 63, per manufacturer's written instructions and CISCA's *Ceiling Systems Handbook*.
.1 Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.

.2 Suspend ceiling hangers from building's structural members and as follows:
.1 Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
.2 Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
.3 Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
.4 Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
.5 Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
.6 When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
.7 Do not attach hangers to steel roof deck. Attach hangers to structural members.
.8 Space hangers not more than 1200 mm o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 200 mm from ends of each member.
.9 Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

.3 Install edge mouldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
.1 Screw attach mouldings to substrate at intervals not more than 400 mm o.c. and not more than 75 mm from ends, levelling with ceiling suspension system to a tolerance of 3.2 mm in 3.6 m. Mitre corners accurately and connect securely.
.2 Do not use exposed fasteners, including pop rivets, on mouldings and trim.

.4 Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

.5 Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge mouldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
.1 Arrange directionally patterned acoustical panels as follows:
.1 Install panels with pattern running in one direction parallel to long axis of space.

.2 For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and mouldings.

.3 For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.

.4 For reveal-edged panels on suspension system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension system surfaces and panel faces flush with bottom face of runners.

.5 Paint cut edges of panel remaining exposed after installation; match colour of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

.6 Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.4 CLEANING

.1 Clean exposed surfaces of acoustical panel ceilings, including trim, edge mouldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touch-up of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:
- .1 Resilient Base
  - .1 Typical
  - .2 Contoured resilient base.
- .2 Resilient stair accessories
  - .1 One piece resilient stair tread and riser
- .3 Resilient moulding accessories.

.2 Types of items you will not find described in this Section:
- .1 Resilient sheet floor coverings.
- .2 Linoleum floor coverings.
- .3 Resilient floor tile.
- .4 Resilient floor coverings designed to control electrostatic discharge.
- .5 Resilient floor coverings for use in athletic-activity or support areas.

1.2 SUBMITTALS

.1 Product Data: For each type of product indicated.

.2 Samples for Initial Selection: For each type of product indicated.

.3 Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 300 mm long, of each resilient product colour, texture, and pattern required.

1.3 QUALITY ASSURANCE

.1 Mock-ups: Provide resilient products with mock-ups specified in other Sections.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 10 deg C or more than 32 deg C.

1.5 PROJECT CONDITIONS

.1 Maintain ambient temperatures within range recommended by manufacturer, but not less than 21 deg C or more than 35 deg C, in spaces to receive resilient products during the following time periods:
- .1 48 hours before installation.
- .2 During installation.
- .3 48 hours after installation.

.2 Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 13 deg C or more than 35 deg C.

.3 Install resilient products after other finishing operations, including painting, have been completed.

1.6 EXTRA MATERIALS

.1 Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  .1 Furnish not less than 3 linear m for every 150 linear m or fraction thereof, of each type, colour, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE - TYPICAL

.1 Refer to drawings to determine if resilient base is required and if so, the required locations.

.2 Resilient Base Standard: to ASTM F 1861.
  .1 Material Requirement: Type TS (rubber, vulcanized thermoset) or Type TP (rubber, thermoplastic).
  .2 Manufacturing Method: Group I (solid, homogeneous) or Group II (layered).
  .3 Style:
    .1 Cove (base with toe): unless otherwise indicated.
    .2 Straight (flat or toeless), at carpet flooring locations.
  .4 Minimum Thickness
    .1 3.2 mm.
  .5 Height
    .1 102 mm, unless otherwise indicated.
  .6 Lengths
    .1 Coils in manufacturer's standard length.
  .7 Outside Corners
    .1 Job formed or preformed.
  .8 Inside Corners
    .1 Job formed or preformed.
  .9 Colours and Patterns
    .1 As selected by Owner's Representative from full range of industry colours if not specifically indicated in the *Interior Finishes Legend*.

2.2 CONTOURED RESILIENT BASE

.1 Refer to drawings to determine if contoured resilient base is required and if so, the required locations.

.2 Contoured resilient base to replicated moulded wood base profiles, to ASTM F-1861, Type TP, Group 1 (solid) Standard.

.3 Colours and Profiles
  .1 As selected by Owner's Representative from full range of manufacturer’s colours and profiles if not specifically indicated in the *Interior Finishes Legend*.

2.3 RESILIENT STAIR ACCESSORIES

.1 Refer to drawings to determine if resilient stair accessories are required and if so, the required locations.

.2 Resilient Stair Treads: to ASTM F 2169.
  .1 Material
    .1 Type TS (rubber, vulcanized thermoset) or Type TP (rubber, thermoplastic); unless otherwise noted.

.2 Surface Design
  .1 Class 1, Smooth (flat): to be used only when specifically indicated
  .2 Class 2, Pattern: choose any one of the following patterns, unless otherwise noted on drawings.
    .1 Raised disc design
    .2 Raised-square design
    .3 Raised-chevron design
    .4 Raised-diamond design
    .5 Raised-rib design
.3 Nosing
  .1 Complete with contrasting colour, embedded abrasive strips, unless otherwise indicated.
  .2 Square profile, adjustable to cover angles between 60 and 90 degrees, unless otherwise indicated.
  .3 Height: as required to completely cover stair nosing.
.4 Riser
  .1 Integral with thread cover, full height of stair riser.
.5 Thickness
  .1 6 mm and tapered to back edge.
.6 Size
  .1 Lengths and depths to fit each stair tread in one piece or, for treads exceeding maximum lengths manufactured, in equal-length units.

.3 Stringers
  .1 Same thickness as risers; height and length after cutting to fit risers and treads and to cover stair stringers.
  .2 Produced by same manufacturer as treads and recommended by manufacturer for installation with treads.

.4 Colours and Patterns
  .1 As selected by Owner's Representative from full range of industry colours if not specifically indicated in the *Interior Finishes Legend*.

2.4 RESILIENT MOULDING ACCESSORY

.1 Description
  .1 Cap for cove carpet
  .2 Cap for cove resilient floor covering
  .3 Carpet edge for glue-down applications
  .4 Nosing for carpet
  .5 Nosing for resilient floor covering
  .6 Reducer strip for resilient floor covering
  .7 Joiner for tile and carpet
  .8 Transition strips.

.2 Material
  .1 Rubber.

.3 Profile and Dimensions
  .1 As required, absolute minimal height.

.4 Colours and Patterns
  .1 As selected by Owner's Representative from full range of industry colours if not specifically indicated in the *Interior Finishes Legend*.

2.5 INSTALLATION MATERIALS

.1 Trowelable Levelling and Patching Compounds
.1 Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

.2 Adhesives
.1 Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
.2 Use adhesives that comply with the following limits for VOC content:
.1 Cove Base Adhesives: Not more than 50 g/L.
.2 Rubber Floor Adhesives: Not more than 60 g/L.

.3 Stair-Tread-Nose Filler
.1 Two-part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates that do not conform to tread contours.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

.2 Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

.3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

.2 Concrete Substrates for Resilient Stair Treads and Accessories: Prepare according to ASTM F 710.
.1 Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
.2 Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
.3 Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
.4 Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

.3 Fill cracks, holes, and depressions in substrates with trowelable levelling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

.4 Do not install resilient products until they are same temperature as the space where they are to be installed.
.1 Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

.5 Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

.1 Comply with manufacturer's written instructions for installing resilient base.

.2 Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

.3 Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

.4 Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

.5 Do not stretch resilient base during installation.

.6 On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

.7 Preformed Corners: Install preformed corners before installing straight pieces.

.8 Job-Formed Corners:
- .1 Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discolouration (whitening) at bends.
- .2 Inside Corners: Use straight pieces of maximum lengths possible.

3.4 RESILIENT ACCESSORY INSTALLATION

.1 Comply with manufacturer's written instructions for installing resilient accessories.

.2 Resilient Stair Accessories:
- .1 Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
- .2 Tightly adhere to substrates throughout length of each piece.
- .3 For treads installed as separate, equal-length units, install to produce a flush joint between units.

.3 Resilient Moulding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

.1 Comply with manufacturer's written instructions for cleaning and protection of resilient products.

.2 Perform the following operations immediately after completing resilient product installation:
- .1 Remove adhesive and other blemishes from exposed surfaces.
- .2 Sweep and vacuum surfaces thoroughly.
- .3 Damp-mop surfaces to remove marks and soil.

.3 Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

.4 Cover resilient products until Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:
  .1 Surface preparation and the application of paint systems on the following interior substrates:
    .1 Concrete.
    .2 Clay masonry.
    .3 Concrete masonry units (CMU).
    .4 Steel.
    .5 Galvanized metal.
    .6 Aluminum (not anodized or otherwise coated).
    .7 Wood.
    .8 Gypsum board.
    .9 Plaster.
    .10 Spray-textured ceilings.
    .11 Cotton or canvas insulation covering.

.2 Types of items you will not find described in this Section:
  .1 Wood stains and transparent finishes.
  .2 Shop priming of metal substrates with primers specified in this Section.
  .3 Shop priming carpentry with primers specified in this Section.
  .4 Factory finishing of steel doors and frames and of wood doors; where specified.
  .5 Gypsum board spackling.
  .6 Special-use coatings.
  .7 Intumescent painting.
  .8 Surface preparation and the application of paint systems on exterior substrates.
  .9 Surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

.3 Scope of Work of this Contract
  .1 While drawings and schedules identify locations for some finishes, the scope of work entails painting all of the following interior surfaces:
    .1 All surfaces explicitly noted to be painted.
    .2 All surfaces scheduled to be covered with wall coverings.
    .3 All unfinished surfaces that are either exposed-to-view or semi-exposed-to-view and not otherwise scheduled to receive another type of finish, excluding finished hardwood; unless otherwise noted.
  .2 Specifically, do not paint any of the following surfaces:
    .1 Grating.
    .2 Concrete floors, unless specifically indicated.
    .3 Stainless steel.
    .4 Aluminum handrail and aluminum stair and ladder components.
    .5 PVC, rubber, copper, bronze or brass surfaces.

1.2 DEFINITIONS

.1 Concealed Surface: A surface that cannot be seen because the view from any angle is obstructed by an immovable object.

.2 Exposed and semi-exposed surface: Any surface that is not a concealed surface.

.3 Finish: a final surface treatment intended to enhance the appearance of a substrate or protect it from the adverse effects of its environmental, or both, and includes but is not limited to paint, stains, coatings, laminates, tiles, fabrics and carpets.
.1 Primer finish is not considered a finish.

.4 Unfinished Surface: A surface having no Finish.

1.3 SUBMITTALS

.1 Product Data: For each type of product indicated.

.2 Samples for Verification: For each type of paint system and in each colour and gloss of topcoat indicated.
.1 Submit Samples on rigid backing, 200 mm square.
.2 Step coats on Samples to show each coat required for system.
.3 Label each coat of each Sample.
.4 Label each Sample for location and application area.

.3 Product List: For each product indicated, include the following:
.1 Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

.4 Sustainability Submittal:
.1 Product Data for paints, including printed statement of VOC content and chemical components.

1.4 QUALITY ASSURANCE

.1 MPI Standards:
.1 Products: Complying with MPI standards indicated and listed in *MPI Approved Products List*.
.2 Preparation and Workmanship: Comply with requirements in *MPI Architectural Painting Specification Manual* for products and paint systems indicated.

.2 Mock-ups: While paint colours may be specifically indicated in the documents, still proceed with mock-ups. Apply benchmark samples of each paint system indicated and each colour and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
.1 Owner's Representative will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
.1 Wall and Ceiling Surfaces: Provide samples of at least 9 sq. m.
.2 Other Items: Owner's Representative will designate items or areas required.
.2 Apply benchmark samples after permanent lighting and other environmental services have been activated.
.3 Final approval of colour selections will be based on benchmark samples.
.1 If preliminary colour selections are not approved, apply additional benchmark samples of additional colours selected by Owner's Representative at no added cost to Owner.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 7 deg C.
.1 Maintain containers in clean condition, free of foreign materials and residue.
.2 Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

.1 Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 10 and 35 deg C.

.2 Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 3 deg C above the dew point; or to damp or wet surfaces.

1.7 EXTRA MATERIALS

.1 Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
.1 Quantity: Furnish an additional 5 percent, but not less than 3.8 L of each material and colour applied.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

.1 Material Compatibility:
.1 Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
.2 For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

.2 VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colourants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
.1 Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
.2 Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
.3 Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
.4 Floor Coatings: VOC not more than 100 g/L.
.5 Shellacs, Clear: VOC not more than 730 g/L.
.6 Shellacs, Pigmented: VOC not more than 550 g/L.
.7 Flat Topcoat Paints: VOC content of not more than 50 g/L.
.8 Nonflat Topcoat Paints: VOC content of not more than 150 g/L.
.9 Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
.10 Floor Coatings: VOC not more than 100 g/L.
.11 Shellacs, Clear: VOC not more than 730 g/L.
.12 Shellacs, Pigmented: VOC not more than 550 g/L.
.13 Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
.14 Dry-Fog Coatings: VOC content of not more than 400 g/L.
.15 Zinc-Rich Industrial Maintenance Primers: VOC content of not more than 340 g/L.
.16 Pre-Treatment Wash Primers: VOC content of not more than 420 g/L.

.3 Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
.1 Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

.2 Restricted Components: Paints and coatings shall not contain any of the following:
- .1 Acrolein.
- .2 Acrylonitrile.
- .3 Antimony.
- .4 Benzene.
- .5 Butyl benzyl phthalate.
- .6 Cadmium.
- .7 Di (2-ethylhexyl) phthalate.
- .8 Di-n-butyl phthalate.
- .9 Di-n-octyl phthalate.
- .10 1,2-dichlorobenzene.
- .11 Diethyl phthalate.
- .12 Dimethyl phthalate.
- .13 Ethylbenzene.
- .14 Formaldehyde.
- .15 Hexavalent chromium.
- .16 Isophorone.
- .17 Lead.
- .18 Mercury.
- .19 Methyl ethyl ketone.
- .20 Methyl isobutyl ketone.
- .21 Methylene chloride.
- .22 Naphthalene.
- .23 Toluene (methylbenzene).
- .24 1,1,1-trichloroethane.
- .25 Vinyl chloride.

.4 Colours: Refer to *Interior Finishes Legend*. When no colour is identified, then selected by Owner's Representative.
- .1 M&E equipment: Assume no colour coding required unless otherwise indicated in mechanical and electrical specification sections.
- .2 Where no colour is identified, Owner's Representative shall chose up to a combination of 8 colours in each suite. Colours can be a combination of main and accent colours in each room.

.5 Gloss Levels: As determined by Owner's Representative.

2.2 BLOCK FILLERS

.1 Interior/Exterior Latex Block Filler: MPI #4.
- .1 VOC Content: E Range of E3.

2.3 PRIMERS/SEALERS

.1 Interior Latex Primer/Sealer: MPI #50.
- .1 VOC Content: E Range of E3.
- .2 Environmental Performance Rating: EPR 3.

.2 Interior Alkyd Primer/Sealer: MPI #45.
- .1 VOC Content: E Range of E2.

.3 Wood-Knot Sealer: Sealer recommended in writing by topcoat manufacturer for use in paint systems indicated.

2.4 METAL PRIMERS

.1 Alkyd Anticorrosive Metal Primer: MPI #79.
.1 VOC Content: E Range of E2.

.2 Quick-Drying Alkyd Metal Primer: MPI #76.
.1 VOC Content: E Range of E3.

.3 Rust-Inhibitive Primer (Water Based): MPI #107.
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 3.

.4 Cementitious Galvanized-Metal Primer: MPI #26.
.1 VOC Content: E Range of E1.

.5 Waterborne Galvanized-Metal Primer: MPI #134.
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 3.

.6 Vinyl Wash Primer: MPI #80.
.1 VOC Content: E Range of E3.

.7 Quick-Drying Primer for Aluminum: MPI #95.
.1 VOC Content: E Range of E3.

2.5 WOOD PRIMERS

.1 Interior Latex-Based Wood Primer: MPI #39.
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 3.

2.6 LATEX PAINTS

.1 Interior Latex (Flat): MPI #53 (Gloss Level 1).
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 2.5.

.2 Interior Latex (Low Sheen): MPI #44 (Gloss Level 2).
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 3.

.3 Interior Latex (Eggshell): MPI #52 (Gloss Level 3).
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 3.

.4 Interior Latex (Satin): MPI #43 (Gloss Level 4).
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 3.5.

.5 Interior Latex (Semigloss): MPI #54 (Gloss Level 5).
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 4.

.6 Interior Latex (Gloss): MPI #114 (Gloss Level 6, except minimum gloss of 65 units at 60 deg).
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 4.

.7 Institutional Low-Odour/VOC Latex (Flat): MPI #143 (Gloss Level 1).
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 5.5.

.8 Institutional Low-Odour/VOC Latex (Low Sheen): MPI #144 (Gloss Level 2).
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 4.5.

.9 Institutional Low-Odour/VOC Latex (Eggshell): MPI #145 (Gloss Level 3).
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 4.5.

.10 Institutional Low-Odour/VOC Latex (Semigloss): MPI #147 (Gloss Level 5).
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 5.5.

.11 High-Performance Architectural Latex (Low Sheen): MPI #138 (Gloss Level 2).
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 6.

.12 High-Performance Architectural Latex (Eggshell): MPI #139 (Gloss Level 3).
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 6.

.13 High-Performance Architectural Latex (Satin): MPI #140 (Gloss Level 4).
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 6.5.

.14 High-Performance Architectural Latex (Semigloss): MPI #141 (Gloss Level 5).
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 7.

.15 Exterior Latex (Flat): MPI #10 (Gloss Level 1).
.1 VOC Content: E Range of E3.

.16 Exterior Latex (Semigloss): MPI #11 (Gloss Level 5).
.1 VOC Content: E Range of E3.

.17 Exterior Latex (Gloss): MPI #119 (Gloss Level 6, except minimum gloss of 65 units at 60 deg).
.1 VOC Content: E Range of E3.

2.7 ALKYD PAINTS

.1 Interior Alkyd (Flat): MPI #49 (Gloss Level 1).
.1 VOC Content: E Range of E3.

.2 Interior Alkyd (Eggshell): MPI #51 (Gloss Level 3).

.1 VOC Content: E Range of E2.

.3 Interior Alkyd (Semigloss): MPI #47 (Gloss Level 5).
.1 VOC Content: E Range of E2.
.2 Environmental Performance Rating: EPR 3.

.4 Interior Alkyd (Gloss): MPI #48 (Gloss Level 6).
.1 VOC Content: E Range of E2.

2.8 QUICK-DRYING ENAMELS

.1 Quick-Drying Enamel (Semigloss): MPI #81 (Gloss Level 5).
.1 VOC Content: E Range of E3.

.2 Quick-Drying Enamel (High Gloss): MPI #96 (Gloss Level 7).
.1 VOC Content: E Range of E3.

2.9 TEXTURED COATING

.1 Latex Stucco and Masonry Textured Coating: MPI #42.
.1 VOC Content: E Range of E3.

2.10 DRY FOG/FALL COATINGS

.1 Latex Dry Fog/Fall: MPI #118.
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 3.

.2 Waterborne Dry Fall: MPI #133.
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 3.

.3 Interior Alkyd Dry Fog/Fall: MPI #55.
.1 VOC Content: E Range of E3.

2.11 ALUMINUM PAINT

.1 Aluminum Paint: MPI #1.
.1 VOC Content: E Range of E3.

2.12 FLOOR COATINGS

.1 Interior Concrete Floor Stain: MPI #58.
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 2.

.2 Interior/Exterior Clear Concrete Floor Sealer (Water Based): MPI #99.
.1 VOC Content: E Range of E3.

.3 Interior/Exterior Clear Concrete Floor Sealer (Solvent Based): MPI #104.
.1 VOC Content: E Range of E2.

.4 Interior/Exterior Latex Floor and Porch Paint (Low Gloss): MPI #60 (maximum Gloss Level 3).
.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 3.

.5 Exterior/Interior Alkyd Floor Enamel (Gloss): MPI #27 (Gloss Level 6).
.1 VOC Content: E Range of E2.
.2 Additives: Manufacturer's standard additive to increase skid resistance of painted surface.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

.2 Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
.1 Concrete: 12 percent.
.2 Masonry (Clay and CMU): 12 percent.
.3 Wood: 15 percent.
.4 Gypsum Board: 12 percent.
.5 Plaster: 12 percent.

.3 Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

.4 Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
.1 Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

.1 Comply with manufacturer's written instructions and recommendations in *MPI Architectural Painting Specification Manual* applicable to substrates indicated.

.2 Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
.1 After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
.2 Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

.3 Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
.1 Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

.4 Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

.5 Clay Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content of surfaces or alkalinity of mortar joints to be painted exceed that permitted in manufacturer's written instructions.

.6 Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

.7 Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

.8 Aluminum Substrates: Remove surface oxidation.

.9 Wood Substrates:
- .1 Scrape and clean knots, and apply coat of knot sealer before applying primer.
- .2 Sand surfaces that will be exposed to view, and dust off.
- .3 Prime edges, ends, faces, undersides, and backsides of wood.
- .4 After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

.10 Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

.11 Plaster Substrates: Do not begin paint application until plaster is fully cured and dry.

.12 Spray-Textured Ceiling Substrates: Do not begin paint application until surfaces are dry.

.13 Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

.1 Apply paints according to manufacturer's written instructions.
- .1 Use applicators and techniques suited for paint and substrate indicated.
- .2 Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
- .3 Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

.2 Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match colour of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

.3 If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, colour, and appearance.

.4 Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and colour breaks.

.5 Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
- .1 Mechanical Work:
  - .1 Uninsulated metal piping.
  - .2 Uninsulated plastic piping.
  - .3 Pipe hangers and supports.
  - .4 Tanks that do not have factory-applied final finishes.

.5 Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
.6 Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
.7 Mechanical equipment that is indicated to have a factory-primed finish for field painting.

.2 Electrical Work:
.1 Galvanized and steel conduits.
.2 Electrical equipment that is indicated to have a factory-primed finish for field painting.

3.4 CLEANING AND PROTECTION

.1 At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

.2 After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

.3 Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Owner's Representative, and leave in an undamaged condition.

.4 At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 INTERIOR PAINTING SCHEDULE

.1 Propose paint system for any surfaces not listed. Propose paint system consisting of a minimum of a prime coat, intermediate coat, and topcoat.

.2 Concrete Substrates, Nontraffic Surfaces:
.1 High-Performance Architectural Latex System: MPI INT 3.1C.
.1 Prime Coat: Interior latex primer/sealer.
.2 Intermediate Coat: High-performance Architectural latex matching topcoat.
.3 Topcoat: High-performance Architectural latex.

.3 Concrete Substrates, Traffic Surfaces:
.1 Alkyd Floor Enamel System: MPI INT 3.2B.
.1 Prime Coat: Exterior/interior alkyd floor enamel.
.2 Intermediate Coat: Exterior/interior alkyd floor enamel.
.3 Topcoat: Exterior/interior alkyd floor enamel.

.4 Clay-Masonry Substrates:
.1 High-Performance Architectural Latex System: MPI INT 4.1L.
.1 Prime Coat: High-performance Architectural latex matching topcoat.
.2 Intermediate Coat: High-performance Architectural latex matching topcoat.
.3 Topcoat: High-performance Architectural latex .

.5 CMU Substrates:
.1 High-Performance Architectural Latex System: MPI INT 4.2D.
.1 Prime Coat: Interior/exterior latex block filler.
.2 Intermediate Coat: High-performance Architectural latex matching topcoat.
.3 Topcoat: High-performance Architectural latex .

.6 Steel Pipes filled with liquids, including but not limited to sprinkler pipes:
.1 Alkyd System: MPI INT 5.1E.

.1 Prime Coat: Alkyd anticorrosive metal primer.
.2 Intermediate Coat: Interior alkyd matching topcoat.
.3 Topcoat: Interior alkyd

.7 Galvanized Metal Pipes filled with liquids, including but not limited to sprinkler pipes:
.1 Alkyd System: MPI INT 5.3C.
.1 Prime Coat: Cementitious galvanized-metal primer.
.2 Intermediate Coat: Interior alkyd matching topcoat.
.3 Topcoat: Interior alkyd

.8 Steel Substrates:
.1 High-Performance Architectural Latex System: MPI INT 5.1R.
.1 Prime Coat: Alkyd anticorrosive metal primer.
.2 Intermediate Coat: High-performance Architectural latex matching topcoat.
.3 Topcoat: High-performance Architectural latex.

.9 Galvanized-Metal Substrates:
.1 High-Performance Architectural Latex System: MPI INT 5.3M.
.1 Prime Coat: Waterborne galvanized-metal primer.
.2 Intermediate Coat: High-performance Architectural latex matching topcoat.
.3 Topcoat: High-performance Architectural latex .

.10 Aluminum (Not Anodized or Otherwise Coated) Substrates:
.1 High-Performance Architectural Latex System: MPI INT 5.4F.
.1 Prime Coat: Quick-drying primer for aluminum.
.2 Intermediate Coat: High-performance Architectural latex matching topcoat.
.3 Topcoat: High-performance Architectural latex.

.11 Glue-Laminated Beam and Column Substrates:
.1 High-Performance Architectural Latex System: MPI INT 6.1N.
.1 Prime Coat: Interior latex-based wood primer.
.2 Intermediate Coat: High-performance Architectural latex matching topcoat.
.3 Topcoat: High-performance Architectural latex .

.12 Dressed Lumber Substrates: Including Architectural woodwork and doors.
.1 High-Performance Architectural Latex System: MPI INT 6.3A.
.1 Prime Coat: Interior latex-based wood primer.
.2 Intermediate Coat: High-performance Architectural latex matching topcoat.
.3 Topcoat: High-performance Architectural latex.

.13 Wood Panel Substrates: Including painted plywood, medium-density fiberboard, and hardboard.
.1 High-Performance Architectural Latex System: MPI INT 6.4S.
.1 Prime Coat: Interior latex-based wood primer.
.2 Intermediate Coat: High-performance Architectural latex matching topcoat.
.3 Topcoat: High-performance Architectural latex.

.14 Dimension Lumber Substrates, Nontraffic Surfaces: Including exposed joists and exposed beams.
.1 High-Performance Architectural Latex System: MPI INT 6.2B.
.1 Prime Coat: Interior alkyd primer/sealer.
.2 Intermediate Coat: High-performance Architectural latex matching topcoat.
.3 Topcoat: High-performance Architectural latex.

.15 Wood Substrates, Traffic Surfaces:
- .1 Latex Floor Paint System: MPI INT 6.5G.
  - .1 Prime Coat: Interior alkyd primer/sealer.
  - .2 Intermediate Coat: Interior/exterior latex floor and porch paint.
  - .3 Topcoat: Interior/exterior latex floor and porch paint.

.16 Gypsum Board Substrates:
- .1 High-Performance Architectural Latex System: MPI INT 9.2B.
  - .1 Prime Coat: Interior latex primer/sealer.
  - .2 Intermediate Coat: High-performance Architectural latex matching topcoat.
  - .3 Topcoat: High-performance Architectural latex.

.17 Plaster Substrates:
- .1 High-Performance Architectural Latex System: MPI INT 9.2B.
  - .1 Prime Coat: Interior latex primer/sealer.
  - .2 Intermediate Coat: High-performance Architectural latex matching topcoat.
  - .3 Topcoat: High-performance Architectural latex.

.18 Spray-Textured Ceiling Substrates:
- .1 Latex System: MPI INT 9.1E, spray applied.
  - .1 Prime Coat: Interior latex matching topcoat.
  - .2 Intermediate Coat: Interior latex matching topcoat.
  - .3 Topcoat: Interior latex.

.19 Cotton or Canvas Insulation-Covering Substrates: Including pipe and duct coverings.
- .1 Latex System: MPI INT 10.1A.
  - .1 Prime Coat: Interior latex matching topcoat.
  - .2 Intermediate Coat: Interior latex matching topcoat.
  - .3 Topcoat: Interior latex.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

.1 Types of items described in this Section:
  .1 Surface preparation and the application of wood finishes on the following substrates:
    .1 Interior substrates consisting of dressed lumber (finish carpentry).

.2 Types of items you will not find described in this Section:
  .1 Stains and transparent finishes applied to wood flooring.
  .2 Surface preparation and application of standard paint systems on exterior substrates.
  .3 Surface preparation and application of standard paint systems on interior substrates.
  .4 Factory-applied finishes over interior architectural millwork.

.3 Scope of Work of this Contract:
  .1 Apply stain on interior wood substrates indicated.
  .2 Apply a transparent finish on interior wood substrates indicated and other interior hardwood substrates not otherwise indicated to receive a finish.

1.3 SUBMITTALS

.1 Product Data: For each type of product indicated.

.2 Samples for Verification: For each type of finish system and in each colour and gloss of finish indicated.
  .1 Submit Samples on representative samples of actual wood substrates, 200 mm square.
  .2 Label each Sample for location and application area.

.3 Product List: For each product indicated, include the following:
  .1 Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules.
  .2 Printout of MPI's current *MPI Approved Products List* for each product category specified in Part 2, with the product proposed for use highlighted.

1.4 QUALITY ASSURANCE

.1 MPI Standards:
  .1 Products: Complying with MPI standards indicated and listed in its *MPI Approved Products List*.
  .2 Preparation and Workmanship: Comply with requirements in *MPI Architectural Painting Specification Manual* for products and finish systems indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 7 deg C.
  .1 Maintain containers in clean condition, free of foreign materials and residue.
  .2 Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

.1 Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 10 and 35 deg C.

.2 Do not apply exterior finishes in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 3 deg C above the dew point; or to damp or wet surfaces.

1.7 EXTRA MATERIALS

.1 Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
  .1 Quantity: Furnish an additional 5 percent, but not less than 3.8 L of each material and colour applied.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

.1 Material Compatibility:
  .1 Provide materials for use within each finish system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  .2 For each coat in a finish system, provide products recommended in writing by manufacturers of topcoat for use in finish system and on substrate indicated.

2.2 WOOD FILLERS

.1 Wood Filler Paste: MPI #91.

2.3 STAINS

.1 Interior Wood Stain (Semitransparent): MPI #90.

2.4 POLYURETHANE FINISHES

.1 Moisture-Cured Clear Polyurethane (Flat): MPI #71, Gloss Level 1.

.2 Moisture-Cured Clear Polyurethane (Gloss): MPI #31.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
  .1 Maximum Moisture Content of Wood Substrates: 15 percent when measured with an electronic moisture meter.
  .2 Verify compatibility with and suitability of substrates, including compatibility with existing finishes.
  .3 Begin finish application only after unsatisfactory conditions have been corrected and surfaces are dry.
  .4 Beginning application of finish system constitutes Contractor's acceptance of substrate and conditions.

3.2 PREPARATION

.1 Comply with manufacturer's written instructions and recommendations in *MPI Architectural Painting Specification Manual* applicable to substrates indicated.

.2 Remove plates, machined surfaces, and similar items already in place that are not to be finished. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.
.1 After completing finishing operations, reinstall items that were removed; use workers skilled in the trades involved. Remove surface-applied protection if any.

.3 Clean and prepare surfaces to be finished according to manufacturer's written instructions for each particular substrate condition and as specified.
.1 Remove surface dirt, oil, or grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibres by brushing.
.2 Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.
.3 Countersink steel nails, if used, and fill with putty tinted to final colour to eliminate rust leach stains.

.4 Apply wood filler paste to open-grain woods, as defined in *MPI Architectural Painting Specification Manual*, to produce smooth, glasslike finish.

3.3 APPLICATION

.1 Apply finishes according to manufacturer's written instructions.
.1 Use applicators and techniques suited for finish and substrate indicated.
.2 Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.

.2 Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 FIELD QUALITY CONTROL

.1 Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when finishes are being applied:
.1 Owner will engage the services of a qualified testing agency to sample finish materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
.2 Testing agency will perform tests for compliance with product requirements.
.3 Owner may direct Contractor to stop applying finishes if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying materials from Project site, pay for testing, and refinish surfaces finished with rejected materials. Contractor will be required to remove rejected materials from previously finished surfaces if, on refinishing with complying materials, the two finishes are incompatible.

3.5 CLEANING AND PROTECTION

.1 At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

.2 After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

.3 Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Departmental Representative, and leave in an undamaged condition.

.4 At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

3.6 INTERIOR WOOD-FINISH-SYSTEM SCHEDULE

.1 Finish Carpentry Wood Substrates:
- .1 Moisture-Cured Clear Polyurethane Over Stain System: MPI INT 6.3Y.
  - .1 Stain Coat: Interior wood stain (semitransparent).
  - .2 Three Finish Coats: Moisture-cured clear polyurethane .
- .2 Moisture-Cured Clear Polyurethane System: MPI INT 6.3X.
  - .1 Three Finish Coats: Moisture-cured clear polyurethane.

3.7 SCHEDULE OF TRANSPARENT FINISH GLOSSES

.1 Confirm finish gloss levels with Departmental Representative prior to commencing work. Finish gloss levels listed below are tentative only.

.2 Specific glosses for specific surfaces may be indicated on drawings as per MPI guidelines, as follows:
- .1 **G1** / Level 1 – Traditional matte.
- .2 **G2** / Level 2 – High-side sheen, flat, velvet.
- .3 **G3** / Level 3 – Traditional eggshell.
- .4 **G4** / Level 4 – Satin.
- .5 **G5** / Level 5 – Traditional semi-gloss.
- .6 **G6** / Level 6 – Traditional gloss.
- .7 **G7** / Level 7 – High gloss.

3.8 SCHEDULE OF FINISH COLOURS

.1 See drawings for wood stain and transparent finish colours.
- .1 Confirm finish colours with Owner's Representative prior to commencing work. Finish colours listed are tentative only.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

.1 Types of items described in this Section:
  .1 Steel toilet compartments configured as toilet enclosures, entrance screens, and urinal screens – floor mounted and overhead braced.

.2 Types of items you will not find described in this Section:
  .1 Steel toilet compartments configured – ceiling mounted and floor mounted.
  .2 Stainless-steel toilet compartments.
  .3 Plastic-laminate-faced toilet compartments.
  .4 Phenolic-core toilet compartments.
  .5 Solid-polymer toilet compartments.
  .6 Metal fabrications for supports that attach ceiling-hung compartments, floor-and-ceiling-anchored compartments, and post-to-ceiling screens to overhead structural system.
  .7 Rough carpentry for blocking, overhead support of floor-and-ceiling-anchored compartments and overhead support of post-to-ceiling screens.
  .8 Toilet, bath, and laundry accessories for toilet tissue dispensers, grab bars, purse shelves, and similar accessories.

1.3 SUBMITTALS

.1 Product Data
  .1 For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

.2 Shop Drawings
  .1 For toilet compartments. Include plans, elevations, sections, details, and attachments to other work.
    .1 Show locations of cut-outs for compartment-mounted toilet accessories.
    .2 Show locations of reinforcements for compartment-mounted grab bars.
    .3 Show locations of centerlines of toilet fixtures.
    .4 Show overhead support or bracing locations.

.3 Samples for Verification
  .1 For the following products, in manufacturer's standard sizes unless otherwise indicated:
    .1 Each type of material, colour, and finish required for units, prepared on 152 mm square Samples of same thickness and material indicated for Work.

.4 Maintenance Data
  .1 For toilet compartments to include in maintenance manuals.

1.4 QUALITY ASSURANCE

.1 Regulatory Requirements: Comply with applicable barrier free/accessibility regulations for toilet compartments designated as accessible.

1.5 PROJECT CONDITIONS

.1 Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Aluminium Castings
.1 ASTM B 26/B 26M.

.2 Aluminium Extrusions
.1 ASTM B 221M.

.3 Brass Castings
.1 ASTM B 584.

.4 Brass Extrusions
.1 ASTM B 455.

.5 Steel Sheet
.1 Commercial steel sheet for exposed applications; mill phosphatized and selected for smoothness.
.1 Electrolytically Zinc Coated: ASTM A 879/A 879M, 03G.
.2 Hot-Dip Galvanized: ASTM A 653/A 653M, either hot-dip galvanized or galvannealed.

.6 Stainless-Steel Sheet
.1 ASTM A 666, Type 304, stretcher-levelled standard of flatness.

.7 Stainless-Steel Castings
.1 ASTM A 743/A 743M.

.8 Zamac
.1 ASTM B 86, commercial zinc-alloy die castings.

2.2 STEEL UNITS

.1 Toilet-Enclosure Style
.1 Overhead braced.

.2 Entrance-Screen Style
.1 Floor and ceiling anchored.

.3 Urinal-Screen Style
.1 Wall hung with integral flanges.

.4 Door, Panel, and Pilaster Construction
.1 Seamless, metal facing sheets pressure laminated to core material; with continuous, interlocking moulding strip or lapped-and-formed edge closures; corners secured by welding or clips and exposed welds ground smooth. Exposed surfaces shall be free of pitting, seam marks, roller marks, stains, discolourations, telegraphing of core material, or other imperfections. Pilasters height to be 2083mm minimum.

.1 Core Material: Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 25 mm for doors and panels and 32 mm for pilasters.
.2 Grab-Bar Reinforcement: Provide concealed internal reinforcement for grab bars mounted on units.
.3 Tapping Reinforcement: Provide concealed reinforcement for tapping (threading) at locations where machine screws are used for attaching items to units.

.5 Urinal-Screen Construction
.1 Integral-Flange, Wall-Hung Urinal Screen: Similar to panel construction, with integral full-height flanges for wall attachment, and maximum 32 mm thick.

.6 Facing Sheets and Closures
.1 Electrolytically coated or hot-dip galvanized-steel sheet with nominal base-metal (uncoated) thicknesses as follows:
.1 Pilasters, Braced at Both Ends: Manufacturer's standard thickness, but not less than 0.91 mm.
.2 Pilasters, Unbraced at One End: Manufacturer's standard thickness, but not less than 1.21 mm.
.3 Panels: Manufacturer's standard thickness, but not less than 0.76 mm.
.4 Doors: Manufacturer's standard thickness, but not less than 0.76 mm.
.5 Flat-Panel Urinal Screens: Thickness matching the panels.
.6 Integral-Flange, Wall-Hung Urinal Screens: Manufacturer's standard thickness, but not less than 0.76 mm.

.7 Pilaster Shoes and Sleeves (Caps)
.1 Stainless-steel sheet, not less than 0.79 mm nominal thickness and 76 mm high, finished to match hardware.

.8 Brackets (Fittings)
.1 Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel or aluminium.

.9 Steel-Sheet Finish
.1 Immediately after cleaning and pretreating, apply manufacturer's standard baked-on finish, including thermosetting, electrostatically applied, and powder coatings. Comply with coating manufacturer's written instructions for applying and baking. Apply one colour in each room.
.1 Refer to drawings for colours.
.1 If colours are not indicated on drawings, selected by Owner's Representative from manufacturer’s full line of standard colours and patterns.

.10 No-Sight System:
.1 Integral to door Powder coated to match partition color, add on no sight strips constructed on brushed steel or aluminum, or door designed with interlocking, sightline free design.

2.3 ACCESSORIES

.1 Hardware and Accessories
.1 Manufacturer's standard design, heavy-duty operating hardware and accessories.
.2 Material
.1 Stainless steel.
.3 Hinges
.1 Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.
.4 Latch and Keeper

.1 Manufacturer's standard surface-mounted sliding latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Do not provide twist-type latches. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.

.5 Coat Hook
.1 Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.

.6 Door Bumper
.1 Manufacturer's standard rubber-tipped bumper at out-swinging doors.

.7 Door Pull
.1 Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.

.2 Overhead Bracing
.1 Manufacturer's standard continuous, extruded-aluminium head rail with antigrip profile and in manufacturer's standard finish.

.3 Anchorages and Fasteners
.1 Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel.

2.4 FABRICATION

.1 Overhead-Braced Units
.1 Provide manufacturer's standard corrosion-resistant supports, levelling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and levelling mechanism.

.2 Urinal-Screen Posts
.1 Provide manufacturer's standard corrosion-resistant anchoring assemblies with levelling adjustment at bottoms of posts. Provide shoes at posts to conceal anchorage.

.3 Door Size and Swings
.1 Unless otherwise indicated, provide 712 mm wide, in-swinging doors for standard toilet compartments and 914 mm wide, swinging doors as indicated on drawings with a minimum 850 mm wide, clear opening for compartments designated as accessible and limited mobility.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 General
.1 Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
.2 Maximum Clearances:
.1 Pilasters and Panels: 13 mm.
.2 Panels and Walls: 25 mm.

.2 Overhead-Braced Units
.1 Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 44 mm into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors

with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

.3 Urinal Screens

.1 Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.2 ADJUSTING

.1 Hardware Adjustment

.1 Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

.3 Section 06 10 00 - Rough Carpentry.

1.2 REFERENCES

.1 Aluminum Association (AA)

.1 DAF 45, Designation System for Aluminum Finishes.

1.3 SUBMITTALS

.1 Product Data

.1 Submit manufacturers printed product literature, specifications and data.

.2 Submit two copies of WHMIS MSDS – Material Safety Data Sheets. Indicate VOC's:

.1 For caulking materials during application and curing.

.2 For adhesives.

.2 Indicate, by large scale details, all materials, finishes, dimensions, anchorage and assembly.

.3 Submit 300 mm long samples of profiles and colours for corner and door frame and wall guards.

.4 Manufacturer's Instructions

.1 Submit manufacturer's installation instructions

PART 2 PRODUCTS

2.1 MATERIALS

.1 Vinyl corner guard: 76 mm x 76 mm x 1.98 mm thick, 1200 mm length, complete with end caps to match guard material, mechanically or adhesive mounted, color as selected by Owner's Representative. Locations as indicated on drawings.

.2 Wall bumper guard: vinyl to profiles indicated, complete with end caps to match wall bumper guard material, surface mechanically or adhesive mounted, colour as selected by Owner's Representative. See finish schedule and drawings for heights and locations.

.3 Door frame bumper guards: vinyl, profiled to fit door frame, colour selected by Owner's Representative. Model to fit door frame style. See door schedule for locations.

2.2 ACCESSORIES

.1 Fasteners: self-tapping stainless steel, concealed flush mounting.

.2 Adhesive: water resistant type as recommended by manufacturer for substrate.

2.3 FINISHES

.1 Finish exposed surfaces of aluminum components in accordance with Aluminum Designation System for Aluminum Finishes.

.2 Appearance and properties of anodized finishes designated by the Aluminum Association as Architectural Class 1, Architectural Class 2, and Protective and Decorative.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 INSTALLATION

.1 Install units on solid wood backing and erect with materials and components straight, tight and in alignment.

.2 Mechanically fasten/adhere wall guards at 200 mm on centre as indicated, straight and level to variation plus or minus 3 mm over 3000 mm straight edge, non-cumulative.

.3 Mechanically fasten/adhere corner guards at 200 mm on centre as indicated.

3.3 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

.2 Clean surfaces after installation using manufacturer's recommended cleaning procedures.

.3 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

.1 Provide Owner with instructions on cleaning.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

.1 Types of items described in this Section:
- .1 Public-use washroom accessories.
- .2 Public-use shower room accessories.
- .3 Childcare accessories.
- .4 Warm-air dryers.
- .5 Custodial accessories.

.2 Types of items you will not find described in this Section:
- .1 Private-use bathroom accessories.
- .2 Healthcare accessories.
- .3 Under lavatory guards.
- .4 Frameless mirrors.
- .5 Shower curtain rod and curtain in prefabricated shower stalls.
- .6 Shower grab bars in prefabricated shower stalls.
- .7 Residential Toilet, Bath, and Laundry Accessories
- .8 Accessories located inside shower and dressing compartments, but only when Division 10 Section *Shower and Dressing Compartments* is included in the Work.
- .9 Accessories designed for installation in inside secure areas of detention facilities.

1.3 SUBMITTALS

.1 Product Data: For each type of product indicated. Include the following:
- .1 Construction details and dimensions.
- .2 Anchoring and mounting requirements, including requirements for cut-outs in other work and substrate preparation.
- .3 Material and finish descriptions.
- .4 Features that will be included for Project.
- .5 Manufacturer's warranty.

.2 Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.4 QUALITY ASSURANCE

.1 Source Limitations: For products listed together in the same articles in Part 2, provide products of same manufacturer unless otherwise approved by Owner's Representative.

1.5 COORDINATION

.1 Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

.2 Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.6 WARRANTY

.1 Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
.1 Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Stainless Steel: ASTM A 666, Type 304, 0.8mm minimum nominal thickness, unless otherwise indicated.

.2 Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

.3 Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

.4 ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

.1 Manufacturers: Subject to compliance with requirements, provide stainless steel finished products by one of the following:
.1 Bobrick Washroom Equipment, Inc.
.2 Bradley Corporation.
.3 Alternative Products: Approved by addendum in accordance with the General Instructions to Bidders.

.2 Toilet Tissue Dispenser: (May also be referred to on drawings as **TTD)**
.1 Description: Double-roll toilet tissue dispenser with controlled delivery.
.2 Mounting: Surface mounted.
.3 Capacity: 2x 115mm diameter rolls.
.4 Material and Finish: Heavy-gauge chrome-plated steel with bright polish finish.
.5 Lockset: Vandal resistant self-locking mechanism and four heavy-duty brake springs.
.6 Acceptable Product: Bobrick B-265

.3 Paper Towel (Roll) Dispenser: (May also be referred to on drawings as **PTD**)
.1 Description: Pull -actuated mechanism permits controlled delivery of paper rolls in preset lengths per pull.
.2 Mounting: Surface mounted.
.3 Minimum Capacity: 205mm wide, 205mm diameter roll.
.4 Material and Finish: Stainless steel, No. 4 finish (satin) on exposed surfaces.
.5 Lockset: Tumbler type.
.6 Acceptable Product: Bobrick B-2860

.4 Waste Receptacle: (May also be referred to on drawings as **WR**)
.1 Mounting: Surface Mount.
.2 Minimum Capacity: 75 litres
.3 Material and Finish: Stainless steel, No. 4 finish (satin).
.4 Liner: Reusable vinyl liner.
.5 Acceptable Product: Bobrick B-275

.5 Soap Dispenser: (May also be referred to on drawings as **SD**)

.1 Owner Supplier.

.6 Grab Bar: (May also be referred to on drawings as **GB**)
- .1 Mounting: Flanges with concealed fasteners.
- .2 Material: Stainless steel, 1.3 mm thick.
  - .1 Finish: Smooth, No. 4, satin finish on ends and slip-resistant texture in grip area.
- .3 Outside Diameter: 32 mm.
- .4 Configuration and Length: As indicated on Drawings and as required by applicable barrier free regulations.
- .5 Provide grabs bars with sufficient extensions to accommodate exposed pipes and flush valves that would otherwise prevent the installation of the grab bar.
- .6 Acceptable Product: Bobrick B-5806 or approved alternate

.7 Sanitary-Napkin Disposal Unit: (May also be referred to on drawings as **SND**)
- .1 Mounting: Surface mounted.
- .2 Door or Cover: Piano Hinge
- .3 Material and Finish: Stainless steel, No. 4 finish (satin).
- .4 Acceptable Product: Bobrick B-270

.8 Mirror Unit - Framed: (May also be referred to on drawings as **M**)
- .1 Frame: Stainless-steel angle, 1.3 mm thick or stainless-steel channel.
  - .1 Corners: Manufacturer's standard.
- .2 Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
  - .1 One-piece, galvanized steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
  - .2 Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
- .3 Size: 610 x 914 mm unless otherwise indicated on drawings.

.9 Coat Hook: (May also be referred to on drawings as **CH**)
- .1 Description: Single-prong unit with large head.
- .2 Material and Finish: Stainless steel, No. 4 finish (satin).

2.3 PUBLIC-USE SHOWER ROOM ACCESSORIES

.1 Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- .1 Bobrick Washroom Equipment, Inc.
- .2 Bradley Corporation.
- .3 Or approved alternate

.2 Shower Curtain Rod: (May also be referred to on drawings as **SCR**)
- .1 Description: 32mm OD; fabricated from nominal 1.3 mm thick stainless steel.
- .2 Mounting Flanges: Stainless-steel flanges designed for exposed fasteners.
- .3 Finish: No. 4 (satin).

.3 Shower Curtain:
- .1 Size: Minimum 305 mm wider than opening by 1828 mm high.
- .2 Material: Nylon-reinforced vinyl, minimum 284-g or 0.2 mm thick vinyl, with integral antibacterial agent.
- .3 Colour: White.
- .4 Grommets: Corrosion resistant at minimum 152 mm o.c. through top hem.
- .5 Shower Curtain Hooks: Chrome-plated or stainless-steel, spring wire curtain hooks with snap fasteners, sized to accommodate specified curtain rod. Provide one hook per curtain grommet.

.4 Folding Shower Seat: (May also be referred to on drawings as **FSS**)
- .1 Configuration: L-shaped seat, designed for wheelchair access .
- .2 Seat: Phenolic or polymeric composite of slat-type or one-piece construction.
- .3 Mounting Mechanism: Stainless steel, No. 4 finish (satin).

.5 Soap Dish: (May also be referred to on drawings as **SD**)
- .1 Description: With washcloth bar.
- .2 Mounting: Surface mounted.
- .3 Material and Finish: Stainless steel, No. 4 finish (satin).

2.4 CHILDCARE ACCESSORIES

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

.2 Diaper-Changing Station: (May also be referred to on drawings as **DCS**)
- .1 Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
  - .1 Engineered to support a minimum of 113-kg static load when opened.
- .2 Mounting: Surface mounted, with unit projecting not more than 100 mm from wall when closed.
- .3 Operation: By pneumatic shock-absorbing mechanism.
- .4 Material and Finish: High-density polyethylene in manufacturer's standard colour .
- .5 Liner Dispenser: Built in.

.3 Child-Protection Seat: (May also be referred to on drawings as **CPS**)
- .1 Description: Unit that opens by folding down from stored position and with child-protection strap.
  - .1 Engineered to support a minimum of 68-kg static load when opened.
- .2 Mounting: Surface mounted, with unit projecting not more than 114 mm from wall when closed.
- .3 Material and Finish: High-density polyethylene in manufacturer's standard colour.

2.5 WARM-AIR DRYERS

.1 Motorized Hand Dryer: Drawing designation **HD**
- .1 Description: Airmax Series Hand Dryers as manufactured by World Dryer Corp.; or approved alternate.
- .2 Model: XM54-974
- .3 Mounting: Surface mounted.
- .4 Motor: 208V, 10 Amp, 2300 Watt.
- .5 Material and Finish: Cast Iron, White

2.6 CUSTODIAL ACCESSORIES

.1 Mop and Broom Holder: (May also be referred to on drawings as **MBH**)
- .1 Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
- .2 Length: 914 mm.
- .3 Hooks: Three.
- .4 Mop/Broom Holders: Four, spring-loaded, rubber hat, cam type.
- .5 Material and Finish: Stainless steel, No. 4 finish (satin).
  - .1 Shelf: Not less than nominal 1.3 mm thick stainless steel.
  - .2 Rod: Approximately 6 mm diameter stainless steel.

2.7 FABRICATION

.1 General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

.2 Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

.2 Grab Bars: Install to withstand a downward load of at least 1112 N, when tested according to method in ASTM F 446.

3.2 ADJUSTING AND CLEANING

.1 Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

.2 Remove temporary labels and protective coatings.

.3 Clean and polish exposed surfaces according to manufacturer's written recommendations.

3.3 LOCATION AND QUANTITY

.1 Where a Division 10 Section *Residential Toilet, Bath, and Laundry Accessories* is included in the Scope of Work of this Contract, provide residential accessories where residential accessories are specifically indicated on drawings and provide commercial accessories for all other locations.

.2 When Division 10 Section *Shower and Dressing Compartments* spec forms part of the Work, provide accessories specified in that Section inside shower and dressing compartments, otherwise provide accessories as outlined below.

.3 Locate accessories where indicated on drawings, but as a minimum not less than the following. Exact locations to be determined by the Owner's Representative.

- .1 Toilet tissue dispenser: one per toilet.
- .2 Paper towel dispenser: one per washroom.
- .3 Soap dispenser: one per wash basin.
- .4 Feminine napkin dispenser: one for each female washroom.
- .5 Feminine napkin disposal bin: one per toilet in washrooms designated for either universal or female use.
- .6 Shower curtain: one at each shower compartment.
- .7 Soap tray: one at each shower unit.
- .8 Grab bar: provide two grabs for
  - .1 Every single-toilet washroom greater than1500 mm x 1500 mm.
  - .2 Every toilet compartment wider than 900 mm.
  - .3 One shower per washroom.
  - .4 One urinal per washroom.
- .9 Robe hooks: two for each shower compartment.
- .10 Shower seat: one per shower stall per shower/washroom.

.11 Curtain holdback hook and chain: one at each shower curtain.
.12 Diaper changing station: one per washroom.
.13 Child-Protection seat: one per washroom.
.14 Mop and Broom Holder: one per custodial/janitor's closet.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction / Demolition Waste Management and Disposal.

.3 Section 01 78 00 - Closeout Submittals.

1.2 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop drawings; submit drawings stamped and signed for approval by Owner's Representative.

.3 Shop drawings to show:

- .1 Mounting arrangements.
- .2 Operating and maintenance clearances.

.4 Shop drawings and product data accompanied by:

- .1 Detailed drawings of bases, supports, and anchor bolts.
- .2 Acoustical sound power data, where applicable.
- .3 Points of operation on performance curves.
- .4 Manufacturer to certify current model production.
- .5 Certification of compliance to applicable codes.

.5 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.

.6 Closeout Submittals:

- .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Operation and maintenance manual approved by, and final copies deposited with, Owner's Representative before final inspection.
- .3 Operation data to include:
  - .1 Control schematics for systems including environmental controls.
  - .2 Description of systems and their controls.
  - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
  - .4 Operation instruction for systems and component.
  - .5 Description of actions to be taken in event of equipment failure.
  - .6 Valves schedule and flow diagram.
  - .7 Colour coding chart.

.4 Maintenance data to include:

.1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.

.2 Data to include schedules of tasks, frequency, tools required and task time.

.5 Performance data to include:

.1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.

.2 Equipment performance verification test results.

.3 Special performance data as specified.

.4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

.6 Approvals:

.1 Submit 2 copies of draft Operation and Maintenance Manual to Owner's Representative for approval. Submission of individual data will not be accepted unless directed by Owner's Representative.

.2 Make changes as required and re-submit as directed by Owner's Representative.

.7 Additional data:

.1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.

.8 Site records:

.1 Owner's Representative will provide 1 set of reproducible mechanical drawings or AutoCAD files. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.

.2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.

.3 Use different colour for each service.

.4 Make available for reference purposes and inspection.

.9 As-built drawings:

.1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.

.2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).

.3 Submit to Owner's Representative for approval and make corrections as directed.

.4 Perform testing, adjusting and balancing for HVAC using as-built drawings.

.5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

.10 Submit copies of as-built drawings for inclusion in final TAB report.

1.3 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.4 MAINTENANCE

.1 Furnish spare parts in accordance with Section 01 78 00 - Closeout Submittals as follows:

.1 One set of packing for each pump.

.2 One casing joint gasket for each size pump.

.3 One glass for each gauge glass.

.2 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 01 78 00 - Closeout Submittals.

.3 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 PRODUCTS

2.1 MATERIALS

.1 All materials used on this project shall be new and CSA approved unless noted otherwise.

PART 3 EXECUTION

3.1 PAINTING, REPAIRS AND RESTORATION

.1 Do painting in accordance with Section 09 91 23 - Interior Painting.

.2 Prime and touch up marred finished paintwork to match original.

.3 Restore to new condition, finishes which have been damaged.

3.2 CLEANING

.1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.

3.3 FIELD QUALITY CONTROL

.1 Site Tests: conduct following tests in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - SUBMITTALS.

.1 Perform tests as specified in other sections of this specification.

.2 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.4 DEMONSTRATION

.1 Owner’s Representative will use equipment and systems for test purposes prior to acceptance. Contractor to supply labour, material, and instruments required for testing.

.2 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.

.3 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.

.4 Instruction duration time requirements as specified in appropriate sections.

.5 Owner’s Representative may record these demonstrations on video tape for future reference.

3.5 PROTECTION

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Thermal insulation for piping and piping accessories in commercial type applications.

1.2 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.
.2 Section 01 74 21 – Construction/Demolition Waste Management and Disposal
.3 Section 07 92 00 – Joint Sealing.
.4 Section 22 07 16 – Plumbing Equipment Insulation.
.5 Section 23 05 53.01 – Mechanical Identification.

1.3 REFERENCES

.1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)

.1 ASHRAE Standard 90.1, Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings (Including all Addenda).

.2 American Society for Testing and Materials (ASTM)

.1 ASTM B209M, Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate Metric.
.2 ASTM C335, Standard Test Method for Steady State Heat Transfer Properties of Horizontal Pipe Insulation.
.3 ASTM C411, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
.4 ASTM C449/C449M, Standard Specification for Mineral Fibre-Hydraulic-Setting Thermal Insulating and Finishing Cement.
.5 ASTM C533 Standard specification for Calium Silicate Insulation Block and Pipe.
.6 ASTM C547 Standard Specification for Mineral Fibre Pipe Insulation.
.7 ASTM C795, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
.8 ASTM C921, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.
.9 ASTM D1784, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.

.3 Canadian General Standards Board (CGSB)

.1 CGSB 51-GP-52Ma, Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
.2 CAN/CGSB-51.53, Poly (Vinyl Chloride) Jacketting Sheet, for Insulated Pipes, Vessels and Round Ducts

.4 Department of Justice Canada (Jus)

.1 Canadian Environmental Assessment Act (CEAA), c. 37.

.2 Canadian Environmental Protection Act, (CEPA), c. 33.

.3 Transportation of Dangerous Goods Act (TDGA), c. 34.

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets.

.6 Manufacturer's Trade Associations

.1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards.

.7 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.

.8 National Energy Code for Buildings (NECB).

1.4 DEFINITIONS

.1 For purposes of this section:

.1 "CONCEALED" - insulated mechanical services in suspended ceilings and non-accessible chases and furred-in spaces.

.2 "EXPOSED" - will mean "not concealed" as defined herein.

.2 TIAC ss:

.1 CRF: Commercial Rectangular Finish

.2 CPF: Commercial Piping Finish.

1.5 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures. Include product characteristics, performance criteria, and limitations.

.1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures.

.3 Shop Drawings:

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.4 Samples:

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit for approval: complete assembly of each type of insulation system, insulation, coating, and adhesive proposed. Mount sample on 12 mm plywood board. Affix label beneath sample indicating service.

.5 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.

.1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.2 Instructions: submit manufacturer's installation instructions to Owner's Representative.

1.6 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer: certified in performing work of this Section, and have at least 5 years successful experience in this size and type of project, qualified to standards of TIAC.

.2 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.3 Deliver materials to site in original factory packaging, labeled with manufacturer's name, address.

.2 Storage and Protection:

.1 Protect from weather, construction traffic.

.2 Protect against damage.

.3 Store at temperatures and conditions required by manufacturer.

.3 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Place excess or unused insulation and insulation accessory materials in designated containers.

.3 Divert unused metal materials from landfill to metal recycling facility approved by Owner's Representative.

.4 Dispose of unused adhesive material at official hazardous material collections site approved by Owner's Representative.

PART 2 PRODUCTS

2.1 FIRE AND SMOKE RATING

.1 In accordance with CAN/ULC-S102.

.1 Maximum flame spread rating: 25.

.2 Maximum smoke developed rating: 50.

2.2 INSULATION

.1 Mineral fibre specified includes glass fibre, rock wool, slag wool.

.2 Thermal conductivity ("k" factor) not to exceed specified values at 24 °C mean temperature when tested in accordance with ASTM C335.

.3 TIAC Code A-2: Rigid moulded calcium silicate in sections and blocks, and with special shapes to suit project requirements.

.1 Insulation: to ASTM C533.

.2 Maximum "k" factor: to 0.075 W/m °C @ 500 °C .

.3 Design to permit periodic removal and re-installation.

.4 TIAC Code A-3: Rigid moulded mineral fibre with factory applied vapour retarder jacket.

.1 Mineral fibre: to CAN/ULC-S702 and ASTM C547.

.2 Jacket: to CGSB 51-GP-52Ma.

.3 Maximum "k" factor: to CAN/ULC-S702.

.5 TIAC Code A-6: Flexible unicellular tubular elastomer.

.1 Insulation: with vapour retarder jacket to ASTM C534.

.2 Jacket: to CGSB 51-GP-52Ma.

.3 Maximum "k" factor: 0.039 W/m – °C.

.4 To be certified by manufacturer to be free of potential stress corrosion cracking corrodants

.5 Flame spread index less than 25, and smoke developed index less than 50.

.6 TIAC Code C-2: Mineral fibre blanket faced with factory applied vapour retarder jacket (as scheduled in PART 3 of this section).

.1 Mineral fibre: to CAN/ULC-S702.

.2 Jacket: to CGSB 51-GP-52Ma.

.3 Maximum "k" factor: to CAN/ULC-S702.

2.3 INSULATION SECUREMENT

.1 Tape: Self-adhesive, aluminum, plain reinforced, 50 mm wide minimum.

.2 Contact adhesive: Quick setting.

.3 Canvas adhesive: Washable.

.4 Tie wire: 1.5 mm diameter stainless steel.

.5 Bands: Stainless steel, 19 mm wide, 0.5 mm thick.

2.4 CEMENT

.1 Thermal insulating and finishing cement:

.1 Hydraulic setting or air drying on mineral wool, to ASTM C449/C449M.

2.5 VAPOUR RETARDER LAP ADHESIVE

.1 Water based, fire retardant type, compatible with insulation.

2.6 INDOOR VAPOUR RETARDER FINISH

.1 Vinyl emulsion type acrylic, compatible with insulation.

2.7 OUTDOOR VAPOUR RETARDER FINISH

.1 Vinyl emulsion type acrylic, compatible with insulation.

.2 Reinforcing fabric: Fibrous glass, untreated 305 g/m^2.

2.8 JACKETS

.1 Polyvinyl Chloride (PVC):

.1 One-piece moulded type and sheet to CAN/CGSB-51.53 with pre-formed shapes as required.
.2 Colours: to match adjacent finish paint. Confirm colour with Owner's Representative.
.3 Minimum service temperatures: -20^{o}C.
.4 Maximum service temperature: 65^{o}C.
.5 Moisture vapour transmission: 0.02 perm.
.6 Thickness: 0.55 mm.
.7 Fastenings:
.1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
.2 Tacks.
.3 Pressure sensitive vinyl tape of matching colour.
.8 Special requirements:
.1 Indoor: flame spread rating 25, smoke developed rating 50.
.2 Outdoor: UV rated material at least 0.5 mm thick.

.2 Canvas:

.1 220gm/m^2 cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.
.2 Lagging adhesive: Compatible with insulation.

.3 Aluminum:

.1 To ASTM B209.
.2 Thickness: 0.50 mm sheet.
.3 Finish: Embossed or corrugated.

.4 Joining: Longitudinal and circumferential slip joints with 50 mm laps.

.5 Fittings: 0.5 mm thick die-shaped fitting covers with factory-attached protective liner.

.6 Metal jacket banding and mechanical seals: stainless steel, 19 mm wide, 0.5 mm thick at 300 mm spacing.

.4 Stainless steel:

.1 Type: 304 or type 316.

.2 Thickness: 0.25 mm.

.3 Finish: Smooth.

.4 Joining: Longitudinal and circumferential slip joints with 50 mm laps.

.5 Fittings: 0.5 mm thick die-shaped fitting covers with factory-attached protective liner.

.6 Metal jacket banding and mechanical seals: stainless steel, 19 mm wide, 0.5 mm thick at 300 mm spacing.

2.9 WEATHERPROOF CAULKING FOR JACKETS INSTALLED OUTDOORS

.1 Caulking to: Section 07 92 00 - Joint Sealing.

PART 3 EXECUTION

3.1 MANUFACTURE'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 PRE- INSTALLATION REQUIREMENT

.1 Pressure testing of piping systems and adjacent equipment to be complete, witnessed and certified.

.2 Surfaces to be clean, dry, free from foreign material.

3.3 INSTALLATION

.1 Install in accordance with TIAC National Standards.

.2 Apply materials in accordance with manufacturers instructions and this specification.

.3 Use two layers with staggered joints when required nominal wall thickness exceeds 75 mm.

.4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.

.1 Install hangers, supports outside vapour retarder jacket.

.5 Supports, Hangers:

.1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

3.4 REMOVABLE, PRE-FABRICATED, INSULATION AND ENCLOSURES

.1 See Section 22 07 16 – Plumbing Equipment Insulation.

3.5 INSTALLATION OF ELASTOMERIC INSULATION

.1 Insulation to remain dry. Overlaps to manufacturers instructions. Ensure tight joints.

.2 Provide vapour retarder as recommended by manufacturer.

3.6 PIPING INSULATION SCHEDULES

.1 Includes valves, valve bonnets, strainers, flanges and fittings unless otherwise specified. Insulate vent pipes 3.0 m from roof penetration.

.2 TIAC Code: A-2.

.1 Insulation securements: 18 ga SS wire or 12 mm x 0.51 mm SS bands at 300 mm oc.
.2 Seals: lap seal adhesive, lagging adhesive.
.3 Installation: TIAC Code: 1501-H.

.3 TIAC Code: A-3.

.1 Securements: Tape at 300 mm oc.
.2 Seals: VR lap seal adhesive, VR lagging adhesive.
.3 Installation: TIAC Code: 1501-C.

.4 TIAC Code: A-6.

.1 Insulation securements: as per manufacturer's recommendation.
.2 Seals: lap seal adhesive, lagging adhesive.
.3 Installation: TIAC Code: 1501-CA.

.5 TIAC Code: C-2 with vapour retarder jacket.

.1 Insulation securements: 18 ga SS wire or 12 mm x 0.5 mm SS bands at 300 mm oc.
.2 Seals: lap seal adhesive, lagging adhesive.
.3 Installation: TIAC Code: 1501-C.

.6 Thickness of insulation to be as listed in following table.

.1 Run-outs to individual units and equipment not exceeding 4000 mm long.
.2 Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, fittings.

Application	**Temp °C**	**TIAC code**	**Pipe sizes (NPS) and insulation thickness (mm)**					
	Run out			***to 1***	***1 1/4 to 2***	***2 1/2 to 4***	***5 to 6***	***8 & over***
Steam	up to 175	A-3	38	50	65	75	90	90
Domestic HWS		A-3	25	25	25	38	38	38

Application	**Temp °C**	**TIAC code**	**Pipe sizes (NPS) and insulation thickness (mm)**					
	Run out			***to 1***	***1 1/4 to 2***	***2 1/2 to 4***	***5 to 6***	***8 & over***
Refrigerated Drinking Water		A-3	25	25	25	25	25	25
Domestic CWS		A-3	25	25	25	25	25	25
RWL and RWP		A-3	25	25	25	25	25	25
Roof Drain Body		C-2	25	25	25	25	25	25
Vent Pipe Plumbing		A-3	25	25	25	25	25	25

.7 Finishes:

.1 Exposed indoors: PVC jacket.

.2 Exposed in mechanical rooms: PVC jacket.

.3 Concealed, indoors: canvas on valves, fittings. No further finish.

.4 Use vapour retarder jacket on TIAC code A-3 insulation compatible with insulation.

.5 Outdoors: Water-proof Aluminium, or SS jacket.

.6 Finish attachments: SS screws or bands, at 150 mm oc. Seals: wing or closed.

.7 Installation: To appropriate TIAC code CPF/1 through CPF/5.

3.7 CLEANING

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 35 29.06 - Health and Safety Requirements.

.3 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.4 Section 01 78 00 - Closeout Submittals.

.5 Section 01 91 13 - General Commissioning (CX) Requirements

.6 Section 21 05 01 - Common Work Results - Mechanical.

.7 Section 22 05 00 – Common Work Results for Plumbing.

.8 Section 22 07 16 – Plumbing Equipment Insulation.

.9 Section 22 07 19 – Plumbing Piping Insulation.

.10 Section 23 05 05 - Installation of Pipework.

.11 Section 23 05 23.01 - Valves - Bronze.

.12 Section 23 05 23.02 - Valves - Cast Iron.

.13 Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

.14 Section 33 11 16.01 - Incoming Site Water Utility Distribution Piping.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME).

.1 ANSI/ASME B16.15, Cast Bronze Threaded Fittings, Classes 125 and 250.

.2 ANSI/ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.

.3 ANSI/ASME B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

.4 ANSI/ASME B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.

.2 American National Standards Institute/National Sanitation Foundation (ANSI/NSF).

.1 ANSI/NSF 61, Drinking Water System Components.

.3 American Society for Testing and Materials International (ASTM).

.1 ASTM A 307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 ASTM A536, Standard Specification for Ductile Iron Castings.

.3 ASTM B 88M, Standard Specification for Seamless Copper Water Tube (Metric).

.4 ASTM F 492, Standard Specification for Propylene and Polypropylene (PP) Plastic-Lined Ferrous Metal Pipe Fittings.

.4 American Water Works Association (AWWA).

.1 AWWA C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

.2 AWWA C606, Grooved and Shouldered Joints.

.5 Canadian Standards Association (CSA International).

.1 CSA B242, Groove and Shoulder Type Mechanical Pipe Couplings.

.6 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act (CEPA).

.7 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.8 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).

.1 MSS-SP-67, Butterfly Valves.

.2 MSS-SP-70, Cast Iron Gate Valves, Flanged and Threaded Ends.

.3 MSS-SP-71, Cast Iron Swing Check Valves, Flanged and Threaded Ends.

.4 MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.

.9 National Research Council (NRC)/Institute for Research in Construction.

.1 NRCC 38728, National Plumbing Code of Canada (NPC).

.10 Transport Canada (TC).

.1 Transportation of Dangerous Goods Act (TDGA).

1.3 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for insulation and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 62 00.01 - Hazardous Materials.

.4 Closeout Submittals:

.1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

.5 Grooved joint couplings and fittings to be indicated on product submittals and to be specifically identified with the applicable style or series designation.

1.4 HEALTH AND SAFETY

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Separate for reuse and recycling and place in designated containers Steel, Metal, Plastic waste in accordance with Waste Management Plan.

.4 Place materials defined as hazardous or toxic in designated containers.

.5 Handle and dispose of hazardous materials in accordance with CEPA , TDGA , Regional and Municipal regulations.

.6 Fold up metal banding, flatten and place in designated area for recycling.

1.6 WARRANTY

.1 Provide a written guarantee, signed and issued in the name of the owner, against defective materials and workmanship for a period of one (1) year from the date of Substantial Completion.

PART 2 PRODUCTS

2.1 PIPING

.1 Domestic hot, cold and recirculation systems, within building.

.1 Above ground: copper tube, hard drawn, type L: to ASTM B88M.

.2 Buried or embedded: copper tube, soft annealed, type K: to ASTM B88M, in long lengths and with no buried joints.

2.2 FITTINGS

.1 Bronze pipe flanges and flanged fittings, Class 150 and 300: to ANSI/ASME B16.24.

.2 Cast bronze threaded fittings, Class 125 and 250: to ANSI/ASME B16.15.

.3 Cast copper, solder type: to ANSI/ASME B16.18.

.4 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22.

.5 NPS2 and larger: roll grooved to CSA B242. Cast bronze to ANSI/ASME B16.18 or wrought copper ANSI/ASME B16.22.

.1 Fittings to be manufactured to copper-tube dimensions. Flaring of tube or fitting ends to accommodate IPS sized couplings is not permitted.

.6 NPS 1 ½ and under: Cast copper, ANSI/ASME B16.18 or wrought copper, ANSI/ASME B16.22; for hard drawn copper tube type L or K, rated for 1300 kPa at ASTM B88.

2.3 JOINTS

.1 Rubber gaskets, latex-free, 1.6 mm thick: to ANSI/AWWA C111.

.2 Bolts, nuts, hex head and washers: to ASTM A307, heavy series.

.3 Solder: 95/5 tin copper alloy lead free.

.4 Teflon tape: for threaded joints.

.5 Grooved couplings: designed with angle bolt pads to provide rigid joint, complete with EPDM flush seal gasket. Gasket to be classified in accordance with ANSI/NSF 61 for potable water service. Couplings to be manufactured to copper-tube dimensions. Flaring of tube or fitting ends to accommodate IPS sized couplings is not permitted.

.6 Dielectric connections between dissimilar metals: dielectric fitting to ASTM F492, complete with thermoplastic liner.

2.4 GATE VALVES

.1 NPS2 and under, soldered:

.1 Rising stem: to MSS-SP-80, Class 125, 860 kPa, bronze body, screw-in bonnet, solid wedge disc as specified Section 23 05 23.01 – Valves - Bronze.

.2 NPS2 and under, screwed:

.1 Rising stem: to MSS-SP-80, Class 125, 860 kPa, bronze body, screw-in bonnet, solid wedge disc as specified Section 23 05 23.01 – Valves - Bronze.

.3 NPS2-1/2 and over, in mechanical rooms, flanged:

.1 Rising stem: to MSS-SP-70, Class 125, 860 kPa, flat flange faces, cast-iron body, OS&Y bronze trim specified Section 23 05 23.02 – Valves – Cast Iron.

.4 NPS2-1/2 and over, other than mechanical rooms, flanged:

.1 Non-rising stem: to MSS-SP-70, Class 125, 860 kPa, flat flange faces, cast-iron body, bronze trim, bolted bonnet specified Section 23 05 23.02 – Valves – Cast Iron.

2.5 GLOBE VALVES

.1 NPS2 and under, soldered:

.1 To MSS-SP-80, Class 125, 860 kPa, bronze body, renewable composition disc, screwed over bonnet as specified Section 23 05 23.01 – Valves – Bronze.

.2 Lockshield handles: as indicated.

.2 NPS2 and under, screwed:

.1 To MSS-SP-80, Class 150, 1 MPa, bronze body, screwed over bonnet, renewable composition disc as specified Section 23 05 23.01 – Valves – Bronze.

.2 Lockshield handles: as indicated.

2.6 SWING CHECK VALVES

.1 NPS 2 and under, soldered:

.1 To MSS-SP-80, Class 125, 860 kPa, bronze body, bronze swing disc, screw in cap, regrindable seat as specified Section 23 05 23.01 – Valves - Bronze.

.2 NPS2 and under, screwed:

.1 To MSS-SP-80, Class 125, 860 kPa, bronze body, bronze swing disc, screw in cap, regrindable seat as specified Section 23 05 23.01 – Valves - Bronze.

.3 NPS2-1/2 and over, flanged:

.1 To MSS-SP-71, Class 125, 860 kPa, cast iron body, flat flange faces, or renewable seat, bronze disc, bolted cap specified Section 23 05 23.02 – Valves – Cast Iron.

2.7 BALL VALVES

.1 NPS2 and under:

.1 As specified Section 23 05 23.01 – Valves - Bronze.

2.8 BUTTERFLY VALVES

.1 NPS21/2 and over lug:

.1 To MSS-SP-67, Class 200, 1.4 MPa.

.2 As specified in Section 23 05 23.05 – Butterfly Valves.

.2 NPS21/2 and over, grooved ends:

.1 Class 300, 2.1 MPa as specified in Section 23 05 23.05 – Butterfly Valves.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install in accordance with Canadian Plumbing Code and local authority having jurisdiction.

.2 Install pipe work in accordance with Section 23 05 05 – Installation of Pipework and by certified journeyperson supplemented as specified herein.

.3 Assemble piping using fittings manufactured to ANSI standards.

.4 Grooved joint couplings and fittings to be installed in accordance with the manufacturer's written installation instructions. Grooved ends to be clean and free from indentations, projections, and roll marks in the area from pipe end to groove. Gaskets to be verified as suitable for the intended service prior to installation. Gaskets to be molded and produced by the coupling manufacturer. The grooved coupling manufacturer's factory trained representative to provide on-site training for Contractor's field personnel in the use of grooving tools, application of groove, and installation of grooved joint products. The manufacturer's representative to periodically visit the jobsite and review installation. Contractor to remove and replace any joints deemed improperly installed.

.5 Install CWS piping below and away from HWS and HWR and other hot piping so as to maintain temperature of cold water as low as possible.

.6 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.

.7 Buried Tubing

.1 Lay in well compacted washed sand in accordance with AWWA Class B bedding.

.2 Bend tubing without crimping or constriction. Minimize use of fittings.

3.2 VALVES

.1 Isolate equipment, fixtures and branches with butterfly or ball valves.

.2 Balance recirculation system using lockshield globe valves. Mark settings and record on as-built drawings on completion.

3.3 PRESSURE TESTS

.1 Conform to requirements of Section 21 05 01 - Common Work Results-Mechanical.

.2 Test pressure: greater of 1 ½ times maximum system operating pressure or 860 kPa.

3.4 FLUSHING AND CLEANING

.1 Flush entire system for 8 h. Ensure outlets flushed for 2 h. Let stand for 24 h, then draw one sample off longest run. Submit to testing laboratory for bacteriological testing to verify that system is clean to Provincial potable water guidelines. Let system flush for additional 2 h, then draw off another sample for testing.

3.5 PRE-START-UP INSPECTIONS

.1 Systems to be complete, prior to flushing, testing and start-up.

.2 Verify that system can be completely drained.

.3 Ensure that pressure booster systems are operating properly.

.4 Ensure that air chambers, expansion compensators are installed properly.

3.6 DISINFECTION

.1 Flush out, disinfect and rinse system to requirements of authority having jurisdiction and approval of Owner's Representative.

.2 Coordinate with Section 33 11 16 – Site Water Utility Distribution Piping and Section 33 11 16.01 – Incoming Site Water Utility Distribution Piping.

.3 Upon completion, provide laboratory test reports on water quality to Owner's Representative.

3.7 START-UP

.1 Timing: Start up after:

.1 Pressure tests have been completed.
.2 Disinfection procedures have been completed.
.3 Water treatment systems operational.

.2 Provide continuous supervision during start-up.

.3 Start-up procedures:

.1 Establish circulation and ensure that air is eliminated.
.2 Check pressurization to ensure proper operation and to prevent water hammer, flashing and/or cavitation.
.3 Bring HWS storage tank up to design temperature slowly.
.4 Monitor HWS and HWR piping systems for freedom of movement, pipe expansion as designed.
.5 Check control, limit, safety devices for normal and safe operation.

.4 Rectify start-up deficiencies.

3.8 PERFORMANCE VERIFICATION

.1 Timing:

.1 After pressure and leakage tests and disinfection completed, and certificate of completion has been issued by authority having jurisdiction.

.2 Procedures:

.1 Verify that flow rate and pressure meet Design Criteria.

.2 TAB HWR in accordance with Section 23 05 93 - Testing Adjusting and Balancing for HVAC.

.3 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.

.4 Sterilize HWS and HWR systems for Legionella control.

.5 Verify performance of temperature controls.

.6 Verify compliance with safety and health requirements.

.7 Check for proper operation of water hammer arrestors. Run one outlet for 10 seconds, then shut off water immediately. If water hammer occurs, replace water hammer arrestor or re-charge air chambers. Repeat for outlets and flush valves.

.8 Confirm water quality consistent with supply standards, verifying that no residuals remain as a result of flushing and/or cleaning.

.3 Reports:

.1 In accordance with Section 01 91 13 – General Commissioning (CX) Requirements: using report forms as specified in Section 01 91 13 – General Commissioning (CX) Requirements.

.2 Include certificate of water flow and pressure tests conducted on incoming water service, demonstrating adequacy of flow and pressure.

END OF SECTION

Part 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 35 29.06 - Health and Safety Requirements.

.3 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.4 Section 01 78 00 - Closeout Submittals.

.5 Section 01 91 13.13 - Commissioning (CX) Requirements.

.6 Section 21 05 01 - Common Work Results for Mechanical.

.7 Section 22 05 00 – Common Work Results for Plumbing.

.8 Section 22 07 16 – Plumbing Equipment Insulation.

.9 Section 22 07 19 – Plumbing Piping Insulation.

.10 Section 23 05 23.01 - Valves - Bronze.

.11 Section 23 05 23.02 - Valves - Cast Iron.

.12 Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

.13 Section 33 11 16.01 - Incoming Site Water Utility Distribution Piping.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)

.1 ANSI B16.1, Cast Iron Pipe Flanges and Flange Fittings, Class 25, 125, 250 and 800.

.2 Canadian Standard Association (CSA)

.1 CSA B137.5, Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications.

.2 CSA B137.6, CPVC Pipe, Tubing and Fittings for Both Hot and Cold Water Distribution Systems.

.3 National Sanitation Foundation (NSF)

.1 NSF61 Potable Water Listing.

.4 Underwriters Listing of Canada (ULC)

.1 CAN/ULC S101, Fire Endurance Tests of Buildings Construction and Materials.

.2 CAN/ULC S102.2, Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies.

.3 CAN/ULC S115, Standard Method of Fire Tests of Firestop Systems.

.5 American Society for Testing and Materials International, (ASTM).

.1 ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 ASTM B88M, Standard Specification for Seamless Copper Water Tube (Metric).

.3 ASTM D1784 Standard Specification for Rigid Poly (Vinyl Chloride) PVC Compounds and Chlorinated Poly (Vinyl Chloride) CPVC compounds.

.4 ASTM D2467, Standard Specification for Poly (Vinyl Chloride) PVC Plastic Pipe Fittings, Schedule 80.

.5 ASTM F437 Standard Specification for Threaded Chlorinated Poly (Vinyl Chloride) CPVC Plastic Pipe Fittings Schedule 80.

.6 ASTM F439 Standard Specification for Chlorinated Poly (Vinyl Chloride) CPVC Plastic Pipe Fittings Schedule 80.

.7 ASTM F441/441M Standard Specification for Chlorinated Poly (Vinyl Chloride) CPVC Plastic Pipe Schedules 40 and 80.

.8 ASTM F876 Standard Specification for Crosslinked Polyethyline (PEX) Tubing.

.9 ASTM F877 Standard Specification for Crosslinked Polyethyline (PEX) Hot and Cold Water Distribution System.

.6 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act (CEPA).

.7 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Safety Data Sheets (SDS).

.8 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).

.1 MSS-SP-67, Butterfly Valves.

.2 MSS-SP-70, Cast Iron Gate Valves, Flanged and Threaded Ends.

.3 MSS-SP-71, Cast Iron Swing Check Valves, Flanged and Threaded Ends.

.4 MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.

.5 MSS-SP-110 Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends

.9 National Research Council (NRC)/Institute for Research in Construction.

.1 NRCC, National Plumbing Code of Canada (NPC).

.10 Transport Canada (TC).

.1 Transportation of Dangerous Goods Act (TDGA).

1.3 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit product data for following: valves.

.3 Submit WHMIS SDS - Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures.

.4 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 HEALTH AND SAFETY

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Separate for reuse and recycling and place in designated containers Steel, Metal, Plastic waste in accordance with Waste Management Plan.

.4 Place materials defined as hazardous or toxic in designated containers.

.5 Handle and dispose of hazardous materials in accordance with CEPA, TDGA , Regional and Municipal regulations.

.6 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 PRODUCTS

2.1 PIPING

.1 Domestic hot, cold and recirculation systems, within building.

.1 Above ground: NPS ½ to 4 CPVC to SDR11 with IPS outside dimensions: CSA B 137.6, ASTM D1784 cell class of 24448 and NSF 61. NPS ½ to 3 PEX to SDR9: CSA B137.5, ASTM F876 and ASTM F877.

.2 Buried or embedded:

.1 Copper tube, soft annealed, type K: to ASTM B88M, in long lengths and with no buried joints.

.2 UO to NPS 3: PEX Tubing to ASTM F876 and F877 and certified to NSF61 rated at 93^{o} at 551kPa, 82^{o}C at 690 kPa, 23^{o}C at 1100 kPa, certified to be used for hot or cold water service.

2.2 FITTINGS

.1 CPVC Fittings: to CSA B137.6, ASTM D1784 Cell Class of 23447 and NSF 61.

.2 CPVC Flanges: to ASTM F1970 and ASTM D2467.

.1 Flanged CPVC: 1034 kPa at 23^0C, 517 kPa at 60^0C not to be used above 60^0C.

.2 Bolt hole patterns to ANSI B16.1 class 125, threads to be tapered iron pipe size threads to ANSI B2.1

.3 Transition points: as recommended by manufacturer.

.4 PEX fittings certified to CSA B137.5, ASTM F876 and ASTM F877, and certified to be used with PEX tubing.

2.3 JOINTS

.1 Rubber gaskets, elastomeric, full face, hardness of 50 to 70 durometer.

.2 Bolts, nuts, hex head and washers: to ASTM A307, heavy series.

.3 Solder: 95/5 tin copper alloy lead free for copper pipe.

.4 Teflon tape: for threaded joints.

.5 Solvent weld with primer to ASTM F493.

.1 Pressure rating 690 kPa at 82^0C, 2760 kPa at 23^0C

2.4 GATE VALVES

.1 NPS2 and under, soldered:

.1 Rising stem: to MSS-SP-80, Class 125, 860 kPa, bronze body, screw-in bonnet, solid wedge disc as specified Section 23 05 23.01 – Valves - Bronze.

.2 NPS2 and under, screwed:

.1 Rising stem: to MSS-SP-80, Class 125, 860 kPa, bronze body, screw-in bonnet, solid wedge disc as specified Section 23 05 23.01 – Valves - Bronze.

.3 NPS2-1/2 and over, in mechanical rooms, flanged:

.1 Rising stem: to MSS-SP-70, Class 125, 860 kPa, flat flange faces, cast-iron body, OS&Y bronze trim specified Section 23 05 23.02 – Valves – Cast Iron.

.4 NPS2-1/2 and over, other than mechanical rooms, flanged:

.1 Non-rising stem: to MSS-SP-70, Class 125, 860 kPa, flat flange faces, cast-iron body, bronze trim, bolted bonnet specified Section 23 05 23.02 – Valves – Cast Iron.

2.5 GLOBE VALVES

.1 NPS2 and under, soldered:

.1 To MSS-SP-80, Class 125, 860 kPa, bronze body, renewable composition disc, screwed over bonnet as specified Section 23 05 23.01 – Valves – Bronze.

.2 Lockshield handles: as indicated.

.2 NPS2 and under, screwed:

.1 To MSS-SP-80, Class 150, 1 MPa, bronze body, screwed over bonnet, renewable composition disc as specified Section 23 05 23.01 – Valves – Bronze.

.2 Lockshield handles: as indicated.

2.6 SWING CHECK VALVES

.1 NPS 2 and under, soldered:

.1 To MSS-SP-80, Class 125, 860 kPa, bronze body, bronze swing disc, screw in cap, regrindable seat as specified Section 23 05 23.01 – Valves - Bronze.

.2 NPS2 and under, screwed:

.1 To MSS-SP-80, Class 125, 860 kPa, bronze body, bronze swing disc, screw in cap, regrindable seat as specified Section 23 05 23.01 – Valves - Bronze.

.3 NPS2-1/2 and over, flanged:

.1 To MSS-SP-71, Class 125, 860 kPa, cast iron body, flat flange faces, or renewable seat, bronze disc, bolted cap specified Section 23 05 23.02 – Valves – Cast Iron.

2.7 BALL VALVES

.1 NPS2 and under:

.1 As specified Section 23 05 23.01 – Valves - Bronze.

.2 CPVC to ASTM D 1784 Cell Class of 23447 and NSF 61.

.1 Rating 1599 kPa at 23° C and 717 kPa at 60° C

.2 O-rings: EPDM

.3 ENDS: socket, flanged, threaded

.4 Seats: Teflon PTFE

.5 Seals: EPDM

.6 Full port, downstream union nut for full blocking

.7 Ball: CPVC

2.8 BUTTERFLY VALVES

.1 NPS21/2 and over lug:

.1 To MSS-SP-67, Class 200, 1.4 MPa.

.2 As specified in Section 23 05 23.05 – Butterfly Valves.

.2 NPS21/2 and over, grooved ends:

.1 Class 300, 2.1 MPa as specified in Section 23 05 23.05 – Butterfly Valves.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install in accordance with Canadian Plumbing Code and local authority having jurisdiction.

.2 Install pipe work in accordance with Section 23 05 05 – Installation of Pipework and manufacturers' recommendations by certified journeyperson supplemented as specified herein.

.3 Assemble piping using fittings manufactured to ANSI standards.

.4 Install CWS piping below and away from HWS and HWR and other hot piping so as to maintain temperature of cold water as low as possible.

.5 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.

.6 Buried Tubing

.1 Lay in well compacted washed sand in accordance with AWWA Class B bedding.

.2 Bend tubing without crimping or constriction. Minimize use of fittings.

.7 Do not install in vertical shafts.

3.2 VALVES

.1 Isolate equipment, fixtures and branches with butterfly or ball valves.

.2 Balance recirculation system using lockshield globe valves. Mark settings and record on as-built drawings on completion.

3.3 PRESSURE TESTS

.1 Conform to requirements of Section 21 05 01 - Common Work Results for Mechanical.

.2 Test pressure: greater of 1 ½ times maximum system operating pressure or 860 kPa.

3.4 FLUSHING AND CLEANING

.1 Flush entire system for 8 h. Ensure outlets flushed for 2 h. Let stand for 24 h, then draw one sample off longest run. Submit to testing laboratory for bacteriological testing to verify that system is clean to Provincial potable water guidelines. Let system flush for additional 2 h, then draw off another sample for testing.

3.5 PRE-START-UP INSPECTIONS

.1 Systems to be complete, prior to flushing, testing and start-up.

.2 Verify that system can be completely drained.

.3 Ensure that pressure booster systems are operating properly.

.4 Ensure that air chambers, expansion compensators are installed properly.

3.6 DISINFECTION

.1 Flush out, disinfect and rinse system to requirements of authority having jurisdiction and approval of Owner.

.2 Coordinate with Section 33 11 16 – Site Water Utility Distribution Piping and Section 33 11 16.01 – Incoming Site Water Utility Distribution Piping.

.3 Upon completion, provide laboratory test reports on water quality to Owner.

3.7 START-UP

.1 Timing: Start up after:

.1 Pressure tests have been completed.
.2 Disinfection procedures have been completed.
.3 Water treatment systems operational.

.2 Provide continuous supervision during start-up.

.3 Start-up procedures:

.1 Establish circulation and ensure that air is eliminated.
.2 Check pressurization to ensure proper operation and to prevent water hammer, flashing and/or cavitation.
.3 Bring HWS storage tank up to design temperature slowly.
.4 Monitor HWS and HWR piping systems for freedom of movement, pipe expansion as designed.
.5 Check control, limit, safety devices for normal and safe operation.

.4 Rectify start-up deficiencies.

3.8 PERFORMANCE VERIFICATION

.1 Timing:

.1 After pressure and leakage tests and disinfection completed, and certificate of completion has been issued by authority having jurisdiction.

.2 Procedures:

.1 Verify that flow rate and pressure meet Design Criteria.

.2 TAB HWR in accordance with Section 23 05 93 - Testing Adjusting and Balancing for HVAC.

.3 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.

.4 Sterilize HWS and HWR systems for Legionella control.

.5 Verify performance of temperature controls.

.6 Verify compliance with safety and health requirements.

.7 Check for proper operation of water hammer arrestors. Run one outlet for 10 seconds, then shut off water immediately. If water hammer occurs, replace water hammer arrestor or re-charge air chambers. Repeat for outlets and flush valves.

.8 Confirm water quality consistent with supply standards, verifying that no residuals remain as a result of flushing and/or cleaning.

.3 Reports:

.1 In accordance with Section 01 91 13.13 – Commissioning (CX) Requirements: using report forms as specified in Section 01 91 13.13 – Commissioning (CX) Requirements.

.2 Include certificate of water flow and pressure tests conducted on incoming water service, demonstrating adequacy of flow and pressure.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section includes:

.1 The installation of drainage waste and vent piping – plastic.

1.2 RELATED SECTIONS

.1 Section 01 35 29.06 - Health and Safety Requirements.

.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.3 Section 22 05 00 – Common Work Results for Plumbing.

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM D2235, Specification for Solvent Cement for Acrylonitrille-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.

.2 ASTM D2564, Specification for Solvent Cements for Poly(Vinyl-Chloride) (PVC) Plastic Piping Systems.

.2 Canadian Standards Association (CSA)

.1 CSA-B1800 Series, ABS Drain, Waste and Vent Pipe and Pipe Fittings.

.2 CSA-B181.2, PVC Drain, Waste and Vent Pipe and Pipe Fittings.

.3 CSA-B182.1, Plastic Drain and Sewer Pipe and Pipe Fittings.

.3 Underwriters Laboratory of Canada (ULC)

.1 CAN/ULC-S102.2 Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies.

1.4 DELIVERY STORAGE AND DISPOSAL

.1 Waste Management and Disposal:

.1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

.2 Collect and separate for disposal, paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

1.5 SUBMITTALS:

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for piping and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

PART 2 PRODUCTS

2.1 PIPING AND FITTINGS

.1 For buried DWV piping to:

.1 CSA-B181.1.
.2 CSA-B181.2.
.3 CSA-B182.1.

.2 For aboveground DWV piping for combustible construction to:

.1 CSA – B181.2

.3 For aboveground DWV piping for non-combustible construction:

.1 Flame spread rating less than 25 and smoke developed classification less than 50.
.2 CSA B181.2

2.2 JOINTS

.1 Solvent weld for PVC: to ASTM D2564.

.1 NPS 1 ½ to 6: one step or two step cement
.2 NPS 8 and above: two step cement.

.2 Solvent weld for ABS: to ASTM D2235.

PART 3 EXECUTION

3.1 INSTALLATION

.1 In accordance with Section 23 05 05 - Installation of Pipework and certified journeyperson.

.2 Install in accordance with Canadian Plumbing Code and local authority having jurisdiction.

3.2 TESTING

.1 Pressure test buried systems before backfilling in accordance with Canadian Plumbing Code.

.2 Hydraulically test to verify grades and freedom from obstructions.

3.3 PERFORMANCE VERIFICATION

.1 Cleanouts:

.1 Ensure accessible and that access doors are correctly located.

.2 Open, cover with linseed oil and re-seal.

.3 Verify cleanout rods can probe as far as the next cleanout, at least.

.2 Test to ensure traps are fully and permanently primed.

.3 Storm water drainage:

.1 Verify domes are secure.

.2 Ensure weirs are correctly sized and installed correctly.

.3 Verify provisions for movement of roof system.

.4 Ensure fixtures are properly anchored, connected to system and effectively vented.

.5 Affix applicable label (storm, sanitary, vent, pump discharge etc.) c/w directional arrows in accordance with Section 23 05 53.01 – Mechanical Identification.

.6 Provide copies of test reports for Commissioning Manuals.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section includes:

.1 The installation of drainage waste and vent piping – cast iron and copper.

1.2 RELATED SECTIONS

.1 Section 01 35 29.06 - Health and Safety Requirements.

.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal

.3 Section 23 05 05 - Installation of Pipework.

1.3 REFERENCES

.1 American Iron and Steel Institute (AISI)

.1 AISI 304, Stainless Steel.

.2 American Society for Testing and Materials (ASTM)

.1 ASTM B32, Specification for Solder Metal.
.2 ASTM B306, Specification for Copper Drainage Tube (DWV).
.3 ASTM C564, Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

.3 Canadian Standards Association (CSA International)

.1 CAN/CSA-B70, Cast Iron Soil Pipe, Fittings and Means of Joining.
.2 CAN/CSA- B125.3, Plumbing Fittings.

1.4 QUALITY ASSURANCE

.1 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 – Health and Safety Requirements.

1.5 DELIVERY STORAGE AND DISPOSAL

.1 Waste Management and Disposal:

.1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

.2 Collect and separate for disposal, paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

1.6 SUBMITTALS:

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

PART 2 PRODUCTS

2.1 COPPER TUBE AND FITTINGS

.1 Above ground sanitary, storm and vent Type DWV to: ASTM B306.

.1 Fittings.

.1 Cast brass: to CAN/CSA-B125.

.2 Wrought copper: to CAN/CSA-B125.

.2 Solder: tin-lead, 50:50, type 50A or tin-antimomy only 95:5, type TA to ASTM B32.

2.2 CAST IRON PIPING AND FITTINGS

.1 Buried sanitary, storm and vent minimum NPS2, to: CAN/CSA-B70, with one layer of protective coating of butimous.

.1 Joints.

.1 Mechanical joints.

.1 Neoprene or butyl rubber compression gaskets: to ASTM C564 or CAN/CSA-B70.

.2 Stainless steel clamps.

.2 Hub and spigot.

.1 Neoprene gasket : to CSA B70.

.2 Cold caulking compounds.

.2 Above ground sanitary, storm and vent: to CAN/CSA-B70.

.1 Joints.

.1 Mechanical joints.

.1 Neoprene or butyl rubber compression gaskets with stainless steel clamps.

2.3 STAINLESS STEEL PIPE AND FITTINGS

.1 Above ground and buried sanitary, storm and vent, NPS 2 to NPS 10, stainless steel, type AISI 304.

.1 Mechanical Joints:

.1 Push-fit socket joint with EPDM sealing ring.

PART 3 EXECUTION

3.1 INSTALLATION

.1 In accordance with Section 23 05 05 – Installation of Pipework and by certified journeyperson.

.2 Install in accordance with Canadian Plumbing Code and local authority having jurisdiction.

3.2 TESTING

.1 Pressure test buried systems before backfilling.

.2 Hydraulically test to verify grades and freedom from obstructions.

3.3 PERFORMANCE VERIFICATION

.1 Cleanouts:

- .1 Ensure accessible and that access doors are correctly located.
- .2 Open, cover with linseed oil and re-seal.
- .3 Verify that cleanout rods can probe as far as the next cleanout, at least.

.2 Test to ensure traps are fully and permanently primed.

.3 Storm water drainage:

- .1 Verify domes are secure.
- .2 Ensure weirs are correctly sized and installed correctly.
- .3 Verify provisions for movement of roof system.

.4 Ensure that fixtures are properly anchored, connected to system and effectively vented.

.5 Affix applicable label (storm, sanitary, vent, pump discharge, etc.) c/w directional arrows every floor or 4.5 m (whichever is less).

.6 Provide copies of test reports for Commissioning Manuals.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Materials and installation for plumbing specialties and accessories.

1.2 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 35 29.06 – Health and Safety Requirements.

.3 Section 01 45 00 – Quality Control.

.4 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

.5 Section 01 78 00 – Closeout Submittals.

.6 Section 01 91 13 – General Commissioning (Cx) Requirements.

1.3 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM A126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
.2 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.

.2 American Water Works Association (AWWA)

.1 AWWA C700, Cold Water Meters-Displacement Type, Bronze Main Case.
.2 AWWA C701, Cold Water Meters-Turbine Type for Customer Service.
.3 AWWA C702, Cold Water Meters-Compound Type.

.3 American National Standards Institute (ANSI)

.1 ANSI Z358.1 Emergency eyewash and shower equipment.

.4 Canadian Standards Association (CSA)

.1 CSA-B64 Series, Backflow Preventers and Vacuum Breakers.
.2 CSA-B356, Water Pressure Reducing Valves for Domestic Water Supply Systems.

.5 Health Canada/Workplace Hazardous Materials Information Systems (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.6 Plumbing and Drainage Institute (PDI)

.1 PDI-G101, Testing and Rating Procedure for Grease Interceptors with Appendix of Installation and Maintenance.

.2 PDI-WH201, Water Hammer Arresters Standard.

1.4 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet for fixtures and equipment.

.2 Indicate dimensions, construction details and materials for specified items.

.3 Submit WHMIS MSDS in accordance with Section 02 62 00.01 – Hazardous Materials. Indicate VOC's for adhesive and solvents during application and curing.

.3 Shop Drawings:

.1 Submit shop drawings to indicate materials, finishes, method of anchorage, number of anchors, dimensions, construction and assembly details and accessories.

.4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.5 Instructions: submit manufacturer's installation instructions.

.6 Closeout submittals: submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals. Include:

.1 Description of plumbing specialties and accessories, giving manufacturer's name, type, model, year and capacity.

.2 Details of operation, servicing and maintenance.

.3 Recommended spare parts list.

1.5 QUALITY ASSURANCE

.1 Pre-Installation Meetings:

.1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations.

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

.2 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 – Health and Safety Requirements.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal, paper, plastic, polystyrene, corrugated cardboard packaging materials in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Divert unused metal materials from landfill to metal recycling facility as approved by Owner's Representative.

.5 Fold up metal and plastic banding flatten and place in designated area for recycling.

1.7 WARRANTY

.1 Provide a written guarantee, signed and issued in the name of the owner, against defective materials and workmanship for a period of one (1) year from the date of Substantial Completion.

PART 2 PRODUCTS

2.1 FLOOR DRAINS

.1 Floor drains and trench drains.

.1 FD-1: general duty; cast iron body, round adjustable head, 125 mm, sediment basket nickel bronze strainer, integral seepage pan and clamping collar, trap primer connection.

.1 Acceptable Product: Zurn ZN-415-B5-P, Jay R. Smith, MIFAB, Blücher, Watts.

.2 FD-3: combination funnel floor drain; coated cast iron body with integral seepage pan, clamping collar, nickel-bronze adjustable head strainer with integral oval funnel, trap primer connection.

.1 Acceptable Product: Zurn ZN-415-BF-P, Jay R. Smith, MIFAB, Blücher, Watts.

.3 FD-4: planters; coated cast-iron body with integral seepage pan, clamping collar, vertically adjustable nickel-bronze adjustable head strainer, vandal-proof NPS2 perforated dome and standpipe, stainless steel screen, trap primer connection.

.1 Acceptable Product: Zurn ZN-350 C-P, Jay R. Smith, MIFAB, Blücher, Watts.

2.2 ROOF DRAINS

.1 RD-1; Standard coated roof drain with cast iron body 381 mm diameter, with aluminum dome, under-deck clamp to suit roof construction, flashing clamp ring with integral gravel stop.

.1 Acceptable Product: Zurn Z-100-C, Jay R. Smith, MIFAB, Watts.

.2 RD-2: Cornice, sill or canopy drain; cast iron body with 150 mm diameter cast bronze dome or strainer and flashing clamp, under deck clamp.

.1 Acceptable Product: Zurn Z-181-C, Jay R. Smith, MIFAB, Watts.

.3 RD-3: parapet or scupper drain; cast iron body with 303 mm x 305 mm obligue aluminum strainer/grate and flashing clamp.

.1 Acceptable Product: Zurn, Z-187, Jay R. Smith, MIFAB, Watts.

.4 RD-4: inverted roofing system; cast iron body with aluminum dome, under-deck clamp and sump receiver to suit roof construction, with integral gravel stop and stainless steel drainage grid.

.1 Acceptable Product: Zurn, Jay R. Smith, MIFAB, Watts.

2.3 CLEANOUTS

.1 Cleanout plugs: heavy cast iron male ferrule with brass screws and threaded brass or bronze plug. Sealing-caulked lead seat or neoprene gasket.

.1 Acceptable Product: Zurn, Jay R. Smith, MIFAB, Blücher, Watts.

.2 Access covers:

.1 Wall access: face or wall type, or stainless steel square cover with flush head securing screws, bevelled edge frame complete with anchoring lugs.

.2 Floor access: round cast iron body and frame with adjustable secured nickel bronze top.

.1 Plugs: bronze with neoprene gasket.

.2 Cover for unfinished concrete floors: cast iron round, gasket, vandal-proof screws.

.3 Cover for terrazzo finish: polished nickel bronze brass with recessed cover for filling with terrazzo, vandal-proof locking screws.

.4 Cover for tile and linoleum floors: polished nickel bronze with recessed cover for linoleum or tile infill, complete with vandal-proof locking screws.

.5 Cover for carpeted floors: polished nickel bronze with deep flange cover for carpet infill, complete with carpet retainer vandal-proof locking screws.

2.4 NON FREEZE WALL HYDRANTS

.1 Recessed with integral vacuum breaker, integral backflow preventer, NPS ¾ hose outlet, removable operating key, polished bronze finish, encased, non-freeze, anti-siphon, automatic draining, wall clamp, replaceable bronze seat and washer.

.2 Acceptable Product: Zurn Z-1300-PB-WC, Jay R. Smith, MIFAB, Watts.

2.5 WATER HAMMER ARRESTORS

.1 Stainless steel or copper construction, bellows or piston type: to PDI-WH201.

.2 Acceptable Product: Zurn, Jay R. Smith, MIFAB, Precision Plumbing Products, Watts.

2.6 BACK FLOW PREVENTERS

.1 To CSA-B64 Series.

.2 Application: domestic service entrance and fire protection system service entrance.

.1 Domestic water:

.1 Reduced pressure principle type consisting of a pressure differential relief valve located between two independently operated spring-loaded centre guided check valves.

.2 Ductile iron construction with FDA approved fusion epoxy coat inside and out.

.3 Compound check.

.4 Single access cover.

.5 Maximum temperature range: 0.5ºC to 60ºC.

.6 Maximum pressure: 1205 kPa.

.7 CSA certified.

.8 Acceptable Product: Wilkins Model 375L, Watts, Zurn.

.2 Fire protection water:

.1 Same as above except without compound check and with FM and ULC approval for fire protection service.

.2 Acceptable Product: Wilkins Model 975L, Watts, Zurn.

.3 Application: install on domestic cold water supply to electrode steam humidifier, emergency eyewash and drench shower.

.1 Bronze body construction.

.2 Internal pressure differential relief valve located in a zone between two positive seating check modules with captured springs and silicone seat discs.

.3 Seats and discs replaceable in both check modules and the relief valve.

.4 Assembly to include two resilient seated isolation valves, four resilient seated test cocks, protective wye strainer with 20 mesh screen, union end connections and an air gap drain fitting.

.5 Reduced pressure zone type backflow preventer.

.6 Acceptable Product: Watts Series U-009QT-S complete with Watts Series 909AG air gap, Wilkins, Zurn.

.4 Provide backflow preventer test kit as follows:

.1 Maximum working pressure: 1205 kPa.

.2 Maximum working temperature: 98.8ºC.

.3 0-103 kPa and 0-15 psig dual scale pressure gauge with 114 mm diameter face, ±2% accuracy.

.4 Test valves: two (2) ball valves and one (1) needle valve.

.5 Hoses: three (3) one (1) metre test hoses with female threaded swivel coupling.

.6 Adapters:

.1 Three (3) NPS ¼ threaded coupling adapters.

.2 Three (3) NPS ½ x NPS ¼ bushings.

.3 Three (3) NPS ¾ x NPS ¼ bushings.

.7 400 mm long securing strap.

.8 Moisture resistant instruction guide.

.9 Light weight, shock resistant molded plastic case with foam inserts.

.10 Acceptable Product: Watts No. TK-9A Backflow Preventer Test Kit, Precisions Plumbing Products, MIFAB.

2.7 VACUUM BREAKERS

.1 To CSA-B64 Series.

.2 Atmospheric vacuum breaker, where indicated:

.1 Plain brass body with silicone disc.

.2 Suitable for temperatures up to 82ºC.

.3 Maximum operating pressure: 860 kPa.

.4 Size: as indicated.

.5 Acceptable Product: Watts Series 288a, Wilkins, Jay R. Smith, MIFAB.

.3 Hose connection vacuum breaker:

.1 NPS ¾ female hose thread inlet, NPS ¾ male hose threat outlet, brass finish.

2.8 PRESSURE REGULATORS

.1 Capacity: as indicated.

.1 Inlet pressure: 1034 kPa.

.2 Outlet pressure: 413 kPa.

.3 Capacity: as indicated.

.2 Up to NPS1-1/2 bronze bodies, screwed: to ASTM B62, strainer and stainless steel strainer screen.

.3 NPS2 and over, semi-steel bodies, Class 125, flanged: to ASTM A126, Class B, strainer.

.4 Semi-steel spring chambers with bronze trim.

2.9 BACKWATER VALVES

.1 Coated extra heavy cast iron body with bronze seat, bronze flapper and threaded cover.

.2 Access:

.1 Surface access.

.2 Concrete access pit with steel cover, as indicated.

2.10 HOSE BIBBS AND SEDIMENT FAUCETS

.1 Bronze construction complete with integral back flow preventer, hose thread spout, replaceable composition disc, and chrome plated in finished areas.

2.11 WATER MAKE-UP ASSEMBLY

.1 Complete with backflow preventer, pressure gauge on inlet and outlet, pressure reducing valve to CSA B356, pressure relief valve on low pressure side and gate valves on inlet and outlet, strainer.

2.12 WATER METERS

.1 Displacement type to AWWA C700, Turbine type to AWWA C701, Compound type to AWWA C702.

.2 Capacity: flow rate, pressure drop, pipe connections as indicated.

.3 Accessories: remote readout device, pulse output or 4-20 mA current output.

2.13 TRAP SEAL PRIMERS

.1 Pressure drop actuated:

.1 Brass body construction with inlet opening of ½ male NPT and outlet opening of female ½ NPT.

.2 Provide complete with four-hole view built-in air gap to prevent any backflow from trap being fed into the water supply.

.3 Provide removable inlet filter screen.

.4 Capacity to serve up to four (4) floor drains.

.5 Provide complete with trap seal primer distribution unit as follows:

.1 Brass body construction.

.2 ½ NPT inlet connection.

.3 Four (4) 3/8 FPT brass nipple outlet connections.

.4 Four (4) 6 mm diameter vent holes in lid to provide air gap and backflow protection.

.2 Up to 12 floor drains: Electronic trap priming manifold with:

.1 Vacuum breaker

.2 Pre-set 24 hour time clock

.3 Manual override switch

.4 120V solenoid valve

.5 120V or 3 wire connection.

.6 NPS ¾ inlet connection.

.7 Calibrated manifold.

.8 Water hammer arrestor

.9 Mounted in steel cabinet

.10 Compression outlet fittings

.11 Inlet shut off valve

.12 Supplies minimum 59 ml @ 138 kPa.

.3 TRAP GUARD:

.1 All elastomeric normally closed trap guard device utilizes a normally closed seal to prevent evaporation of the trap seal and to protect against sewer gases from backing up into habitable areas. It opens with fluid flow and allows liquid drainage to flow through into the building drain.

.2 Trap Guards are not to be used unless otherwise noted on plumbing drawings. The use of Trap Guards in lieu of Trap Seal Primers shall be at the discretion of MUN.

2.14 STRAINERS

.1 860 kPa, Y type with 20 mesh, monel, bronze or stainless steel removable screen.

.2 NPS2 and under, bronze body, screwed ends, with brass cap, tapped blowoff and plug.

.3 NPS2½ and over, cast iron body, flanged ends, with bolted cap, tapped blow off connection with bronze ball valve.

2.15 GREASE INTERCEPTORS

.1 Dura coated interior and exterior fabricated steel low type grease interceptors rated as indicated with grease holding capacity as indicated. Unit shall be supplied complete with internal air relief bypass, bronze cleanout plug and trap seal with removable combination pressure equalizer/flow diffusing baffles, gasketted secured cover.

.2 Provide optional enzyme port in cover.

.3 Provide internal or external flow control for field installation. External flow control with orifice sized to suit rated flow as outlined above. External flow control to have inlet/outlet connections as indicated.

.4 Supply grease interceptor with one (1) year supply of poly-enzyme.

.5 Grease interceptor shall carry the PDI label.

.6 Acceptable Product: Zurn Low Profile Grease Interceptor size as indicated, Jay R. Smith, MIFAB, Watts.

2.16 ACID DILUTION DEVICES

.1 Chemical dilution tank:

.1 Chemical dilution tanks to be constructed of seamless natural linear low density polyethylene resins. Tank to have uniform wall thickness and be free of any stresses.

.2 Tanks to be provided complete with side inlet/outlet connections.

.3 Tanks to be supplied with side plumbing vent connection.

.4 Each tank inlet/outlet to accept connection to corrosion resistant drainage piping system utilizing threaded male adaptor and mechanical joint connections.

.5 Tanks to be provided with bolted cover complete with vapour tight cover gasket pre-cut to cover bolt hole pattern.

.6 Connections: as indicated.

.7 Size (total volume, not effective volume):

.1 As indicated.

.8 Dilution tank overall height and diameter to be as follows:

.1 As indicated.

.9 Dilution tank inlet/outlet location on tank will be field determined by Contractor after rough-in of chemical resistant waste piping.

.10 Acceptable Product: Watts/Orion, PEGAS, Town and Country, Zurn Z9A-NT.

.2 Chemical dilution tank sediment interceptor:

.1 Chemical dilution tank sediment interceptors to be constructed of seamless natural linear low density polyethylene resins. Tanks to have uniform thickness and be free of any stresses.

.2 Tanks to be provided complete with side inlet/outlet connections.

.3 Tanks to be supplied without plumbing vent connection.

.4 Each tank inlet/outlet to accept connection to corrosion resistant drainage piping system utilizing male threaded adaptor and mechanical joint connections.

.5 Tanks to be provided complete with bolted cover complete with vapour tight cover gasket pre-cut to cover bolt hole pattern.

.6 Connections: as indicated.

.7 Sizes (total tank volume, not solids retained in basket):

.1 Capacity: as indicated.

.8 Sediment interceptor overall height and diameter as indicated.

.9 Sediment interceptor inlet/outlet location on tank wall to be field determined by Contractor after rough-in of chemical resistant waste piping.

.10 Sediment interceptor to be fully recessed in pre-formed concrete pit constructed by the General Contractor. The General Contractor is to be responsible to supply cover over pit to accommodate pedestrian traffic.

.11 Sediment interceptor solids baskets shall consist of a perforated polyethylene liner with 4.7 mm diameter perforations.

.12 The General Contractor to be responsible to fabricate and install steel frame structure to support sediment interceptor if required to facilitate connection to dilution tank at proper invert.

.13 Acceptable Product: Watts/Orion Sediment Interceptor, PEGAS, Town and Country, Zurn Z9A-SI.

2.17 COMBINATION EMERGENCY DRENCH SHOWER/EYEWASH UNIT (BARRIER FREE)

.1 Bowl: 254 mm diameter corrosion resistant stainless steel bowl.

.2 Shower head: 254 mm diameter corrosion resistant stainless steel shower head.

.3 Pipe and fittings: galvanized steel with protective yellow safety coating.

.4 Operation:

.1 Shower: pull rod with triangular handle.

.2 Eyewash: large, highly visible push handle.

.5 Pipe and Fittings: Schedule 40, stainless steel, complete with orange of yellow polyethylene cover on vertical piping for high visibility and corrosion resistance.

.6 Water supply: NPS 1/2.

.7 Waste: NPS 1 ¼.

.8 Shower valve: chrome-plated NPS 1 stay-open ball valve.

.9 Eyewash valve: chrome-plated NPS ½ stay-open ball valve.

.10 Eyewash spray head assembly: chrome-plated brass spray head assembly with twin, soft flow, eyewash heads and protective sprayhead covers. Integral flow control to ensure safe, steady flow under varying water supply conditions.

.11 Identification sign: 355 mm x 90 mm sign for wall mounting. Sign to read "**EMERGENCY DRENCH SHOWER/EYEWASH UNIT**".

.12 Location: as indicated.

.13 Acceptable Product: Bradley Model S19-310BF, HAWS, Guardian.

2.18 EMERGENCY EYEWASH AND COMBINATION EMERGENCY DRENCH SHOWER/EYEWASH THERMOSTATIC MIXING VALVE

.1 To ANSI Z358.1.

.2 Liquid-filled thermal motor and piston control mechanism with positive shut-off of hot water when cold water supply is lost to prevent scalding.

.3 Valve shall allow cold water flow in the event of loss or interruption of the hot water supply or thermostatic failure.

.4 Vandal-resistant temperature adjustment.

.5 Rough bronze finish.

.6 Temperature range: 18ºC to 35ºC.

.7 Accuracy: ±1.67ºC.

.8 Maximum operating pressure: 860 kPa.

.9 Maximum inlet temperature: 82ºC.

.10 Provide complete with dial thermometer.

.11 Check stops on inlet of hot/cold.

.12 Provide complete with 18 gauge surface mounted stainless steel enclosure. Dimension of enclosure to be 610 mm high x 578 mm wide x 165 mm deep.

.13 Capacity: 98.5 L/min at 310 kPa differential pressure with a cold flow bypass capacity of 50.0 L/min at 310 kPa differential pressure.

.14 Application: emergency fixtures as indicated.

.15 Acceptable Product: Bradley S19-2100-SS, Powers, HAWS, Guardian.

2.19 EMERGENCY EYEWASH THERMOSTATIC MIXING VALVE

.1 Same as thermostatic mixing valve specified in Item 2.18 except for the following:

.1 Wall enclosure dimensions to be 318 mm high x 279 mm wide x 165 mm deep.

.2 Capacity: 35.6 L/min at 310 kPa differential pressure with a cold flow bypass capacity of 25.7 L/min at 310 kPa differential pressure.

.2 Acceptable Product: Bradley S19-2000-SS, Powers, Haws, Guardian, Lawler 911.

2.20 EMERGENCY EYEWASH FIXTURE - PEDESTAL MOUNTED (BARRIER FREE)

.1 Application: as indicated.

.2 Bowl: 254 mm diameter corrosion resistant stainless steel bowl.

.3 Face spring ring: chrome plated circular spray ring to provide supplemental face spray. Provide complete with flow control to ensure adequate flow from eyewash nozzles and face spray ring.

.4 Spray Head Assembly: Chrome plated brass spray head assembly with twin, soft flow, eye wash heads and protective spray head covers. The integral flow control shall ensure safe, steady flow under varying water supply conditions.

.5 Valve: chrome plated brass, NPS ½ stay-open ball valve.

.6 Operation: hand operated by a large, highly visible safety yellow PVC push handle.

.7 Waste: Dome type strainer and NPS 1 ¼ drain fitting furnished.

.8 Water Supply: NPS ½.

.9 Pipe and fittings: galvanized steel with protective yellow safety coating.

.10 Identification sign: 355 mm x 90 mm sign for wall mounting. Sign to read "**EMERGENCY EYEWASH FOUNTAIN**".

.11 Acceptable Product: Bradley Model S19-210BF complete with options indicated, HAWS, Guardian.

2.21 PIPE WALL AND FLOOR PENETRATION SEAL

.1 Application:

.1 Pipes penetrating exterior concrete walls below grade and concrete floors on grade.

.2 Seal material to be EPDM.

.3 Pressure plates to be glass-reinforced plastic.

.4 Bolts and nuts to be stainless steel 18-8.

.5 Suitable temperature range to be -40ºC to 121ºC.

.6 Wall sleeves to be Schedule 40 black iron pipe. Sleeves in exterior walls to be galvanized.

.7 Floor sleeves to be Schedule 40 black iron pipe.

.8 Wall and floor sleeves to be sufficiently long to mount flush with interior and exterior walls and flush with finished floor of slab-on-grade floors, 50 mm above floor, for floors above grade.

.9 Acceptable Product: Metraseal MS Series, Link Seal.

2.22 DOMESTIC CLOTHES WASHER SUPPLY FITTING

.1 To control both hot and cold water simultaneously.

.2 "Finger-tip" lever operation.

.3 Bronze body construction with NPT ½ copper connections and satin chrome finish.

.4 Provide complete with mini water hammer arrestor on hot and cold.

.5 Mount in 300 mm x 300 mm x 100 mm deep stainless steel valve box, 16 gauge, #4 finish. Provide less access door and complete with back in box.

.6 Acceptable Product: Watts Duo-Cloz Model No. 2-M2-SC complete with Watts Model No. 05-H mini water hammer arrestor on hot and cold and entire assembly mounted in a MIFAB Model MI-VB stainless steel valve box, Precision Plumbing Products, MIFAB.

2.23 TEMPERED WATER ASSEMBLY

.1 Quantity: as indicated

.2 Hi/Lo combination assembly mounted in wall mounted (surface) stainless steel cabinet.

.3 Capacity:

.1 High capacity: as indicated @ 310 kPa differential pressure (maximum flow).

.2 Low capacity: as indicated @ 34 kPa differential pressure (minimum flow).

.4 Provide check stops on hot/cold water inlet to each valve.

.5 Provide a pressure regulating valve that responds to varying flow requirements.

.6 Each tempered water valve to be thermostatic mixing type with liquid filled thermostatic motors that sense and control water temperature.

.7 Assembly shall be capable of maintaining water temperature to within 8ºC above setpoint within the range of 4ºC to 71ºC.

.8 Valves to be bronze body.

.9 Valves to be ASSE and CSA approved.

.10 Provide pressure gauges on inlet/outlet of high capacity valve.

.11 Provide dial thermometer at discharge of tempered water assembly.

.12 Acceptable Product: Powers Hydroguard Simmons, RADA Mechanical Products Ltd., Lawler Master Controller Or approved equal.

2.24 POTABLE WATER THERMAL EXPANSION TANK

.1 Quantity: as indicated.

.2 Application: absorb expanded water from domestic hot water tanks because of the inability to expand back into the Town potable water system due to the presence of a backflow preventer on the incoming water supply to the building.

.3 ASME Section VIII construction and label.

.4 FDA approved butyl bladder.

.5 1NPT stainless steel system connection.

.6 Standard tire air charging valve connection.

.7 1033 kPa maximum working pressure.

.8 Vertical tank, floor mounted.

.9 Dimensions: as indicated.

.10 Tank volume: as indicated.

.11 Acceptance volume: as indicated.

.12 Red primer exterior finish.

.13 Air pre-charge to be adjusted in field by the Mechanical Contractor to equal the residual cold water pressure on the discharge side of the pressure reducing valve on the domestic water service entrance by the Mechanical Contractor.

.14 Acceptable Product: ExpanFlex, Amtrol, Taco, S. A. Armstrong, Bell and Gossett, Zurn, Wilkins Series WXTP, Watts.

2.25 COMBINATION EMERGENCY DRENCH SHOWER/EYEWASH UNIT FLOW SWITCH ALARM SYSTEM

.1 Suitable for connection to drench shower with NPS 1-1/2 inlet piping rated for a flow of 1.89 L/s.

.2 System to be fully grounded and electrically insulated from water piping for safety.

.3 Power supply: 120/1/60 with 0.5 amp current draw.

.4 Electrical connection: Pre-wired 1800 mm long multiple conductor, quick connect, waterproof cable for easy connection to the alarm assembly.

.5 Flow Switch: UL listed and CSA approved. Watertight and completely assembled for easy hook-up to alarm assembly.

.6 Strobe light: UL Listed and CSA approved. Light intensity to be 258,000 maximum effective candella on horizontal axis. Safety amber-colored glass complete with dust cover. All solid state components with no moving parts for maintenance-free operation.

.7 Audible Horn: UL listed, externally adjustable from 78-103 decibels at 3.0 meters. Horn designed to sound away from the injured person.

.8 On/Off Switch: Enables horn to be turned off while the strobe light continues to flash and the water flows.

.9 Provide complete with one (1) year warranty.

.10 Acceptable Product: Bradley Model S19-320, HAWS, Guardian.

2.26 EMERGENCY EYEWASH FLOW SWITCH ALARM SYSTEM

.1 Suitable for connection to emergency eyewash with NPS ½ inlet piping rated for a flow of 0.32 L/s.

.2 Alarm horn and strobe light to be wall-mounted above and to side of emergency eyewash. Ensure audible horn points away from injured person.

.3 Construction: Same as Item 2.25, except flow switch sized as per Item 2.26.1 above.

.4 Acceptable Product: Bradley Model S19-320A, HAWS, Guardian.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

3.2 INSTALLATION

.1 Install in accordance with Canadian Plumbing Code , and local authority having jurisdiction.

.2 Install in accordance with manufacturer's instructions and as specified.

3.3 CLEANOUTS

.1 In addition to those required by code, and as indicated, install at base of soil and waste stacks, and rainwater leaders.

.2 Bring cleanouts to wall or finished floor unless serviceable from below floor.

.3 Building drain cleanout and stack base cleanouts: line size to maximum NPS4.

3.4 NON FREEZE WALL HYDRANTS

.1 Install 600 mm above finished grade unless otherwise indicated.

3.5 WATER HAMMER ARRESTORS

.1 Install on branch supplies to fixtures or group of fixtures where indicated.

3.6 BACK FLOW PREVENTORS

.1 Install in accordance with CSA-B64 Series, where indicated and elsewhere as required by code.

.1 Reduced pressure type where backflow would constitute a health hazard.

.2 Double check type where backflow would constitute a nuisance or be aesthetically objectionable or material which would not constitute a health hazard.

.2 Pipe discharge to terminate over nearest drain and or service sink.

3.7 BACKWATER VALVES

.1 Install in main sewer lines where indicated.

.2 Install in access pit as indicated.

3.8 HOSE BIBBS AND SEDIMENT FAUCETS

.1 Install at bottom of risers, at low points to drain systems, and as indicated.

3.9 TRAP SEAL PRIMERS

.1 Install for floor drains and elsewhere, as indicated.

.2 Install on cold water supply to nearest frequently used plumbing fixture, in concealed space, to approval of Owner.

.3 Install Type K soft copper tubing to floor drain.

3.10 STRAINERS

.1 Install with sufficient room to remove basket.

3.11 GREASE INTERCEPTORS

.1 Install with sufficient space, as indicated, for ease of maintenance.

3.12 WATER METERS

.1 Install water meter provided by local water authority.

.2 Install water meter as indicated.

3.13 WATER MAKE-UP ASSEMBLY

.1 Install on valved bypass.

.2 Pipe discharge from relief valve to nearest floor drain.

3.14 CHEMICAL DILUTION TANK

.1 Install with sufficient space, as indicated, for ease of maintenance.

3.15 CHEMICAL DILUTION TANK SEDIMENT INTERCEPTOR

.1 Install with sufficient space, as indicated, for ease of maintenance.

3.16 START-UP AND COMMISSIONING

.1 General:

.1 In accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: supplemented as specified herein.

.2 Timing: Start-up only after:

.1 Pressure tests have been completed.

.2 Disinfection procedures have been completed.

.3 Water treatment systems operational.

.3 Provide continuous supervision during start-up.

3.17 TESTING AND ADJUSTING

.1 General:

.1 In accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: supplemented as specified herein.

.2 Timing:

.1 After start-up deficiencies rectified.

.2 After certificate of completion has been issued by authority having jurisdiction.

.3 Application tolerances:

.1 Pressure at fixtures: +/- 70 kPa.

.2 Flow rate at fixtures: +/- 20%.

.4 Adjustments:

.1 Verify that flow rate and pressure meet design criteria.

.2 Make adjustments while flow rate or withdrawal is (1) maximum and (2) 25% of maximum and while pressure is (1) maximum and (2) minimum.

.5 Floor drains:

.1 Verify operation of trap seal primer.

.2 Check operations of flushing features.

.3 Check security, accessibility, removeability of strainer.

.4 Clean out baskets.

.6 Vacuum breakers, backflow preventers, backwater valves:

.1 Test tightness, accessibility for O&M of cover and of valve.

.2 Simulate reverse flow and back-pressure conditions to test operation of vacuum breakers, backflow preventers.

.3 Verify visibility of discharge from open ports.

.7 Roof drains:

.1 Check location at low points in roof.

.2 Check security, removeability of dome.

.3 Adjust weirs to suit actual roof slopes, meet requirements of design.

.4 Clean out sumps.

.5 Verify provisions for movement of roof systems.

.8 Access doors:

.1 Verify size and location relative to items to be accessed.

.9 Cleanouts:

.1 Verify covers are gas-tight, secure, yet readily removable.

.10 Water hammer arrestors:

.1 Verify proper installation of correct type of water hammer arrester.

.11 Wall, Ground hydrants:

.1 Verify complete drainage, freeze protection.
.2 Verify operation of vacuum breakers.

.12 Pressure regulators, PRV assemblies:

.1 Adjust settings to suit locations, flow rates, pressure conditions.

.13 Strainers:

.1 Clean out repeatedly until clear.
.2 Verify accessibility of cleanout plug and basket.
.3 Verify that cleanout plug does not leak.

.14 Grease interceptors:

.1 Activate, using manufacturer's recommended procedures and materials.

.15 Hose bibbs, sediment faucets:

.1 Verify operation and at all low points.

.16 Hydronic system water Make-up Assembly:

.1 Verify operation.

.17 Water meters:

.1 Verify calibration certificate.

.18 .Dilution Tank:

.1 Install as per manufacturer's instructions.

.2 Fill with limestone chips.

.19 Tempered water assemblies:

.1 Verify operation of Hi/Lo tempered water assemblies at both high and low flow conditions.

.2 Verify proper discharge temperature setpoint for all tempered water assemblies including those serving emergency fixtures.

.20 Commissioning Reports:

.1 In accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: supplemented as specified herein.

.21 Training:

.1 In accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: supplemented as specified herein.

.2 Demonstrate full compliance with Design Criteria.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section includes:

.1 The supply and installation of washroom fixtures and trim.

.2 Products installed but not supplied under this section as indicated elsewhere in the contract:

.1 Install rough-in for equipment supplied by others, complete with valves on hot and cold water supplies, waste and vent.

.2 Equipment installed by others.
.1 Connect with unions.

.3 Equipment not installed.
.1 Capped for future connection by others.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 35 29.06 – Health and Safety Requirements.

.3 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

.4 Section 01 78 00 - Closeout Submittals.

1.3 REFERENCES

.1 American National Standards Institute (ANSI)

.1 ANSI 112-19.2, Ceramic Plumbing Fixtures.

.2 American National Standards Institute/national Sanitation Foundation (ANSI/NSF)

.1 ANSI/NSF 61, Drinking Water System Components.

.3 Canadian Standards Association (CSA)

.1 CAN/CSA-B45 Series, Plumbing Fixtures.
.2 CAN/CSA-B125, Plumbing Fittings.
.3 CAN/CSA-B651, Barrier-Free Design.

.4 Province of Newfoundland and Labrador Building Accessibility Act Regulations.

1.4 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Product Data: Submit WHMIS SDS –Safety Data Sheets.

.3 Submit shop drawings and product data in accordance with Section 01 33 00 – Submittal Procedures.

.4 Indicate fixtures and trim:

.1 Dimensions construction details, roughing-in dimensions.

.2 Factory-set water consumption per flush at recommended pressure.

.3 For water closets, urinals: minimum pressure required for flushing.

.5 Closeout Submittals:

.1 Provide maintenance data including monitoring requirements for incorporation into manuals specified in Section 01 78 00 – Closeout Submittals.

.2 Include:

.1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.

.2 Details of operation, servicing, maintenance.

.3 List of recommended spare parts.

1.5 QUALITY ASSURANCE

.1 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 – Health and Safety Requirements.

1.6 DELIVERY STORAGE AND DISPOSAL

.1 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

.2 Collect and separate for disposal, paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.3 Fold up metal and plastic banding, flatten and place in designated area for recycling.

1.7 WARRANTY

.1 Provide a written guarantee, signed and issued in the name of the owner, against defective materials and workmanship for a period of one (1) year from the date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

.1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.

.2 Trim, fittings: manufacture in accordance with CAN/CSA-B125.

.3 Exposed plumbing brass to be chrome plated.

.4 Number, locations: Architectural drawings to govern.

.5 Fixtures to be product of one manufacturer and of same type.

.6 Trim to be product of one manufacturer and of same type.

2.2 WATER CLOSETS

.1 Water Closets

.1 WC-All: Wall-mounted, flush valve, top spud maximum 6 litres/flush.
- .1 Bowl: vitreous china, syphon jet, elongated rim, 50 mm ballpass trapway, NPS 1½ spud. 460mm ADD
- .2 Acceptable Product: American Standard 3351 101

.2 Water Closet Trims

.1 WCV-All Water closet flush valve exposed, manual:
- .1 Quiet action, externally adjustable exposed diaphragm flush valve.
- .2 For water closets with NPS 1 ½ top spud.
- .3 Maximum 292 mm from centerline of valve inlet to top of water closet, except trap seal models which are maximum 298 mm.
- .4 Polished chrome plated finish.
- .5 Vandal resistant cover screw.
- .6 Metal “non hold open” oscillating handle.
- .7 NPS 1 FIP/Copper sweat inlet adaptor.
- .8 Adjustable 121 mm plus or minus 11 mm inlet/valve outlet centers.
- .9 Vacuum breaker.
- .10 88 mm dia. cover tube and wall flange.
- .11 Renewable seat.
- .12 Chloramine resistant diaphragm attached to guide with forged metal retainer.
- .13 Spud flange and concealed spud nut.
- .14 Pressure loss check angle stop with protecting cap.
- .15 6 litre Factory set flush – field adjustable.
- .16 Acceptable Product: Delta 81T201

.3 Water Closet Seats and Backrests:

.1 Seat: white, elongated, open front, molded solid plastic, less cover, stainless steel check hinges, stainless steel or solid brass insert post. For handicapped closets include cover if back rest not provided by architect.

2.3 URINALS

.1 Urinals

.1 U-All: Wall-mounted, back spud, 1.9L flush
- .1 Urinal: low consumption, integral flushing mechanism, elongated 356mm rim from finished wall, flushing rim, washout flush action, integral extended sides,

wall hangers, 50mm NPTF outlet connection, cover and mounting kit, plug-in power supply 120 VAC, 60 HZ, 5VDC, 500 ma output.

.2 Acceptable Product: American Standard 6515 001

.2 Urinal Trims

.1 UFV-All Urinal Electronic Flush Valves for Public Washrooms and as indicated.

.1 CSA certified.
.2 ADA compliant and meets Handicapped Accessibility Standard ANSI 117.1.
.3 Complies to ASSE standard 1037.
.4 IAMPO listed.
.5 Infrared electronic activation.
.6 355 mm stainless steel cover with integral sensor.
.7 Recessed mounting components assembled with flush valve in 305mm frame.
.8 Preset blocking time, built-in activation delay.
.9 Electronic manual override.
.10 Solenoid operation valve.
.11 8 second blocking time.
.12 4 second activation delay.
.13 Adjustable flush volume with adjustment screw.
.14 Selectable sensing distance 610 to 1400 mm in 200 mm increments. Factory set at 1000 mm.
.15 24 hour courtesy flush, factory set to off.
.16 Acceptable Products: Delta 1600T6403RI and 1600T6403TR

2.4 WASHROOM LAVATORIES

.1 Washroom Lavatory

.1 LAV-1 Counter-top:

.1 Vitreous China, self-rimming, with concealed front overflow, gasket, swivel clamps, oval bowl, supply openings on 100 mm centres. Sizes: 521 x 428 mm outside
.2 Acceptable Product: American Standard 0346 403.

.2 LAV-2 Wall-hung, for accessible/barrier –free.

.1 Vitreous china, front overflow, faucet holes on 102 mm centers, concealed arm carrier. Size: 515 x 686mm.
.2 Acceptable Product: American Standard 9141.011

.2 Washroom Lavatory Trim.

.1 LT-1 Washroom Lavatory Electronic Trim for Public Washrooms and as indicated.

.1 Hard wire c/a battery back-up.
.2 Chrome plated, cast brass construction above deck.
.3 Cast one-piece body with integral waterproof sensor and connector.
.4 DMD self-adaptive technology no external adjustments required.
.5 Serviceable filter screen upstream of solenoid valve.
.6 Metal hold-down package.
.7 Hands free (touchless) operation.
.8 Water flows when sensor is activated.

.9 Water flow stops upon de-activation of sensor.
.10 Sensing zone approximately 178 mm.
.11 Pre-set 45 second maximum run time.
.12 Will reset once obstruction is removed.
.13 110 to 24 VAC transformer.
.14 Chrome finish.
.15 Vandal resistant 5.7L/min.) flow control non-aerating spray outlet.
.16 Factory assembled in recessed mounting 250 mm metal box with stainless steel cover- includes mechanical mixing valve with thermostatic limit stop.
.17 Acceptable Product: Moen CA8301

2.5 FIXTURE PIPING

.1 Hot and cold water supplies to fixtures:
.1 Chrome plated flexible supply pipes with screwdriver stop, reducers, escutcheon.

.2 Waste:
.1 Brass P trap with cleanout on fixtures not having integral trap.
.2 Chrome plated in exposed places.

2.6 CHAIR CARRIERS.

.1 Factory manufactured floor-mounted carrier systems for wall-mounted fixtures.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Mounting heights: As per architectural drawings

3.2 ADJUSTING

.1 Conform to water conservation requirements specified this section.

.1 Adjustments.
.1 Adjust water flow rate to design flow rates.
.2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
.3 Adjust flush valves to suit actual site conditions.
.4 Adjust urinal flush timing mechanisms.
.5 Automatic flush valves for urinals and waterclosets: set controls to prevent unnecessary flush cycles during silent hours.

.2 Checks.
.1 Water closets, urinals: flushing action.
.2 Aerators: operation, cleanliness.
.3 Vacuum breakers, backflow preventers: operation under all conditions.

.3 Thermostatic controls.
.1 Verify temperature settings, operation of control, limit and safety controls.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction / Demolition Waste Management and Disposal.

.3 Section 01 78 00 - Closeout Submittals.

1.2 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop drawings; submit drawings stamped and signed for approval by Owner's Representative.

.3 Shop drawings to show:

- .1 Mounting arrangements.
- .2 Operating and maintenance clearances.

.4 Shop drawings and product data accompanied by:

- .1 Detailed drawings of bases, supports, and anchor bolts.
- .2 Acoustical sound power data, where applicable.
- .3 Points of operation on performance curves.
- .4 Manufacturer to certify current model production.
- .5 Certification of compliance to applicable codes.

.5 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.

.6 Closeout Submittals:

- .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Operation and maintenance manual approved by, and final copies deposited with, Owner's Representative before final inspection.
- .3 Operation data to include:
  - .1 Control schematics for systems including environmental controls.
  - .2 Description of systems and their controls.
  - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
  - .4 Operation instruction for systems and component.
  - .5 Description of actions to be taken in event of equipment failure.
  - .6 Valves schedule and flow diagram.
  - .7 Colour coding chart.

.4 Maintenance data to include:

.1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.

.2 Data to include schedules of tasks, frequency, tools required and task time.

.5 Performance data to include:

.1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.

.2 Equipment performance verification test results.

.3 Special performance data as specified.

.4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

.6 Approvals:

.1 Submit 2 copies of draft Operation and Maintenance Manual to Owner's Representative for approval. Submission of individual data will not be accepted unless directed by Owner's Representative.

.2 Make changes as required and re-submit as directed by Owner's Representative.

.7 Additional data:

.1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.

.8 Site records:

.1 Owner's Representative will provide 1 set of reproducible mechanical drawings or AutoCAD files. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.

.2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.

.3 Use different colour for each service.

.4 Make available for reference purposes and inspection.

.9 As-built drawings:

.1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.

.2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).

.3 Submit to Owner's Representative for approval and make corrections as directed.

.4 Perform testing, adjusting and balancing for HVAC using as-built drawings.

.5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

.10 Submit copies of as-built drawings for inclusion in final TAB report.

1.3 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.4 MAINTENANCE

.1 Furnish spare parts in accordance with Section 01 78 00 - Closeout Submittals as follows:

.1 One set of packing for each pump.

.2 One casing joint gasket for each size pump.

.3 One head gasket set for each heat exchanger.

.4 One glass for each gauge glass.

.5 One filter cartridge or set of filter media for each filter or filter bank in addition to final operating set.

.2 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 01 78 00 - Closeout Submittals.

.3 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 PRODUCTS

2.1 MATERIALS

.1 All materials used on this project shall be new and CSA approved unless noted otherwise.

PART 3 EXECUTION

3.1 PAINTING, REPAIRS AND RESTORATION

.1 Do painting in accordance with Section 09 91 23 - Interior Painting.

.2 Prime and touch up marred finished paintwork to match original.

.3 Restore to new condition, finishes which have been damaged.

3.2 CLEANING

.1 Clean interior and exterior of all systems including strainers. Protect open ends of ducts, diffusers, grilles and registers during construction to prevent ingress of dust and dirt into interior of ducts. If

dust or dirt is detected prior to startup, vacuum interior of all ducts and air handling units. Prior to vacuuming use video camera to record condition of ductwork. Also use video camera to record condition of ducts after cleaning.

3.3 FIELD QUALITY CONTROL

.1 Site Tests: conduct following tests in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - SUBMITTALS.

.1 Submit tests as specified in other sections of this specification.

.2 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.4 DEMONSTRATION

.1 Owner’s Representative will use equipment and systems for test purposes prior to acceptance. Contractor to supply labour, material, and instruments required for testing.

.2 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.

.3 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.

.4 Instruction duration time requirements as specified in appropriate sections.

.5 Owner’s Representative may record these demonstrations on video tape for future reference.

3.5 PROTECTION

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Use of HVAC systems during construction.

1.2 RELATED SECTIONS

.1 Section 01 51 00 - Temporary Utilities.

1.3 USE OF SYSTEMS

.1 Use of new and/or existing permanent heating and/or ventilating systems for supplying temporary heat or ventilation is permitted only under the following conditions: .

- .1 Entire system is complete, pressure tested, cleaned, flushed out.
- .2 Specified water treatment system has been commissioned, water treatment is being continuously monitored.
- .3 Building has been closed in, areas to be heated/ventilated are clean and will not thereafter be subjected to dust-producing processes.
- .4 There is no possibility of damage from any cause.
- .5 Supply ventilation systems are protected by 60 % filters, which shall be inspected daily, changed every week or more frequently as required.
- .6 Return systems have approved filters over all openings, inlets, outlets.
- .7 All systems will be:
  - .1 operated as per manufacturer's recommendations or instructions.
  - .2 operated by Contractor.
  - .3 monitored continuously by Contractor.
- .8 Warranties and guarantees are not thereby relaxed.
- .9 Regular preventive and all other manufacturers recommended maintenance routines are performed by Contractor at his own expense and under supervision of Owner’s Representative.
- .10 Refurbish entire system before static completion; clean internally and externally, restore to "as- new" condition, and replace filters in air systems.

.2 Filters specified in this section are over and above those specified in other sections of this project.

.3 Exhaust systems are not included in any approvals for temporary heating ventilation.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section includes:

.1 Concrete housekeeping pads, hangers and supports for mechanical piping, ducting and equipment.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 – Construction/Demolition Waste Management and Disposal

.3 Section 03 30 00 - Cast-in-Place Concrete.

.4 Section 05 12 23 - Structural Steel for Buildings.

.5 Section 05 50 00 - Metal Fabrications.

1.3 REFERENCES

.1 American National Standards Institute/ American Society of Mechanical Engineers (ANSI/ASME)

.1 ANSI/ASME B31.1, Power Piping, (SI Edition).

.2 American Society for Testing and Materials (ASTM)

.1 ASTM A125, Specification for Steel Springs, Helical, Heat-Treated.
.2 ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
.3 ASTM A563, Specification for Carbon and Alloy Steel Nuts.

.3 Factory Mutual (FM)

.4 Health Canada / Workplace Hazardous Materials Information System (WHMIS).

.1 Materials Safety Data Sheets (MSDS).

.5 Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS)

.1 MSS SP-58, Pipe Hangers and Supports - Materials, Design and Manufacture.
.2 ANSI/MSS SP-69, Pipe Hangers and Supports - Selection and Application.
.3 MSS SP-89, Pipe Hangers and Supports - Fabrication and Installation Practices.

.6 Underwriter's Laboratories of Canada (ULC)

1.4 SYSTEM DESCRIPTION

.1 Design Requirements

.1 Construct pipe hanger and support to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.

.2 Base maximum load ratings on allowable stresses prescribed by MSS SP58 or ASME B31.1.

.3 Ensure that supports, guides, anchors do not transmit excessive quantities of heat to building structure.

.4 Design hangers and supports to support systems under all conditions of operation, allow free expansion and contraction, prevent excessive stresses from being introduced into pipework or connected equipment.

.5 Provide for vertical adjustments after erection and during commissioning. Amount of adjustment to be in accordance with MSS SP58.

.2 Performance Requirements

.1 Design supports, platforms, catwalks, hangers, to withstand seismic events for location as per the National Building Code

1.5 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop drawings: submit drawings stamped and signed for approval by Owner’s Representative.

.3 Submit shop drawings and product data for following items:

.1 Bases, hangers and supports.

.2 Connections to equipment and structure.

.3 Structural assemblies.

.4 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.

.1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.2 Instructions: submit manufacturer's installation instructions.

.1 Owner’s Representative will make available 1 copy of systems supplier's installation instructions.

.5 Closeout Submittals:

.1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals

1.6 QUALITY ASSURANCE

.1 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 PRODUCTS

2.1 GENERAL

.1 Fabricate hangers, supports and sway braces in accordance with ANSI B31.1 and MSS SP-58 and SP-89.

.2 Use components for intended design purpose only. Do not use for rigging or erection purposes.

2.2 PIPE HANGERS

.1 Finishes:

.1 Pipe hangers and supports: galvanized painted with zinc-rich paint after manufacture.

.2 Use electro-plating galvanizing process or hot dipped galvanizing process.

.3 Ensure steel hangers in contact with copper piping are copper plated or epoxy coated.

.2 Upper attachment structural: Suspension from lower flange of I-Beam.

.1 Cold piping NPS 2 maximum: malleable iron C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip.

.1 Rod: 9 mm UL listed, 13 mm FM approved.

.2 Cold piping NPS 2 1/2 or greater, hot piping: Malleable iron beam clamp, eye rod, jaws and extension with carbon steel retaining clip, tie rod, nuts and washers, UL listed, FM approved where required to MSS-SP58 and MSS-SP69.

.3 Upper attachment structural: Suspension from upper flange of I-Beam.

.1 Cold piping NPS 2 maximum: Ductile iron top-of-beam C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip, UL listed FM approved where required to MSS SP69.

.2 Cold piping NPS 2 1/2 or greater, all hot piping: Malleable iron top-of-beam jaw-clamp with hooked rod, spring washer, plain washer and nut UL listed, FM approved where required.

.4 Upper attachment to concrete.

.1 Ceiling: Carbon steel welded eye rod, clevis plate, clevis pin and cotters with weldless forged steel eye nut. Ensure eye 6 mm minimum greater than rod diameter.

.2 Concrete inserts: wedge shaped body with knockout protector plate UL listed FM approved where required to MSS SP-69.

.5 Shop and field-fabricated assemblies.

.1 Trapeze hanger assemblies: MSS SP-89.

.2 Steel brackets: MSS SP-89.

.3 Sway braces for seismic restraint systems: to MSS SP-89.

.6 Hanger rods: threaded rod material to MSS SP-58.

.1 Ensure that hanger rods are subject to tensile loading only.

.2 Provide linkages where lateral or axial movement of pipework is anticipated.

.3 Do not use 22 mm or 28 mm rod.

.7 Pipe attachments: material to MSS SP-58.

.1 Attachments for steel piping: carbon steel galvanized.

.2 Attachments for copper piping: copper plated black steel.

.3 Use insulation saddles for hot pipework.

.4 Oversize pipe hangers and supports for insulated pipes.

.8 Adjustable clevis: material to MSS SP-69, UL listed FM approved, where required clevis bolt with nipple spacer and vertical adjustment nuts above and below clevis.

.1 Ensure "U" has hole in bottom for rivetting to insulation shields.

.9 Yoke style pipe roll: carbon steel yoke, rod and nuts with cast iron roll, to MSS SP-69.

.10 U-bolts: carbon steel to MSS SP-69 with 2 nuts at each end to ASTM A563.

.1 Finishes for steel pipework: galvanized.

.2 Finishes for copper, glass, brass or aluminum pipework: black with formed portion plastic coated or epoxy coated.

.11 Pipe rollers: cast iron roll and roll stand with carbon steel rod to MSS SP-69.

2.3 RISER CLAMPS

.1 Steel or cast iron pipe: galvanized black carbon steel to MSS SP-58, type 42, UL listed FM approved where required.

.2 Copper pipe: carbon steel copper plated to MSS SP-58, type 42.

.3 Bolts: to ASTM A307.

.4 Nuts: to ASTM A563.

2.4 INSULATION PROTECTION SHIELDS

.1 Insulated cold piping:

.1 64 kg/m^3 density insulation plus insulation protection shield to: MSS SP-69, galvanized sheet carbon steel. Length designed for maximum 3 m span.

.2 Insulated hot piping:

.1 Curved plate 300 mm long, with edges turned up, welded-in centre plate for pipe sizes NPS 12 and over, carbon steel to comply with MSS SP-69.

2.5 CONSTANT SUPPORT SPRING HANGERS

.1 Springs: alloy steel to ASTM A125, shot peened, magnetic particle inspected, with +/-5% spring rate tolerance, tested for free height, spring rate, loaded height and provided with Certified Mill Test Report(CMTR).

.2 Load adjustability: 10 % minimum adjustability each side of calibrated load. Adjustment without special tools. Adjustments not to affect travel capabilities.

.3 Provide upper and lower factory set travel stops.

.4 Provide load adjustment scale for field adjustments.

.5 Total travel to be actual travel + 20%. Difference between total travel and actual travel 25 mm minimum.

.6 Individually calibrated scales on each side of support calibrated prior to shipment, complete with calibration record.

2.6 VARIABLE SUPPORT SPRING HANGERS

.1 Vertical movement: 13 mm minimum, 50 mm maximum, use single spring pre-compressed variable spring hangers.

.2 Vertical movement greater than 50 mm: use double spring pre-compressed variable spring hanger with 2 springs in series in single casing.

.3 Variable spring hanger to be complete with factory calibrated travel stops. Provide certificate of calibration for each hanger.

.4 Steel alloy springs: to ASTM A125, shot peened, magnetic particle inspected, with +/-5 % spring rate tolerance, tested for free height, spring rate, loaded height and provided with CMTR.

2.7 EQUIPMENT SUPPORTS

.1 Fabricate equipment supports not provided by equipment manufacturer from structural grade steel meeting requirements of Section 05 12 23 - Structural Steel for Buildings. Submit calculations with shop drawings.

2.8 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

.1 Provide templates to ensure accurate location of anchor bolts.

2.9 PLATFORMS AND CATWALKS

.1 To Section 05 50 00 - Metal Fabrication.

2.10 HOUSE-KEEPING PADS

.1 For base-mounted equipment: Concrete, at least 100 mm high, 50 mm larger all around than equipment, and with chamfered edges.

.2 Concrete: to Section 03 30 00 - Cast-in-place Concrete by Division 3.

2.11 OTHER EQUIPMENT SUPPORTS

.1 From structural grade steel meeting requirements of Section 05 12 23 - Structural Steel for Buildings.

.2 Submit structural calculations with shop drawings.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

.1 Install in accordance with:

.1 Manufacturer's instructions and recommendations.

.2 Vibration Control Devices:

.1 Install on piping systems at pumps, boilers, chillers, cooling towers, elsewhere as indicated.

.3 Clamps on riser piping:

.1 Support independent of connected horizontal pipework using riser clamps and riser clamp lugs welded to riser.

.2 Bolt-tightening torques to be to industry standards.

.3 Steel pipes: Install below coupling or shear lugs welded to pipe.

.4 Cast iron pipes: Install below joint.

.4 Clevis plates:

.1 Attach to concrete with 4 minimum concrete inserts, one at each corner.

.5 Provide supplementary structural steelwork where structural bearings do not exist or where concrete inserts are not in correct locations.

.6 Use approved constant support type hangers where:

.1 vertical movement of pipework is 13 mm or more,

.2 transfer of load to adjacent hangers or connected equipment is not permitted.

.7 Use variable support spring hangers where:

.1 transfer of load to adjacent piping or to connected equipment is not critical.

.2 variation in supporting effect does not exceed 25 % of total load.

3.3 HANGER SPACING

.1 Plumbing piping: most stringent requirements of Canadian Plumbing Code

.2 Fire protection: to applicable fire code.

.3 Gas and fuel oil piping: up to NPS 1/2: every 1.8 m.

.4 Copper piping: up to NPS 1/2: every 1.5 m.

.5 Hydronic, steam, condensate, rigid, and flexible joint roll groove pipe: in accordance with table below, but not less than one hanger at joints.

Maximum Pipe Size: NPS	Maximum Spacing: Steel	Maximum Spacing: Copper
up to 1-1/4	2.1 m	1.8 m
1-1/2	2.7 m	2.4 m
2	3.0 m	2.7 m
2-1/2	3.6 m	3.0 m
3	3.6 m	3.0 m
3-1/2	3.9 m	3.3 m
4	4.2 m	3.6 m
5	4.8 m	
6	5.1 m	
8	5.7 m	
10	6.6 m	
12	6.9 m	

.6 Within 300 mm of each elbow.

.7 Pipework greater than NPS 12: to MSS SP69.

3.4 HANGER INSTALLATION

.1 Install hanger so that rod is vertical under operating conditions.

.2 Adjust hangers to equalize load.

.3 Support from structural members. Where structural bearing does not exist or inserts are not in suitable locations, provide supplementary structural steel members, comprised of angel iron or c-channel.

3.5 HORIZONTAL MOVEMENT

.1 Angularity of rod hanger resulting from horizontal movement of pipework from cold to hot position not to exceed 4 degrees from vertical.

.2 Where horizontal pipe movement is less than 13 mm, offset pipe hanger and support so that rod hanger is vertical in the hot position.

3.6 FINAL ADJUSTMENT

.1 Adjust hangers and supports:

.1 Ensure that rod is vertical under operating conditions.
.2 Equalize loads.

.2 Adjustable clevis:

.1 Tighten hanger load nut securely to ensure proper hanger performance.
.2 Tighten upper nut after adjustment.

.3 C-clamps:

.1 Follow manufacturer's recommended written instructions and torque values when tightening C-clamps to bottom flange of beam.

.4 Beam clamps:

.1 Hammer jaw firmly against underside of beam.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 TAB is used throughout this Section to describe the process, methods and requirements of testing, adjusting and balancing for HVAC.

.2 TAB means to test, adjust and balance to perform in accordance with requirements of Contract Documents and to do other work as specified in this Section.

1.2 QUALIFICATIONS OF TAB PERSONNEL

.1 Submit names of personnel certified to AABC, NBC, NEBB or SMACNA to perform TAB to Owner's Representative within 90 days of award of contract.

.2 Provide documentation confirming qualifications, successful experience. TAB contractor shall have a minimum of 5 (five) years experience to AABC, NBC, NEBB or SMACNA.

.3 TAB: performed in accordance with the requirements of standard under which TAB Firm's qualifications are approved:

- .1 Associated Air Balance Council, (AABC) National Standards for Total System Balance, MN-1.
- .2 National Balancing Council, (NBC) Certified Air Balancing Specifications and Certified Hydronic Balancing Specifications.
- .3 National Environmental Balancing Bureau (NEBB) TABES, Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems.
- .4 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), HVAC TAB HVAC Systems – Testing, Adjusting and Balancing.

.4 Recommendations and suggested practices contained in the TAB Standard: mandatory.

.5 Use TAB Standard provisions, including checklists, and report forms to satisfy Contract requirements.

.6 Use TAB standard for TAB, including qualifications for TAB Firm and Specialist and calibration of TAB instruments.

.7 Where instrument manufacturer calibration recommendations are more stringent than those listed in the TAB standard, use manufacturer's recommendations.

.8 TAB Standard quality assurance provisions such as performance guarantees form part of this contract.

- .1 For systems or system components not covered in TAB standard, use TAB procedures developed by TAB Specialist.
- .2 Where new procedures and requirements are applicable to Contract requirements have been published or adopted by body responsible for TAB Standard used (AABC, NBC,

NEBB, or SMACNA), requirements and recommendations contained in these procedures and requirements are mandatory.

1.3 PURPOSE OF TAB

.1 Test to verify proper and safe operation, determine actual point of performance, evaluate qualitative and quantitative performance of equipment, systems and controls at design, average and low loads using actual or simulated loads.

.2 Adjust and regulate equipment and systems so as to meet specified performance requirements and to achieve specified interaction with other related systems under normal and emergency loads and operating conditions.

.3 Balance systems and equipment to regulate flow rates to match load requirements over full operating ranges.

1.4 EXCEPTIONS

.1 TAB of systems and equipment regulated by codes, standards to be to satisfaction of authority having jurisdiction.

1.5 CO-ORDINATION

.1 Schedule time required for TAB (including repairs, re-testing) into project construction and completion schedule so as to ensure completion before acceptance of project.

.2 Do TAB of each system independently and subsequently, where interlocked with other systems, in unison with those systems.

1.6 PRE-TAB REVIEW

.1 Review contract documents before project construction is started and confirm in writing to Owner's Representative adequacy of provisions for TAB and other aspects of design and installation pertinent to success of TAB.

.2 Review specified standards and report to Owner's Representative in writing all proposed procedures which vary from standard.

.3 During construction, co-ordinate location and installation of TAB devices, equipment, accessories, measurement ports and fittings.

1.7 START-UP

.1 Follow start-up procedures as recommended by equipment manufacturer unless specified otherwise.

.2 Follow special start-up procedures specified elsewhere in other Divisions.

1.8 OPERATION OF SYSTEMS DURING TAB

.1 Operate systems for length of time required for TAB and as required by Owner's Representative for verification of TAB reports.

1.9 START OF TAB

.1 Notify Owner's Representative seven (7) working days prior to start of TAB.

.2 Start TAB when building is essentially completed, including:

- .1 Installation of ceilings, doors, windows, other construction affecting TAB.
- .2 Application of weatherstripping, sealing, caulking.
- .3 All pressure, leakage, other tests specified elsewhere in other Divisions.
- .4 All provisions for TAB installed and operational.

.3 Start-up, verification for proper, normal and safe operation of mechanical and associated electrical and control systems affecting TAB including but not limited to:

- .1 Proper thermal overload protection in place for electrical equipment.
- .2 Air systems:
  - .1 Filters in place, clean.
  - .2 Duct systems clean.
  - .3 Ducts, air shafts, ceiling plenums are airtight to within specified tolerances.
  - .4 Correct fan rotation.
  - .5 Fire, smoke, volume control dampers installed and open.
  - .6 Coil fins combed, clean.
  - .7 Access doors, installed, closed.
  - .8 Outlets installed, volume control dampers open.
- .3 Liquid systems:
  - .1 Flushed, filled, vented.
  - .2 Correct pump rotation.
  - .3 Strainers in place, baskets clean.
  - .4 Isolating and balancing valves installed, open.
  - .5 Calibrated balancing valves installed, at factory settings.
  - .6 Chemical treatment systems complete, operational.

1.10 APPLICATION TOLERANCES

.1 Do TAB to following tolerances of design values:

- .1 Laboratory HVAC systems: plus 10%, minus 0%.
- .2 Other HVAC systems: plus 5%, minus 5%.
- .3 Hydronic systems: plus or minus 10 %.
- .4 Refrigeration systems: plus or minus 10%.

1.11 ACCURACY TOLERANCES

.1 Measured values to be accurate to within plus or minus 2 % of actual values.

1.12 INSTRUMENTS

.1 Prior to TAB, submit to Owner's Representative list of instruments to be used together with serial numbers.

.2 Calibrate in accordance with requirements of most stringent of referenced standard for either applicable system or HVAC system.

.3 Calibrate within 3 (three) months of TAB. Provide certificate of calibration to Owner's Representative.

1.13 SUBMITTALS

.1 Submit, prior to commencement of TAB:

.2 Proposed methodology and procedures for performing TAB if different from referenced standard.

1.14 PRELIMINARY TAB REPORT

.1 Submit for checking and approval of Owner's Representative, prior to submission of formal TAB report, sample of rough TAB sheets. Include:

.1 Details of instruments used.
.2 Details of TAB procedures employed.
.3 Calculations procedures.
.4 Summaries.

1.15 TAB REPORT

.1 Format to be in accordance with referenced standard.

.2 TAB report to show results in SI units and to include:

.1 Project record drawings.
.2 System schematics.

.3 Submit 3 (three) copies of TAB Report to Owner's Representative for verification and approval, in English in D-ring binders, complete with index tabs.

1.16 VERIFICATION

.1 Reported results subject to verification by Owner's Representative.

.2 Provide manpower and instrumentation to verify up to 30% of reported results.

.3 Number and location of verified results to be at discretion of Owner's Representative.

.4 Bear costs to repeat TAB as required to satisfaction of Owner's Representative.

1.17 SETTINGS

.1 After TAB is completed to satisfaction of Owner's Representative, replace drive guards, close access doors, lock devices in set positions, ensure sensors are at required settings.

.2 Permanently mark settings to allow restoration at any time during life of facility. Markings not to be eradicated or covered in any way.

1.18 COMPLETION OF TAB

.1 TAB to be considered complete when final TAB Report received and approved by Owner's Representative.

1.19 AIR SYSTEMS

.1 Standard: TAB to be to most stringent of this section or TAB standards of AABC, NBC or NEBB.

.2 Do TAB of systems, equipment, components, controls specified in other Divisions.

.3 Qualifications: personnel performing TAB to be qualified to standards of AABC, NBC or NEBB.

.4 Quality assurance: Perform TAB under direction of supervisor qualified to standards of AABC, NBC or NEBB.

.5 Measurements: to include, but not limited to, following as appropriate for systems, equipment, components, controls: air velocity, static pressure, flow rate, pressure drop (or loss), temperatures (dry bulb, wet bulb, dewpoint), duct cross-sectional area, RPM, electrical power, voltage, noise, vibration, amperage and volts for each stage of electrical heating coils.

.6 Locations of equipment measurements: To include, but not be limited to, following as appropriate:

.1 Inlet and outlet of dampers, filter, coil, humidifier, fan, other equipment causing changes in conditions.

.2 At controllers, controlled device.

.7 Locations of systems measurements to include, but not be limited to, following as appropriate: Main ducts, main branch, sub-branch, run-out (or grille, register or diffuser).

1.20 HYDRONIC SYSTEMS

.1 Definitions: for purposes of this section, to include low pressure hot water heating, chilled water, condenser water, glycol systems.

.2 Standard: TAB to be to most stringent of TAB standards of AABC, NBC or NEBB.

.3 Do TAB of systems, equipment, components, controls specified in other Divisions.

.4 Qualifications: personnel performing TAB to be qualified to standards of AABC, NBC or NEBB.

.5 Quality assurance: perform TAB under direction of supervisor qualified to standards of AABC, NBC or NEBB.

.6 Measurements: to include, but not limited to, following as appropriate for systems, equipment, components, controls: flow rate, static pressure, pressure drop (or loss), temperature, specific gravity, density, RPM, electrical power, voltage, noise, vibration.

.7 Locations of equipment measurement: to include, but not be limited to, following as appropriate:

.1 Inlet and outlet of heat exchangers (primary and secondary sides), boiler, chiller, coil, humidifier, cooling tower, condenser, pump, PRV, control valve, other equipment causing changes in conditions.

.2 At controllers, controlled device.

.8 Locations of systems measurements to include, but not be limited to, following as appropriate: supply and return of primary and secondary loops (main, main branch, branch, sub-branch) of all hydronic systems, inlet connection of make-up water.

1.21 DOMESTIC WATER SYSTEMS

.1 Meet requirements as specified for hydronic systems.

.2 Locations of equipment measurements: To include, but not be limited to, following as appropriate: inlet and outlet of heaters, tank, pump, circulator, at controllers, controlled device.

.3 Locations of systems measurements to include, but not be limited to, following as appropriate: main, main branch, branch, sub-branch.

1.22 OTHER SYSTEMS

.1 Plumbing systems:

.1 Standard: National Plumbing Code.

.2 TAB procedures:

.1 Flush valves: adjust to suit project pressure conditions.

.2 Pressure booster systems: test for capacity and pressures under all conditions and at all times.

.3 Controlled flow roof drain systems: adjust weirs to suit actual roof conditions, slopes, areas drained.

.4 Pumped sanitary and storm water systems: test for proper operation at all possible flow rates. Refer to Section 32 32 13.13 – Packaged Sewage Lift, Wet Well Type.

.5 Pressure reducing station.

.2 Wet pipe sprinkler sprinkler systems:

.1 Standard: NFPA.

.2 TAB procedures: Refer to NFPA 13 Sprinkler System.

.3 Refrigeration systems forming part of HVAC systems:

.1 Standard: CSA B52 – Mechanical Refrigeration Code.

.2 TAB procedures: Refer to Standard as follows:

.1 Suction Pressure and Temperature.

.2 Discharge Pressure and Temperature.

.3 Suction Superheat

.4 Evaporation Pressure and Temperature.

.4 Chemical treatment systems:

.1 Standard: Section 23 25 00 – HVAC Water Treatment Systems.

.2 TAB procedures: refer to Section 23 25 00 – HVAC Water Treatment Systems.

1.23 OTHER TAB REQUIREMENTS

.1 General requirements applicable to work specified this paragraph:

.1 Qualifications of TAB personnel: as for air systems specified this section.

.2 Quality assurance: as for air systems specified this section.

.2 Laboratory fume hoods:

.1 Standard: ASHRAE 110 – Method of Testing Performance of Laboratory Fume Hoods, applicable provincial standard.

.2 TAB procedures: as described in standard.

.3 Building pressure conditions:

.1 Adjust HVAC systems, equipment, controls to ensure specified pressure conditions during winter and summer design conditions.

.4 Zone pressure differences:

.1 Adjust HVAC systems, equipment, controls to establish specified air pressure differentials, with all systems in all possible combinations of normal operating modes.

.5 Smoke management systems:

.1 Test for proper operation of all smoke and fire dampers, sensors, detectors, installed as component parts of air systems specified in other Divisions.

.6 Measurement of noise and vibration from equipment specified in Mechanical Division.

.1 Standard: 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment and 23 32 48 – Acoustical Air Plenums.

.2 Vibration measurements around each piece of rotating equipment.

.3 Sound measurements in each octave band around each piece of rotating equipment.

.4 Induct sound measurements in each octave band at each fan inlet and discharge.

.5 Induct sound measurements in each octave band at each air handling unit intake, return and discharge.

.6 Sound measurements in each octave band for each normally occupied room with air handling equipment running.

.7 Measurement of spatial noise:

.1 Standard: Section 23 32 48 – Acoustical Air Plenums.

1.24 POST- OCCUPANCY TAB

.1 Measure DBT, WBT (or %RH), air velocity, air flow patterns, NC levels, in occupied zone of areas designated by Owner's Representative.

.2 Participate in systems checks twice during Warranty Period - #1 approximately 3 months after acceptance and #2 within 3 months of termination of Warranty Period.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Balancing dampers for mechanical forced air ventilation and air conditioning systems.

1.2 RELATED SECTIONS:

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 35 29.06 – Health and Safety Requirements.

.3 Section 01 45 00 – Quality Control.

.4 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

.5 Section 01 78 00 – Closeout Submittals.

1.3 REFERENCES

.1 Sheet Metal and Air Conditioning National Association (SMACNA)

.1 SMACNA HVAC Duct Construction Standards, Metal and Flexible.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 – Submittal Procedures. Include product characteristics, performance criteria, and limitations.

.1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 – Submittal Procedures.

.2 Indicate the following:

.1 Specifications.

.2 Quality assurance submittals: submit following in accordance with Section 01 33 00 – Submittal Procedures.

.1 Certificates: Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.2 Instructions: Submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

.1 Health and Safety Requirements:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 – Health and Safety Requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with Section 01 61 00 – Common Product Requirements.

.2 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

PART 2 PRODUCTS

2.1 GENERAL

.1 Manufacture to SMACNA standards.

2.2 SINGLE BLADE DAMPERS

.1 Fabricate from same material as duct, 0.8 mm up to 450 mm wide, 1.6 mm maximum up to 1200 mm wide, V-groove stiffened.

.2 Size and configuration to recommendations of SMACNA, except maximum height 100 mm.

.3 Locking quadrant with shaft extension to accommodate insulation thickness.

.4 Inside and outside nylon or bronze end bearings.

.5 Channel frame of same material as adjacent duct, complete with angle stop.

2.3 MULTI-BLADED DAMPERS

.1 Factory manufactured of material compatible with duct.

.2 Opposed blade: configuration, metal thickness and construction to recommendations of SMACNA.

.3 Maximum blade height: 100 mm.

.4 Bearings: pin in bronze bushings or self-lubricating nylon.

.5 Linkage: shaft extension with locking quadrant.

.6 Channel frame of same material as adjacent duct, complete with angle stop.

.7 Maximum leakage: 2 % at 500 Pa.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

.1 Install where indicated.

.2 Install in accordance with recommendations of SMACNA and in accordance with manufacturer's instructions.

.3 For supply, return and exhaust systems, locate balancing dampers in each branch duct.

.4 Runouts to registers and diffusers: located as close as possible to main ducts.

.5 All dampers to be vibration free.

.6 Ensure damper operators are observable and accessible.

3.3 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Materials and installation of flexible ductwork, joints and accessories.

1.2 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 35 29.06 – Health and Safety Requirements.

.3 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

.4 Section 01 91 13 – General Commissioning (Cx) Requirements.

1.3 REFERENCES

.1 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).

.2 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act (CEPA).
.2 Transportation of Dangerous Goods Act, (TDGA).

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.4 National Fire Protection Association (NFPA).

.1 NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems.
.2 NFPA 90B, Standard for Installation of Warm Air Heating and Air-Conditioning Systems.

.5 Sheet Metal and Air-Conditioning Contractors' National Association (SMACNA).

.1 SMACNA HVAC Duct Construction Standards - Metal and Flexible.
.2 SMACNA IAQ Guideline for Occupied Buildings under Construction.

.6 Underwriters' Laboratories Inc. (UL).

.1 UL 181, Standard for Factory-Made Air Ducts and Air Connectors.

.7 Underwriters' Laboratories of Canada (ULC).

.1 CAN/ULC-S110, Standard Methods of Tests for Air Ducts.

1.4 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data: submit WHMIS MSDS in accordance with Section 02 60 00.01 - Hazardous Materials for the following:

.1 Thermal properties.
.2 Friction loss.
.3 Acoustical loss.
.4 Leakage.
.5 Fire rating.

.3 Samples: submit samples with product data of different types of flexible duct being used in accordance with Section 01 33 00 - Submittal Procedures.

1.5 QUALITY ASSURANCE

.1 Certification of Ratings:

.1 Catalogue or published ratings to be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.

.2 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Protect on site stored or installed absorptive material from moisture damage.

.2 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
.4 Place materials defined as hazardous or toxic in designated containers.
.5 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.
.6 Ensure emptied containers are sealed and stored safely.
.7 Fold up metal and plastic banding, flatten and place in designated area for recycling.

1.7 INDOOR AIR QUALITY (IAQ)

.1 During construction, meet or exceed the requirements of SMACNA IAQ Guideline for Occupied Buildings under Construction.

PART 2 PRODUCTS

2.1 GENERAL

.1 Factory fabricated to CAN/ULC S110.

.2 Pressure drop coefficients listed below are based on relative sheet metal duct pressure drop coefficient of 1.00.

.3 Flame spread rating not to exceed 25. Smoke developed rating not to exceed 50.

2.2 METALLIC - UNINSULATED

.1 Type 1: spiral wound flexible aluminum.

.2 Performance:

.1 Factory tested to 1000 Pa without leakage.

.2 Maximum relative pressure drop coefficient: 3.

2.3 METALLIC - INSULATED

.1 Type 2: spiral wound flexible aluminum with factory applied, 25 mm thick flexible glass fibre thermal insulation with vapour barrier and vinyl or reinforced mylar/neoprene laminate jacket.

.2 Performance:

.1 Factory tested to 1000 Pa without leakage.

.2 Maximum relative pressure drop coefficient: 3.

.3 Thermal loss/gain: 1.3 $W/m^2.^0C$. mean.

2.4 NON-METALLIC - UNINSULATED

.1 Type 3: non-collapsible, coated mineral base fabric or aluminum foil mylar type, mechanically bonded to, and helically supported by, external steel wire.

.2 Performance:

.1 Factory tested to 1000 Pa without leakage.

.2 Maximum relative pressure drop coefficient: 3.

2.5 NON-METALLIC - INSULATED

.1 Type 4: non-collapsible, coated mineral base fabric or aluminum foil mylar type mechanically bonded to, and helically supported by, external steel wire with factory applied, 25 mm thick flexible glass fibre thermal insulation with vapour barrier and vinyl or reinforced mylar/neoprene laminate jacket.

.2 Performance:

.1 Factory tested to 1000 Pa without leakage.

.2 Maximum relative pressure drop coefficient: 3.

.3 Thermal loss/gain: 1.3 W/m^2.° C mean.

2.6 METALLIC ACOUSTIC INSULATED MEDIUM PRESSURE

.1 Type 5: Spiral wound, flexible perforated aluminum with factory applied 25 mm thick flexible glass fibre thermal insulation and sleeved by aluminum foil and mylar laminate vapour barrier.

.2 Performance:

.1 Factory tested to 3 kPa without leakage.

.2 Maximum relative pressure drop coefficient: 3.

.3 Acoustical performance: Minimum attenuation (dB/m) to following table:

	Frequency (Hz)				
Duct Diam:	125	250	500	1000	2000
100	0.6	3	12	27	0
150	1.2	3	12	22	27
200	2.0	5	12	19	20
300	2.4	5	12	16	15

2.7 METALLIC ACOUSTIC INSULATED HIGH PRESSURE

.1 Type 6: Spiral wound, flexible perforated aluminum with factory applied 37 mm thick flexible glass fibre thermal insulation and encased in spiral wound flexible aluminum jacket, as indicated.

.2 Performance:

.1 Factory tested to 2.5 kPa without leakage.

.2 Maximum relative pressure drop coefficient: 3.

.3 Acoustical performance: Minimum attenuation (dB/m) to following table:

	Frequency (Hz)				
Duct Diam:	125	250	500	1000	2000
100	0.6	3	12	27	0
150	1.2	3	12	22	27
200	2.0	5	12	19	20
300	2.4	5	12	16	15

2.8 NON-METALLIC - ACOUSTIC INSULATED

.1 Type 7: Non-collapsible, coated mineral base perforated fabric type helically supported by and mechanically bonded to steel wire with factory applied flexible glass fibre acoustic insulation and encased in aluminum foil and mylar laminate vapour barrier.

.2 Performance:

.1 Factory tested to 3 kPa without leakage.

.2 Maximum relative pressure drop coefficient: 3.

.3 Acoustical performance: Minimum attenuation (dB/m) to following table:

	Frequency (Hz)				
Duct Diam:	125	250	500	1000	2000
100	0.6	3	12	27	0
150	1.2	3	12	22	27
200	2.0	5	12	19	20
300	2.4	5	12	16	15

PART 3 EXECUTION

3.1 DUCT INSTALLATION

.1 Install in accordance with: NFPA 90A and NFPA 90B SMACNA.

.2 Do leakage test in accordance with Section 23 05 94 - Pressure Testing of Ducted Air System.

.3 Do trial test to demonstrate workmanship.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section includes:

.1 Supply, return and exhaust grilles and registers, diffusers and linear grilles, for commercial and residential use.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

.3 Section 01 78 00 - Closeout Submittals.

1.3 REFERENCES

.1 American Society of Heating Refrigerating and Air-Conditioning Engineers (ASHRAE).

.1 ASHRAE 70, Method of Testing for Rating the Performance of Air Outlets and Inlets.

1.4 SYSTEM DESCRIPTION

.1 Performance requirements:

.1 Catalogued or published ratings for manufactured items: obtained from tests carried out by manufacturer or those ordered by manufacturer from independent testing agency signifying adherence to codes and standards.

1.5 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures. Include product characteristics, performance criteria, and limitations.

.1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate following:

.1 Capacity

.2 Throw and terminal velocity

.3 Noise criteria

.4 Pressure drop

.5 Neck velocity

.2 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.

.1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.2 Instructions: submit manufacturer's installation instructions.

1.6 QUALITY ASSURANCE

.1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.8 MAINTENANCE

.1 Extra Materials:

.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

.2 Include:

.1 Keys for volume control adjustment

.2 Keys for air flow pattern adjustment.

PART 2 PRODUCTS

2.1 GENERAL

.1 To meet capacity, pressure drop, terminal velocity, throw, noise level, neck velocity.

.2 Frames:

.1 Full perimeter gaskets.

.2 Plaster frames where set into plaster or gypsum board.

.3 Concealed fasteners.

.3 Concealed manual volume control damper operators as indicated.

.4 Colour: standard or as directed by Owner’s Representative.

.5 Acceptable Product: E. H. Price, Titus, Nailor, Carnes, Airvector, Anemostat, Kruger, Kruegen.

2.2 MANUFACTURED UNITS

.1 Grilles, registers and diffusers of same generic type to be product of one manufacturer.

2.3 SUPPLY GRILLES AND REGISTERS

.1 See Schedule.

2.4 RETURN AND EXHAUST GRILLES AND REGISTERS

.1 See Schedule.

2.5 DIFFUSERS

.1 See Schedule.

2.6 LINEAR GRILLES

.1 See Schedule.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

.1 Install in accordance with manufacturers instructions.

.2 Install with flat head stainless steel or cadmium plated screws in countersunk holes where fastenings are visible.

.3 Bolt grilles, registers and diffusers, in place, in gymnasium and similar game rooms.

.4 Provide concealed safety chain on each grille, register and diffuser in gymnasium and similar game rooms and elsewhere.

3.3 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL

.1 This Section covers items common to Sections of Division 26. This section supplements requirements of Division 1, Division 23, Division 27, Division 28, Division 33 and Division 34. Refer to Section 01 00 00 – Bid Depository Sections where applicable for bid depository.

1.2 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA C22.1, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.

.2 CAN/CSA-22.3 No. 1, Overhead Systems.

.3 CAN3-C235, Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

1.3 CARE, OPERATION AND START-UP

.1 Instruct Owner's Representative and operating personnel in the operation, care and maintenance of systems, system equipment and components.

.2 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

1.4 DESIGN REQUIREMENTS

.1 Operating voltages: to CAN3-C235

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.5 SUBMITTALS

.1 Submit shop drawings in accordance with Section 10 33 00 – Submittal Procedures.

.2 Quality Control: in accordance with Section 01 45 00 - Quality Control.

.1 Provide CSA certified equipment and material. Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction for approval before delivery to site.

.2 Submit test results of installed electrical systems and instrumentation.

.3 Submit, upon completion of Work, load balance report as described in sentence 3.4.6.

.4 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Owner's Representative.

1.6 PERMITS, FEES AND INSPECTION

.1 Submit to Electrical Inspection Division and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.

.2 Pay associated fees.

.3 Owner's Representative will provide drawings and specifications required by Electrical Inspection Division and Supply Authority at no cost.

.4 Notify Owner's Representative of changes required by Electrical Inspection Division prior to making changes.

.5 Furnish Certificates of Acceptance from Electrical Inspection Division or authorities having jurisdiction on completion of work to Owner's Representative.

1.7 CO-ORDINATION

.1 Co-ordinate work with work of other divisions to avoid conflict.

.2 Locate distribution systems, equipment, and materials to provide minimum interference and maximum usable space.

.3 Locate all existing underground services and make all parties aware of their existence and location.

.4 Where interference occurs, Owner's Representative must approve relocation of equipment and materials regardless of installation order.

.5 Notwithstanding the review of shop drawings, this division may be required to relocate electrical equipment which interferes with the equipment of other trades, due to lack of co-ordination by this Division. The cost of this relocation shall be the responsibility of this Division. The Owner's Representative shall decide the extent of relocation required.

1.8 CUTTING AND PATCHING

.1 Inform all other divisions in time, concerning required openings. Where this requirement is not met, bear the cost of all cutting. Openings of 200 mm or smaller shall be the responsibility of Division 26. Openings larger than 200 mm shall be the responsibility of Division 1. Obtain written approval of Structural engineer before drilling any beams or floors.

1.9 PROTECTION

.1 Protect exposed live equipment during construction for personnel safety.

.2 Shield and mark all live parts "LIVE 120 VOLTS", or with appropriate voltage in English.

.3 Arrange for installation of temporary doors for rooms containing electrical distribution equipment. Keep these doors locked except when under direct supervision of electrician.

1.10 RECORD DRAWINGS

.1 Obtain and pay for three sets of white prints. As the job progresses, mark these prints to accurately indicate installed work. Have the white prints available for inspection at the site at all times and present for scrutiny at each job meeting.

.2 Show on the record drawings the installed inverts of all services entering and leaving the building and the property. Dimension underground services at key points of every run in relation to the structure and building.

.3 Indicate exact location of all services for future work. Show and dimension all work embedded in the structure.

.4 Submit record drawings within 30 days prior to start of commissioning.

1.11 INSPECTION OF WORK

.1 The Owner will make periodic visits to the site during construction to ascertain reasonable conformity to plans and specifications but will not execute quality control. The Contractor shall be responsible for the execution of his work in conformity with the construction documents and with the requirements of the inspection authority.

1.12 SCHEDULING OF WORK

.1 Work shall be scheduled in phases as per other divisions of the architectural specifications.

.2 Become familiar with the phasing requirements for the work and comply with these conditions.

.3 No additional monies will be paid for contractor’s requirement to comply with work phasing conditions.

1.13 FIRE RATING OF PENETRATIONS

.1 Maintain fire ratings around conduits passing through floors, ceilings and fire rated walls.

.2 Use 3M brand or equal fire barrier products at each penetration.

.3 Acceptable products for fire barrier products shall be 3M #CP25 fire barrier caulk, #303 putty, #FS 195 wrap and #CS195 sheet.

.4 Acceptable manufacturers: Nelson, Fire Stop Systems, 3M or approved equal. Material of same manufacturer to be used throughout project..

PART 2 PRODUCTS

2.1 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

.1 Supplier and installer responsibility is indicated in Motor, Control and Equipment Schedule on electrical drawings and related mechanical responsibility is indicated on Mechanical Equipment Schedule on mechanical drawings, where applicable.

.2 Control wiring and conduit is specified in Division 26 except for conduit, wiring and connections below 50 V which are related to control systems specified in Division 25 and shown on mechanical drawings. Division 25 – EMCS Controls Contractor is responsible for all conduit, wiring and connections below 50V which are related to control systems in Division 25 and shall comply with the requirements of Division 26 for standard of quality.

2.2 MATERIALS AND EQUIPMENT

.1 Provide materials and equipment in accordance with Section 01 61 00 - Common Product Requirements.

.2 Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Inspection Division.

.3 Factory assemble control panels and component assemblies.

2.3 WARNING SIGNS

.1 As specified and to meet requirements of Electrical Inspection Department and Owner's Representative.

.2 Porcelain enamel decal signs, minimum size 175 x 250 mm.

2.4 WIRING TERMINATIONS

.1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

2.5 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with nameplates and labels as follows:

.1 Nameplates: Lamicoid 3 mm thick plastic engraving sheet, black white face, black white core, mechanically attached with self tapping screws.

.2 Sizes as follows:

NAMEPLATE SIZES

Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters

NAMEPLATE SIZES

Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

.2 Labels:

.1 Embossed plastic labels with 6 mm high letters unless specified otherwise.

.3 Wording on nameplates and labels to be approved by Owner's Representative prior to manufacture.

.4 Allow for average of twenty-five (25) letters per nameplate and label.

.5 Identification to be English (and French where applicable).

.6 Nameplates for terminal cabinets and junction boxes to indicate system name and voltage characteristics.

.7 Disconnects, starters and contactors: indicate equipment being controlled and voltage.

.8 Terminal cabinets and pull boxes: indicate system name and voltage.

.9 Transformers: indicate capacity, primary and secondary voltages and transformer number.

.10 All new panel boards in the work area to be painted as follows. Provide new lamicoid labels and arc flash labels for all panel boards.

Equipment System	Color	Pantone
12500+ V Normal	Bright Yellow	12-0752 Buttercup
4160 V Essential	Dark Orange	17-1461 Orangeade
480 to 600 V Normal	Light Blue	13-5410 Iced Aqua
480 to 600 V Essential	Dark Blue	17-4530 Barrier Reef
120 to 240 V Normal	Light Green	14-0425 Beachnut
120 to 240 V Essential	Dark Green	18-0430 Avocado
Fire Alarm	Bright Red	-

2.6 WIRING IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour code: to CSA C22.1, Canadian Electrical Code.

.4 Use colour coded wires in communication cables, matched throughout system.

2.7 CONDUIT AND CABLE IDENTIFICATION

.1 Colour code all new conduits, boxes and metallic sheathed cables using 25mm wide tape (minimum 2 full wraps)..

.2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.

.3 Colours:

Conduit System	Color	Pantone
12500+ V Normal	Bright Yellow	12-0752 Buttercup
4160 V Essential	Dark Orange	17-1461 Orangeade
480 to 600 V Normal	Light Blue	13-5410 Iced Aqua
277 to 600 V Essential	Dark Blue	17-4530 Barrier Reef
120 to 240 V Normal	Light Green	14-0425 Beachnut
120 to 240 V Essential	Dark Green	18-0430 Avocado
Fire Alarm	Bright Red	-

PART 3 EXECUTION

3.1 NAMEPLATES AND LABELS

.1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.2 LOCATION OF OUTLETS

.1 Locate outlets in accordance with Section 26 27 26 – Wiring Devices.

.2 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.

.3 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.

.4 Locate light switches on latch side of doors. Locate disconnect devices in mechanical and elevator machine rooms on latch side of door.

3.3 CONDUIT AND CABLE INSTALLATION

.1 Install conduit and sleeves prior to pouring of concrete. Sleeves through concrete: schedule 40 steel pipe, sized for free passage of conduit, and protruding 50 mm.

.2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.

.3 Install cables, conduits and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

3.4 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

.3 Install electrical at following heights unless indicated otherwise.

- .1 Local switches: 1200 mm.
- .2 Wall receptacles:
  - .1 General: 406 mm.
  - .2 Above top of continuous baseboard heater: 200mm.
  - .3 Above top of counters or counter splash backs: 175 mm.
  - .4 In mechanical rooms: 1400 mm.
- .3 Panelboards: as required by Code or as indicated.
- .4 Telephone and interphone outlets: 400 mm.
- .5 Wall mounted telephone and interphone outlets: 1400 mm.
- .6 Fire alarm stations: 1200 mm.
- .7 Fire alarm bells: 2400 mm.
- .8 Wall mounted speakers: 2400 mm.
- .9 Clocks: 2400 mm.
- .10 Door bell pushbuttons: 1200 mm.
- .11 Exit lights: 2400 mm.
- .12 Emergency lighting heads: 2400 mm.

3.5 CO-ORDINATION OF PROTECTIVE DEVICES

.1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

3.6 FIELD QUALITY CONTROL

.1 All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks – the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.

.2 The work of this division to be carried out by a contractor who holds a valid Code 1 Electrical Contractor License as issued by the Province.

.3 Perform tests in Accordance with this section as noted and Section 01 91 13 – Commissioning (Cx) Requirements.

.4 Load Balance:

.1 Measure phase current to panelboard with normal loads (lighting) operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.

.2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

.3 Submit, at completion of work, report listing phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load. State hour and date on which each load was measured, and voltage at time of test.

.5 Conduct and pay for following tests:

.1 Power generation and distribution system including phasing, voltage, grounding and load balancing.

.2 Circuits originating from branch distribution panels.

.3 Lighting and its control.

.4 Motors, heaters and associated control equipment including sequenced operations of systems where applicable.

.5 Systems: fire alarm system, communications.

.6 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.

.7 Insulation resistance testing.

.1 Megger and record circuits, feeders and equipment up to 350 V with a 500 V instrument.

.2 Megger and record 350 – 600 V circuits, feeders and equipment with a 1000 V instrument.

.3 Check resistance to ground before energizing and record value.

.8 Carry out tests in presence of Owner's Representative.

.9 Provide instruments, meters, equipment and personnel required to conduct tests during and conclusion of project.

.10 Submit test results for Owner's Representative's review and include in Commissioning Manuals specified in Section 01 91 13 – Commissioning (Cx) Requirements.

3.7 CLEANING

.1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

.2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Materials and installation for wire and box connectors.

1.2 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results - Electrical.

1.3 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CAN/CSA-C22.2 No.18, Outlet Boxes, Conduit Boxes and Fittings.

.2 CAN/CSA-C22.2 No.65, Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).

.2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)

.1 EEMAC 1Y-2, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).

.3 National Electrical Manufacturers Association (NEMA)

PART 2 PRODUCTS

2.1 MATERIALS

.1 Pressure type wire connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.

.2 Fixture type splicing connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.

.3 Bushing stud connectors: to EEMAC 1Y-2 to consist of:

.1 Connector body and stud clamp for stranded copper conductors.

.2 Clamp for copper bar.

.3 Stud clamp bolts.

.4 Bolts for copper bar.

.5 Sized for conductors and bars as indicated.

.4 Clamps or connectors for armoured cable, aluminum sheathed cable, mineral insulated cable, flexible conduit, non-metallic sheathed cable as required to: CAN/CSA-C22.2 No.18.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Remove insulation carefully from ends of conductors and:

.1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No.65.

.2 Install fixture type connectors and tighten. Replace insulating cap.

.3 Install bushing stud connectors in accordance with EEMAC 1Y-2.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 26 05 20 - Wire and Box Connectors - 0 - 1000 V.

.2 Refer to drawings for wiring type required under different applications.

1.2 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA C22.2 No .0.3, Test Methods for Electrical Wires and Cables.
.2 CAN/CSA-C22.2 No. 131, Type TECK 90 Cable.

PART 2 PRODUCTS

2.1 BUILDING WIRES

.1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.

.2 Copper: size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE and RWU90 XLPE as indicated. Provide RWU90 XLPE rated cable for underground wiring. Related to new service entrance feeders and site lighting circuits. RWU90 XLPE not required under interior floor slabs.

.3 Copper conductors: size as indicated, with thermoplastic insulation type TWH rated at 600 V, typically used for insulated ground wires.

2.2 TECK Cable

.1 Cable: to CAN/CSA-C22.2 No. 131.

.2 Conductors:

.1 Grounding conductor: copper.
.2 Circuit conductors: copper, size as indicated.

.3 Insulation:

.1 Cross-linked polyethylene XLPE, rating – 600 V.

.4 Inner jacket: polyvinyl chloride material.

.5 Armour: interlocking aluminum, compliant to applicable Building Code classification for this project.

.6 Overall covering: thermoplastic polyvinyl chloride material.

.7 Fastenings:

.1 One hole steel straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.

.2 Channel type supports for two or more cables at 1500 mm centers.

.3 Threaded rods: 6 mm dia. to support suspended channels.

.8 Connectors:

.1 Watertight and/or type approved for TECK cable, as indicated.

2.3 MINERAL-INSULATED CABLES

.1 Conductors: solid bare soft-annealed copper, size as indicated.

.2 Insulation: compressed powdered magnesium oxide to form compact homogeneous mass throughout entire length of cable.

.3 Overall covering: annealed seamless copper sheath, Type M1 rated 600 V, 250°C.

.4 Overall jacket: PVC applied over the sheath and compliant to applicable Building Code classification for this project for direct buried and wet locations, as indicated.

.5 Two hour fire rating.

.6 Connectors: watertight, field installed, approved for MI cable.

.7 Termination kits: field installed approved for MI cable.

2.4 ARMOURED CABLES

.1 Conductors: insulated, copper, size as indicated.

.2 Type: AC90.

.3 Armour: interlocking type fabricated from aluminum strip.

.4 Connectors: standard as required, complete with double split rings.

2.5 CONTROL CABLES

.1 Type LVT: 2 soft annealed copper conductors, sized as indicated, with thermoplastic insulation, outer covering of thermoplastic jacket.Low energy 300 V control cable: stranded annealed copper conductors sized as indicated, with PVC insulation type TW -40° C polyethylene insulation with shielding of tape coated with paramagnetic material wire braid over each conductor and overall covering of PVC jacket.

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Perform tests using method appropriate to site conditions and to approval of Owner's Representative and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

.4 No splices permitted in panel board feeders in new construction. Splices in re-work or renovation projects only with pre-approval by Owner's Representative.

3.2 GENERAL CABLE INSTALLATION

.1 Install cable in trenches in accordance with Section 33 71 73.02 - Underground Electrical Service.

.2 Lay cable in cable trays in accordance with Section 26 05 36 - Cable Trays for Electrical Systems.

.3 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1000 V).

.4 Cable Colour Coding: to Section 26 05 00 Common Work Results for Electrical.

.5 Conductor length for parallel feeders to be identical.

.6 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.

.7 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.

.8 Branch circuit wiring for surge suppression receptacles and permanently wired computer and electronic equipment to be 2-wire circuits only, i.e. common neutrals not permitted.

.9 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.

3.3 INSTALLATION OF BUILDING WIRES

.1 Install wiring as follows:

.1 In conduit systems in accordance with Section 26 05 34- Conduits, Fastenings and Fittings.

.2 In cable troughs in accordance with Section 26 05 33.01- Cable Trays for Electrical Systems.

.3 In underground ducts in accordance with Section 26 05 43.01- Installation of Cables in Ducts.

.4 In trenches in accordance with Section 26 05 43.01- Installation of Cables in Trenches.

.5 In underfloor distribution system in accordance with Section 26 05 39- Underfloor Raceways for Electrical Systems

.6 In cellular floor raceways in accordance with Section 26 05 38 – Cellular Metal Floor Raceway Fittings.

.7 In surface and lighting fixture raceways in accordance with Section 26 50 00- Lighting.

.8 In wireways and auxiliary gutters in accordance with Section 26 05 37 – Wireways and Auxiliary Gutters.

.9 Overhead service conductors in accordance with Section 26 24 01 - Service Equipment.

3.4 INSTALLATION OF TECK CABLE 0 -1000 V

.1 Install cables.

.1 Group cables wherever possible on channels.

.2 Install cable concealed, securely supported by straps and hangers.

3.5 INSTALLATION OF MINERAL-INSULATED CABLES

.1 Run cable exposed, securely supported by straps.

.2 Support 2 h fire rated cables at 1m intervals.

.3 Make cable terminations by using factory-made kits.

.4 At cable terminations use thermoplastic sleeving over bare conductors.

.5 Where cables are buried in cast concrete or masonry, sleeve for entry and exit of cables.

.6 Do not splice cables.

3.6 INSTALLATION OF ARMOURED CABLES (AC-90)

.1 Group cables wherever possible.

.2 Use permitted only for work in movable partitions and vertical power supply drops to lighting fixtures.

3.7 INSTALLATION OF CONTROL CABLES

.1 Install control cables in conduit as indicated.

.2 Ground control cable shield.

END OF SECTION

PART 1 GENERAL

1.1 REALTED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 91 13 – General Commissioning (Cx) Requirements.

.3 Section 26 05 00 – Common Work Results – Electrical.

1.2 SUBMITTALS

.1 Submit shop drawings and product data for cabinets.

.2 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Provide drawings stamped and signed by professional engineer registered or licensed in the Province of Newfoundland and Labrador, Canada.

PART 2 PRODUCTS

2.1 SPLITTERS

.1 Sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.

.2 Main and branch lugs to match required size and number of incoming and outgoing conductors as indicated.

.3 At least three spare terminals on each set of lugs in splitters less than 400 A.

2.2 JUNCTION AND PULL BOXES

.1 Welded steel construction with screw-on flat covers for surface mounting.

.2 Covers with 25 mm minimum extension all around, for flush-mounted pull and junction boxes.

2.3 CABINETS

.1 Type E: sheet steel, hinged door and return flange overlapping sides, handle, lock and catch, for surface mounting.

.2 Type T: sheet steel cabinet, with hinged door, latch, lock, 2 keys, containing 19 mm fir plywood backboard for surface flush mounting.

PART 3 EXECUTION

3.1 SPLITTER INSTALLATION

.1 Install splitters and mount plumb, true and square to the building lines.

.2 Extend splitters full length of equipment arrangement except where indicated otherwise.

3.2 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Mount cabinets with top not higher than 2 m above finished floor.

.3 Install terminal block as indicated in Type T cabinets.

.4 Only main junction and pull boxes are indicated. Install pull boxes so as not to exceed 30 m of conduit run between pull boxes.

3.3 IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Results - Electrical.

.2 Install size 2 identification labels indicating system name voltage and phase.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results – Electrical.

.2 Section 26 05 29 – Hangers and Supports for Electrical Systems.

.3 Section 26 05 34 – Conduits, Conduit Fastenings and Fittings.

1.2 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA C22.1, Canadian Electrical Code, Part 1.

PART 2 PRODUCTS

2.1 OUTLET AND CONDUIT BOXES GENERAL

.1 Size boxes in accordance with CSA C22.1.

.2 102 mm square or larger outlet boxes as required for special devices.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

.5 347 V outlet boxes for 347 V switching devices.

.6 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 GALVANIZED STEEL OUTLET BOXES

.1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.

.2 Electro-galvanized steel utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.

.3 102 mm square or octagonal outlet boxes for lighting fixture outlets.

.4 102 mm square outlet boxes with extension and plaster rings for flush mounting devices in finished plaster walls.

2.3 MASONRY BOXES

.1 Electro-galvanized steel masonry single and multi gang boxes for devices flush mounted in exposed block walls.

2.4 CONCRETE BOXES

.1 Electro-glavanized sheet steel concrete type boxes for flush mount in concrete with matching extension and plaster rings as required.

2.5 FLOOR BOXES

.1 Concrete tight electro-galvanized sheet steel floor boxes with adjustable finishing rings to suit floor finish with brass faceplate. Device mounting plate to accommodate short or long ear duplex receptacles. Minimum depth: 28 mm for receptacles; 73 mm for communication equipment.

.2 Adjustable, watertight, concrete tight, cast floor boxes with openings drilled and tapped for 12 mm and 19 mm conduit. Minimum size: 73 mm deep.

2.6 CONDUIT BOXES

.1 Cast FS or FD aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacle.

2.7 FITTINGS - GENERAL

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 32 mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

.5 Double split rings for AC-90 terminations.

2.8 SERVICE FITTINGS

.1 'High tension' receptacle fitting made of 2 piece die-cast aluminum with brushed aluminum housing finish for 1 duplex receptacles. Bottom plate with two knockouts for centered or offset installation.

.2 Pedestal type 'low tension' fitting made of 2 piece die cast aluminum with brushed aluminum housing finish to accommodate two amphenol jack connectors.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

.3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.

.4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.

.5 Vacuum clean interior of outlet boxes before installation of wiring devices.

.6 Identify systems for outlet boxes as required.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CAN/CSA C22.2 No. 18, Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware, a National Standard of Canada.

.2 CSA C22.2 No. 45, Rigid Metal Conduit.

.3 CSA C22.2 No. 56, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.

.4 CSA C22.2 No. 83, Electrical Metallic Tubing.

.5 CSA C22.2 No. 211.2, Rigid PVC (Unplasticized) Conduit.

.6 CAN/CSA C22.2 No. 227.3, Nonmetallic Mechanical Protection Tubing (NMPT), a National Standard of Canada.

1.2 SUBMITTALS

.1 Product data: submit manufacturer's printed product literature, specifications and datasheets.

.1 Submit cable manufacturing data.

.2 Quality assurance submittals:

.1 Test reports: submit certified test reports.

.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.3 Instructions: submit manufacturer's installation instructions.

PART 2 PRODUCTS

2.1 CONDUITS

.1 Rigid metal conduit: to CSA C22.2 No. 45, hot dipped galvanized steel threaded.

.2 Epoxy coated conduit: to CSA C22.2 No. 45, with zinc coating and corrosion resistant epoxy finish inside and outside.

.3 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.

.4 Rigid PVC conduit: to CSA C22.2 No. 211.2.

.5 Flexible metal conduit: to CSA C22.2 No. 56, aluminum liquid-tight flexible metal.

.6 FRE conduit: to CSA C22.2.

.7 Flexible PVC conduit: to CAN/CSA-C22.2 No. 227.3,

2.2 CONDUIT FASTENINGS

.1 One hole steel straps to secure surface conduits 50 mm and smaller. Two hole steel straps for conduits larger than 50 mm.

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits at 1.5 m oc.

.4 Threaded rods, 6 mm dia., to support suspended channels.

2.3 CONDUIT FITTINGS

.1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.

.2 Factory "ells" where 90°, 45 ° or 22.5 ° bends are required for 25 mm and larger conduits.

.3 Ensure conduit bends other than factory “ells” are made with an approved bender. Making offsets and other bends by cutting and rejoining 90 degree bends are not permitted.

.4 Connectors and couplings for EMT. Steel set-screw type, size as required.

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

.1 Weatherproof expansion fittings with internal bonding assembly suitable for 100 mm linear expansion.

.2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection in all directions.

.3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.5 FISH CORD

.1 Polypropylene.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Install all conduit, conduit fittings and accessories in accordance with the latest edition of the Canadian Electrical Code in a manner that does not alter, change or violate any part of the installed system components or the CSA/UL certification of these components.

.2 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.3 Conceal conduits except in mechanical and electrical service rooms and in unfinished areas.

.4 Surface mount conduits except in finished areas or as indicated.

.5 Use rigid hot dipped galvanized steel threaded conduit for exposed work below 2.4 m above finished floor.

.6 Use epoxy coated conduit underground in corrosive areas and where exposed to exterior elements. (ie: pole mounted service entrance conduits)

.7 Use electrical metallic tubing (EMT) except in cast concrete and above 2.4 m not subject to mechanical injury, as well as concealed work in masonry construction.

.8 Use rigid PVC conduit underground and buried in or under concrete slab on grade.

.9 Use FRE conduit for encasement in concrete duct bank for service entrance feeders.

.10 Use flexible metal conduit for connection to motors in dry areas connection to recessed incandescent fixtures without a prewired outlet box connection to surface or recessed fluorescent fixtures work in movable metal partitions.

.11 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations.

.12 Use AC-90 for vertical power supply drops to light fixtures.

.13 Use explosion proof flexible connection for connection to explosion proof motors.

.14 Install conduit sealing fittings in hazardous areas. Fill with compound.

.15 Minimum conduit size for lighting and power circuits: 19 mm. 12 mm conduit is acceptable for switch leg drops only where one two-wire circuit and ground is required.

.16 Install EMT conduit from computer room branch circuit panel to outlet boxes located in sub floor.

.17 Install EMT conduit from computer room branch circuit panel to junction box in sub-floor immediately below panel. Run flexible conduit from junction box to outlet boxes for each computer in sub-floor.

.18 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.

.19 Mechanically bend steel conduit over 19 mm dia.

.20 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

.21 Install fish cord in empty conduits.

.22 Run 2 - 25 mm spare conduits up to ceiling space and 2 - 25 mm spare conduits down to ceiling space from each flush panel. Terminate these conduits in 152 x 152 x 102 mm junction boxes in ceiling space or in case of an exposed concrete slab, terminate each conduit in flush concrete type box.

.23 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.

.24 Dry conduits out before installing wire.

3.3 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.

.3 Run conduits in flanged portion of structural steel.

.4 Group conduits wherever possible on suspended channels.

.5 Do not pass conduits through structural members except as indicated.

.6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.4 CONCEALED CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Do not install horizontal runs in masonry walls.

.3 Do not install conduits in terrazzo or concrete toppings.

3.5 CONDUITS IN CAST-IN-PLACE CONCRETE

.1 Locate to suit reinforcing steel. Install in centre one third of slab. Use rigid PVC conduit.

.2 Protect conduits from damage where they stub out of concrete. Use rigid steel conduit for stub-up and adapt to in floor rigid PVC conduit.

.3 Install sleeves where conduits pass through slab or wall.

.4 Provide oversized sleeve for conduits passing through waterproof membrane, before membrane is installed. Use cold mastic between sleeve and conduit.

.5 Do not place conduits is slabs in which slab thickness is less than 4 times conduit diameter.

.6 Encase conduits completely in concrete with minimum 25 mm concrete cover.

.7 Organize conduits in slab to minimize cross-overs.

3.6 CONDUITS IN CAST-IN-PLACE SLABS ON GRADE

.1 Run conduits 25 mm and larger below slab and encased in 75 mm concrete envelope. Provide 50 mm of sand over concrete envelope below floor slab.

3.7 CONDUITS UNDERGROUND

.1 Slope conduits to provide drainage.

.2 Waterproof joints (PVC excepted) with heavy coat of bituminous paint.

3.8 CLEANING

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 On Completion and verification of performance of installation, remove surplus materials, excess materials rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 91 13 - General Commissioning (Cx) Requirements.

.3 Section 26 05 00 - Common Work Results - Electrical.

.4 Section 26 50 00 - Lighting.

1.2 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA C22.2 No.184.1, Solid-State Dimming Controls (Bi-national standard with UL 1472).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's printed product literature and data sheets for lighting control devices and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area

.2 Store and protect lighting devices from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse pallets, crates, padding and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 PRODUCTS

2.1 DIMMING WALL SWITCH

.1 Single button, single scene.

.2 Decora type wall plate. White Colour.

.3 Customizable buttons with LED indicators.

.4 Connections via RJ45 connectors and Category 5e cables.

.5 Standard of Acceptance: Wattstopper LMSW-101-W Digital 1 Button Wall Switch

2.2 WIRELESS CONFIGURATION TOOL

.1 Handheld tool for configuration of system parameters.

.2 Communication via Infrared Transceiver

.3 IR Range = 10 Metres.

.4 Remotely configures and reports dimming parameters.

.5 Manually adjusts light level of dimmed loads to facilitate scene setting.

.6 Standard of Acceptance: Wattstopper time LMCT-100 Digital Wireless Configuration Tool. (Provide one).

2.3 CONTROLLER

.1 Series Digital ON/OFF/0-10V Dimming Room Controller.

.2 Voltage: 120VAC, 60 Hz

.3 Maximum 120A load per Room Controller.

.1 Each relay rated for 20A ballast

.4 Class 2 dimming control signal: 0-10 VDC, sinks up to 100 mA per channel for control of compatible ballasts.

.5 Class 2 output to DLM local network: 24VDC, 250 mA maximum across 4 RJ45 Ports.

.6 DLM Local Network:

.1 Maximum current: 800 mA.

.2 Category 5e cable, up to 1000 ft.

.3 Up to 64 loads.

.4 Up to 48 communicating devices.

.5 Max 4 LMRC-100 Series Room Controllers.

.7 Operating Conditions: 32-158°F (0-70°C); 5-96% RH, non-condensing.

.8 UL (88T9) and cUL listed.

.9 Five year warranty.

.10 ON/OFF/Dim local override button for each load.

.11 LED to indicate status of each load.

.12 Integral current monitoring of total connected load.

.13 4 RJ45 parts with integral strain relief.

.14 Zero-crossing.

.15 UL 2043 plenum rated.

.16 UL 2043 plenum rated.

.17 Store load preset level and 16 scene preset levels for each load.

.18 Standard of Acceptance: Wattstopper LMRC 212

2.4 ACCEPTABLE MANUFACTURERS

.1 Standard of Acceptance: Wattstopper

.2 Acceptable Alternates:

.1 Lutron

.2 Sensor Switch

.3 Lithonia

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install components comprising dimming system in accordance with manufacturer's instructions, and as indicated.

.2 Install wiring, shielding, grounding in accordance with manufacturer's instructions.

.3 Ensure shielded leads between intensity selector potentiometer and intensity controls have outer insulating jackets and are connected to ground at one point only.

.4 Keep radio, VCR, TV and intercom wiring a minimum of 1.8 m away from dimming circuitry. Where crossing of wiring is essential, ensure that grounded shields surround such intercom wiring, and that crossings take place at 90□.

.5 Locate intensity controls and "on-off" switches as indicated.

.6 Ensure positive, low resistance lamp to pin contact within lampholder.

.7 Age lamps by operating at full intensity for 100 h prior to final inspection. Operate ballasts in ambient temperature above 18□C.

.8 Ensure connections are correctly made and to same phase before energizing.

3.2 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 – Common work Results - Electrical and Section 01 91 13 – General Commissioning (Cx) Requirements.

.2 Demonstrate that dimming systems are installed as indicated.

.3 Demonstrate that dimming systems operate as intended and that there are no problems in starting lamps, nor in keeping them lit, and free of perceptible flicker at any setting of dimming intensity control.

.4 Demonstrate that no radio, VCR or TV interference is carried by system and that there is no interference between dimming system and locally used infrared-based remote/integral controls.

3.3 ADJUSTING

.1 Adjust lighting control devices for correct function and operation in accordance with manufacturer's written instructions.

.2 Include in the tender price for the manufacturer’s representative to set up and program the system on site as per the Owner’s instructions. At the end of the project, provide a letter signed by the manufacturer’s representative instructing that the system has been programmed as per the Owner’s requirements and that training as per Clause 3.6 has been completed.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by lighting control devices installation.

3.6 TRAINING

.1 Provide on-site training to the Owner's staff. Training shall include system description, features and operating instructions.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Switches, receptacles, wiring devices, cover plates and their installation.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 91 13 – General Commissioning (Cx) Requirements.

.3 Section 26 05 00 – Common Work Results - Electrical.

1.3 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA-C22.2 No.42, General Use Receptacles, Attachment Plugs and Similar Devices.
.2 CSA-C22.2 No.42.1, Cover Plates for Flush-Mounted Wiring Devices (Bi-national standard, with UL 514D).
.3 CSA-C22.2 No.55, Special Use Switches.
.4 CSA-C22.2 No.111, General-Use Snap Switches (Bi-national standard, with UL 20, twelfth edition).

PART 2 PRODUCTS

2.1 SWITCHES

.1 Single pole, double pole, three-way, four-way switches to: CSA-C22.2 No.55 and CSA-C22.2 No.111.

.2 Manually-operated general purpose ac switches with following features:

.1 Terminal holes approved for No. 10 AWG wire.
.2 Silver alloy contacts.
.3 Urea or melamine moulding for parts subject to carbon tracking.
.4 Suitable for back and side wiring.
.5 White toggle.
.6 Specification grade.
.7 Hospital grade as indicated.

.3 Toggle operated fully rated for tungsten filament and fluorescent lamps, and up to 80% of rated capacity of motor loads.

.4 Single pole, double pole, three way, four way switches as indicated on drawings.

.5 Switches to be of one manufacturer throughout project.

.6 Standard of Acceptance:

.1 Hubbell HBL 1201W (120 V) and Hubbell 18201-W (347 V)

.7 Acceptable alternates:

.1 Leviton.
.2 Pass and Seymour.
.3 Cooper.

2.2 RECEPTACLES

.1 Duplex receptacles, CSA type 5-15 R, 125 V, 15 A, U ground, to: CSA-C22.2 No.42 with following features:

.1 White thermoplastic moulded housing.
.2 Suitable for No. 10 AWG for back and side wiring.
.3 Break-off links for use as split receptacles.
.4 Eight back wired entrances, four side wiring screws.
.5 Triple wipe contacts and rivetted grounding contacts.
.6 Specification grade.
.7 Hospital grade as indicated.

.2 Single receptacles CSA type 5-15 R, 125 V, 15 A, U ground with following features:

.1 White thermoplastic moulded housing.
.2 Suitable for No. 10 AWG for back and side wiring.
.3 Four back wired entrances, 2 side wiring screws.

.3 Other receptacles with ampacity and voltage as indicated.

.4 Receptacles to be of one manufacturer throughout project.

.5 Standard of Acceptance:

.1 Hubbel 5262-W.

.6 Acceptable alternates:

.1 Leviton.
.2 Pass and Seymour.
.3 Copper.

2.3 GROUND FAULT INTERRUPTER (GFI) RECEPTACLES

.1 CSA Type 5-20R, 125 V, 20A, U-ground.

.2 Tamper resistant, weather resistant.

.3 White urea molded housing.

.4 10 kA short circuit current rating.

.5 Suitable for #10 AWG wiring.

.6 Double wide contacts and riveted grounding contacts.

.7 Specification grade.

.8 Trip level: 4 to 6 mA. Trip time: 0.25 seconds.

.9 Meets UL 498 and UL 943 for Class A GFCI's. CSA certified.

.10 Standard of Acceptance: Hubbell GFR5362WTR.

.11 Acceptable Alternates:

.1 Pass and Seymour.
.2 Cooper.
.3 Leviton.

2.3 SPECIAL WIRING DEVICES

.1 Special wiring devices:

.1 Clock hanger outlets, 15 A, 125 V, 3 wire, grounding type, suitable for No. 10 AWG for installation in flush outlet box.

.2 Pilot lights as indicated, with neon type 0.04 W, 125 V lamp and red plastic jewel lense, flush type.

2.4 WIRING DEVICES FOR COMPUTER ROOMS

.1 As indicated.

2.5 COVER PLATES

.1 Cover plates for wiring devices to: CSA-C22.2 No.42.1.

.2 Cover plates from one manufacturer throughout project.

.3 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.

.4 Stainless steel cover plates, thickness 2.5 mm for wiring devices mounted in flush-mounted outlet box.

.5 Sheet metal cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.

.6 Weatherproof double lift spring-loaded cast aluminum cover plates, complete with gaskets for duplex receptacles as indicated.

.7 Weatherproof spring-loaded cast aluminum cover plates complete with gaskets for single receptacles or switches.

.8 All wiring device cover plates to be labeled using clear adhesive strips with black type identifying panel and circuit number for each device.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Switches:

.1 Install single throw switches with handle in "UP" position when switch closed.

.2 Install switches in gang type outlet box when more than one switch is required in one location.

.3 Mount toggle switches at height in accordance with Section 26 05 00 – Common Work Results - Electrical.

.2 Receptacles:

.1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.

.2 Mount receptacles at height in accordance with Section 26 05 00 – Common Work Results - Electrical.

.3 Where split receptacle has one portion switched, mount vertically and switch upper portion.

.3 Cover plates:

.1 Protect cover plate finish with paper or plastic film until painting and other work is finished.

.2 Install suitable common cover plates where wiring devices are grouped.

.3 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Materials and installation for industrial control devices including pushbutton stations, control and relay panels.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 26 05 00 – Common Work Results - Electrical.

1.3 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA C22.2 No.14, Industrial Control Equipment.

.2 National Electrical Manufacturers Association (NEMA)

.1 NEMA ICS 1, Industrial Control and Systems: General Requirements.

1.4 SUBMITTALS

.1 Include schematic, wiring, interconnection diagrams.

1.5 QUALITY ASSURANCE

.1 Submit to Owner's Representative one copy of test results.

PART 2 PRODUCTS

2.1 AC CONTROL RELAYS

.1 Control Relays: to CSA C22.2 No.14 and NEMA ICS 1.

.2 Convertible contact type: contacts field convertible from NO to NC, electrically held, with solid state timer as indicated. Coil rating: as indicated. Contact rating: as indicated.

.3 Sealed contact type: electrically held. Coil rating: as indicated. Contact rating: as indicated.

.4 Universal pole type: electrically held convertible from NO to NC by changing wiring connections. Coil rating: as indicated. Contact rating: as indicated.

.5 Fixed contact plug-in type: general purpose low coil current. Coil rating: as indicated. Contact rating: as indicated.

.6 Socket bases and DIN mounting rails for plug-in type relays.

2.2 RELAY ACCESSORIES

.1 Standard contact cartridges: normally-open - convertible to normally-closed in field.

2.3 OILTIGHT LIMIT SWITCHES

.1 Snap action type: roller rod or fork lever, top, side, push or wobble stick actuator, CSA type 1 enclosure. Contact rating as indicated.

.2 Surface mounted.

.3 Standard contact block.

2.4 SEALED CONTACT OILTIGHT LIMIT SWITCHES

.1 Lever type switches: roller fork or rod operated, single or double pole, double throw. Contact rating: as indicated.

.2 Push type switches: actuated by rod or plunger located on side of operating head, spring return single pole, throw. Contact rating: as indicated.

.3 Wobble stick cat whisker type switches: actuated by rod or stick extending from tip of operating head. Moving rod in any direction operates contacts. Single pole, double throw. Contact rating: as indicated.

.4 Lever operated: time delay switch: adjustable time delay from 1/2s to 15s plus 25%. Contact rating: as indicated.

.5 Plug-in construction switches: CSA Type 4, two or four circuit, lever push or wobble stick type, contact rating: as indicated.

2.5 SOLID STATE TIMING RELAYS

.1 Construction: AC operated electronic timing relay with solid-state timing circuit to operate output contact. Timing circuit and output contact completely encapsulated to protect against vibration, humidity and atmospheric contaminants.

.2 Operation: on-delay or off-delay.

.3 Potentiometer: self contained to provide time interval adjustment.

.4 Supply voltage: 120 or 24 V, AC, 60 Hz, as indicated.

.5 Temperature range: minus 20 degrees C to 60 degrees C.

.6 Output contact rating: maximum voltage 300 V AC or DC. Current: NEMA ICS 1 as indicated.

.7 Timing ranges: minimum 0.5 maximum 60s.

2.6 INSTANTANEOUS TRIP CURRENT RELAYS

.1 Enclosure: CSA Type 1.

.2 Contacts: NO, NC automatic reset with adjustable tripping point.

.3 Control: 3 wire, with provision for shorting contacts during accelerating period of motor.

.4 Contact rating: NEMA ICS 1 as indicated.

2.7 OPERATOR CONTROL STATIONS

.1 Enclosure: CSA Type1, surface mounting:

2.8 PUSHBUTTONS

.1 Illuminated, Standard duty. Operator recessed mushroom type, as indicated, with 1-NO and 1-NC auxiliary contacts rated as indicated. Labels as indicated. Stop pushbuttons coloured red, provision for padlocking in depressed position and labelled "emergency stop".

2.9 SELECTOR SWITCHES

.1 Maintained 2 or 3 position labelled as indicated standard duty, operators wing lever, contact arrangement as indicated, rated as indicated.

2.10 INDICATING LIGHTS

.1 Standard duty, full voltage, transformer LED type, push-to-test, lens colour: as indicated, supply voltage as indicated, labels as indicated.

2.11 CONTROL AND RELAY PANELS

.1 CSA Type 1 sheet steel enclosure (sprinkler proof where required) with hinged padlockable access door, accommodating relays, timers, labels, as indicated, factory installed and wired to identified terminals.

2.12 CONTROL CIRCUIT TRANSFORMERS

.1 Single phase, dry type.

.2 Primary: 208, 240 or 600 V, 60 Hz ac.

.3 Secondary: 120 V, or 24V ac.

.4 Rating: 50, 150, 250, 350 or 500 VA, as indicated.

.5 Secondary fuse: size as required.

.6 Close voltage regulation as required by magnet coils and solenoid valves.

2.13 THERMOSTAT (LINE VOLTAGE)

.1 Wall mounted, for exhaust fan control.

.2 Full load rating: Amps as indicated at 120 V.

.3 Temperature setting range: 10 degrees C to 30 degrees C.

.4 Thermometer Range: 10 degrees C to 30 degrees C.

.5 Markings in 5 degrees increments.

.6 Differential temperature fixed at 20 degrees C.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install pushbutton stations, control and relay panels, control devices and interconnect as required on control wiring diagrams as per drawings.

3.2 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 – Common Work Results - Electrical and in accordance with Section 01 91 13 – General Commissioning (Cx) Requirements.

.2 Depending upon magnitude and complexity, divide control system into convenient sections, energize one section at a time and check out operation of section.

.3 Upon completion of sectional test, undertake group testing.

.4 Check out complete system for operational sequencing.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 American National Standards Institute (ANSI)

.1 ANSI C82.1, Electric Lamp Ballasts-Line Frequency Fluorescent Lamp Ballast.

.2 ANSI C82.4, Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps.

.2 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)

.1 ANSI/IEEE C62.41, Surge Voltages in Low-Voltage AC Power Circuits.

.3 American Society for Testing and Materials (ASTM)

.1 ASTM F1137, Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.

.4 United States of America, Federal Communications Commission (FCC)

.1 FCC (CFR47) EM and RF Interference Suppression.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 45 00 - Quality Control.

.3 Section 01 91 13 – General Commissioning (Cx) Requirements.

1.3 SUBMITTALS

.1 Submit complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Owner's Representative.

.2 Photometric data to include: VCP Table and spacing criterion and luminaire coefficient of utilization (CU) tables.

.3 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.4 Quality assurance submittals: provide the following in accordance with Section 01 45 00 - Quality Control.

.1 Manufacturer's instructions: provide manufacturer's written installation instructions and special handling criteria, installation sequence, cleaning procedures and relamping schedule.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Divert unused metal materials from landfill to metal recycling facility.

.4 Disposal and recycling of fluorescent lamps as per local regulations.

.5 Disposal of old PCB filled ballasts.

1.5 ACCEPTABLE PRODUCTS

.1 Luminaires described in the Lighting Fixture Schedule identify quality, performance criteria and other parameters, as indicated for this project. Named fixtures are acceptable with modifications and accessories, as indicated.

.2 Fixtures from other manufacturers may be acceptable provided:

.1 Appearance and lighting performance are similar.
.2 Quality is equal or better.
.3 Lamp and ballast criteria remain the same.
.4 The fixture is provided with modifications and accessories to provide a complete product in keeping with the intent of the project.
.5 Approval in writing is obtained from the Owner's Representative to the supplier/manufacturer 5 days prior to tender closing date.

PART 2 PRODUCTS

2.1 LAMPS

.1 Incandescent lamps to be - clear, A19, 100 Watt with 1000 hour lamp life, rough-service rated; or as indicated.

.2 Tungsten halogen lamps to be - clear, T-3, 300 Watt, RSC base, 2000 hour lamp life, 5000 lumens; or as indicated.

.3 Fluorescent lamps to be - T8, 32 Watt, medium bi-pin, rapid or instant start to suit application, 4100 K, 30,000 hour lamp life, 2950 initial lumens, CRI 80; or as indicated.

.4 Metal halide lamps to be - clear, BT37, 400 Watt, mogul base, horizontal burn, 4100 K, 15,000 hour lamp life, 36,000 initial lumens, CRI65, open or enclosed type to suit the luminaire; or as indicated.

.5 Low pressure sodium lamps to be - clear, T21, 135 Watt, BY22d base, horizontal burn,16,000 hour lamp life, 22,000 initial lumens; or as indicated.

.6 High pressure sodium lamps to be - clear, ED18, 400 Watt, mogul base, 30,000 hour lamp life, 54,000 initial lumens; or as indicated.

.7 Compact fluorescent lamps to be - 18 Watt, G24q-2 base, 12,000 hour lamp life, 12,000 initial lumens, 4100 K, CRI 80; or as indicated.

2.2 BALLASTS

.1 Fluorescent ballast: CBM and CSA certified, energy efficient type, IC electronic.

.1 Rating: 120 or 347 V, 60 Hz, as indicated, for use with 2-32W, T8 octron imperial lamps.
.2 RFI/EMI suppression circuit to: FCC (CFR47) Part 18, sub-part C, Class A and Part 15, sub-part B, Class B.
.3 Totally encased and designed for 40 °C ambient temperature.
.4 Power factor: minimum 98 % with 98% of rated lamp lumens.
.5 Crest factor: 1.5 maximum.
.6 Capacitor: thermally protected.
.7 Thermal protection: non-resettable on coil.
.8 Harmonics: 10 % maximum THD.
.9 Operating frequency of electronic ballast: 20 khz minimum.
.10 Total Circuit Power: 62 Watts.
.11 Ballast Factor: greater than 0.90.
.12 Sound rated: Class A.
.13 Mounting: integral with luminaire.
.14 Be warranted by manufacturer for five years.

.2 Metal halide ballast: design B.

.1 Rating: 60 Hz voltage as indicated, for use with metal halide lamp as indicated. Provide circuitry for standby light to provide light for starting and restart.
.2 Totally encased and designed for 40 °C ambient temperature.
.3 Power factor: minimum 95 % with 95% of rated lamp lumens.
.4 Type: constant wattage auto-transformer or solid state.
.5 Input voltage range: plus or minus 10% of nominal.
.6 Minimum starting temperature: minus 29 °C at 90% line voltage.
.7 Mounting: outdoor integral with luminaire.
.8 Current crest factor: 1.7 maximum current.

.3 High pressure sodium ballast: to ANSI C82.4 design C.

.1 Rating: 60Hz voltage as indicated, for use with high pressure sodium lamps, as indicated.
.2 Totally encased and designed for 40 °C ambient temperature.
.3 Power factor: minimum 95 % with 95% of rated lamp lumens.
.4 Type: reactor or solid state with matching igniter as recommended by manufacturer.
.5 Input voltage range: plus 10% to minus 10% of nominal.
.6 Minimum starting temperature: minus 34 °C at 90% line voltage.
.7 Mounting: outdoor integral with luminaire.
.8 Current crest factor: 1.7 maximum current.

.4 Low pressure sodium ballast: design D.

.1 Rating: 60 Hz voltage as indicated, for use with low pressure sodium lamps as indicated.

.2 Totally encased and designed for 40 °C ambient temperature.

.3 Power factor: minimum 95% with 95% of rated lamp lumens.

.4 Type: constant wattage.

.5 Input voltage range: plus or minus 20% of nominal.

.6 Minimum starting temperature: minus 34 °C at 90% line voltage.

.7 Mounting: outdoor integral with luminaire.

2.3 FINISHES

.1 Light fixture finish and construction to meet ULC listings and CSA certifications related to intended installation.

2.4 LUMINAIRES

.1 As indicated in luminaire schedule on drawings. Provide 10% spare lamps of each type noted in luminaire schedule.

2.5 OPTICAL CONTROL DEVICES

.1 As indicated in luminaire schedule on drawings.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Locate and install luminaires as indicated. Install lamps in all fixtures.

.1 Provide adequate support to suit ceiling system.

3.2 WIRING

.1 Connect luminaires to lighting circuits.

.1 Install flexible conduit for vertical power supply drop to luminaires as indicated. Horizontal wiring using flexible conduit is not permitted.

3.3 LUMINAIRE SUPPORTS

.1 For suspended ceiling installations support luminaires from ceiling grid in accordance with local inspection requirements.

3.4 LUMINAIRE ALIGNMENT

.1 Align luminaires mounted in continuous rows to form straight uninterrupted line.

.2 Align luminaires mounted individually parallel or perpendicular to building grid lines.

3.5 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 – Common Work Results - Electrical and Section 01 91 13 – General Commissioning (Cx) Requirements.

END OF SECTION

Memorial University of Newfoundland

LEVEL 2 WASHROOM RENOVATIONS

ST. JOHN'S

JUNE 7, 2024

ISSUED FOR TENDER

L-119-22 ISSUED FOR TENDER

LIST OF DRAWINGS

A-0.1 - GENERAL NOTES & SUBMITTALS
A-1.0 - LOCATIONS AND HOARDING PLANS
A-2.0 - DEMOLITION FLOOR PLAN
A-2.1 - NEW FLOOR PLAN
A-2.2 - ACCESSIBILITY CLEARANCES
A-2.3 - CEILING PLANS AND DETAILS
A-2.4 - NEW FINISH PLAN AND SCHEDULE
A-3.0 - DOOR AND WINDOW SHEDULE
A-4.0 - WASHROOM ACCESSORIES
A-4.1 - WASHROOM ELEVATIONS L-2021A
A-4.2 - WASHROOM ELEVATIONS L-2021
A-4.3 - WASHROOM ELEVATIONS L-2021
A-4.4 - WASHROOM ELEVATIONS L-2020
A-5.0 - MILLWORK DETAILS

M-0.1 - MECHANICAL SYMBOL LEGEND
MP-1.0 - DOMESTIC WATER PLAN
MP-1.1 - DEMOLITION D.W.V PLUMBING PLAN
MP-1.2 - NEW D.M.V PLUMBING PLAN
MP-1.3 SPRINKLER PLAN
MV-1.0 VENTILATION PLAN

E-0.1 - ELECTRICAL SYMBOL LEGEND
E-1.0 - ELECTRICAL POWER PLANS
E-2.0 - ELECTRICAL CEILING PLAN
E-3.0 - EXISTING PANEL SCHEDULE
E-3.1 - NEW PANEL SCHEDULE

DEPARTMENT OF
FACILITIES MANAGEMENT

This University was raised by the people of Newfoundland as a memorial to the fallen in the great wars, 1914-1918, 1939-1945, that in freedom of learning, their cause and sacrifice might not be forgotten.

- Dedication plaque, Arts & Administration Building, St. John's Campus

MEMORIAL
UNIVERSITY

GENERAL NOTES: (APPLY TO ALL DWG SHEETS)

1. ALL WORK TO BE DONE IN ACCORDANCE WITH LATEST ADDITION OF THE NATIONAL BUILDING CODE AND APPLICABLE LOCAL BUILDING CODES.
2. ALL CONTRACTORS AND SUBCONTRACTORS PERFORMING WORK ON THE PROJECT ARE TO PROVIDE UTMOST QUALITY WORKMANSHIP. THEY MUST ALSO ADHERE TO ALL SCHEDULES AS SET OUT IN THE CONTRACT DOCUMENTS.
3. CONTRACTOR TO ENSURE A HAZARD ASSESSMENT IS DONE ONSITE PRIOR TO THE START OF WORK TO IDENTIFY POTENTIAL HAZARDS AND RECOMMENDED CONTROLS.
4. CONTRACTOR SHALL BE AWARE THAT ASBESTOS CONTAINING MATERIAL (ACM) EXISTS THROUGHOUT THE CAMPUS. COORDINATE ALL CUTTING, DRILLING, AND DEMOLITION OF PLASTER, FLOOR TILE, CEILING TILE, ETC., BY ALL TRADES WITH MUN PROJECT COORDINATOR OR MUN ASBESTOS COORDINATOR.
5. THE AREA OF WORK MAY BE OCCUPIED BY THE CLIENT STAFF FOR THE DURATION OF THE PROJECT. THE MUN PROJECT COORDINATOR AND GENERAL CONTRACTOR SHALL COORDINATE RENOVATING SMALL AREAS OF THE SPACE AT A TIME TO MINIMIZE DUST, DEBRIS, AND NOISE LEVELS. A SCHEDULE FOR WORK SHALL BE SUBMITTED BY THE GENERAL CONTRACTOR WITH THE BID FORM. THE PROJECT COORDINATOR SHALL COORDINATE WITH THE CLIENT AND GENERAL CONTRACTOR TO ESTABLISH A SCHEDULE OF WORK.
6. ALL TEMPORARY HOARDING AND ACCESSES REQUIRED IN EGRESS CORRIDORS, ATRIUMS, FOYERS AND STAIRWELLS TO BE OF NON–COMBUSTABLE FIRE RATED CONSTRUCTION AS PER NBC.
7. CONTRACTOR IS TO HOARD WORK AS NECESSARY AND PROTECT REMAINING PREMISES IN THE WORK AREA AND ADJACENT TENANT SPACES FROM DAMAGE AND MAKE GOOD ANY DAMAGES THAT MAY OCCUR DURING THE WORK. CONTRACTOR TO SEAL ALL AFFECTED DUCT SYSTEMS FOR DUST CONTROL WITHIN THE WORK AREA AND ADJACENT SPACES. ALL MATERIALS TO BE PROTECTED & COVERED DURING PAINTING.
8. CONCRETE BLOCK REMOVAL AND WORK CREATING EXCESSIVE NOISE SHALL BE SCHEDULED FOR AFTER NORMAL BUSINESS HOURS 8:30AM – 5:00PM, MONDAY – FRIDAY. TO LIMIT NOISE AND DISRUPTIONS TO SURROUNDING OCCUPANTS OF BUILDING.
9. CONTRACTOR TO CAREFULLY REMOVE EXISTING SIGNAGE FROM WALL LOCATIONS PRIOR TO DEMOLITION AND PAINTING. REPLACE USING TWO SIDED TAPE TO MATCH EXISTING.
10. ALL DEMOLISHED MATERIAL BECOMES THE PROPERTY OF THE CONTRACTOR. WORK SITE TO BE LEFT IN SAFE CONDITION AT THE END OF EACH WORK DAY.
11. PROVIDE FIRE STOPPING AT ALL PENETRATIONS THROUGH FLOOR SLABS AND CONCRETE BLOCK WALLS.
12. READ IN CONJUNCTION WITH MECHANICAL AND ELECTRICAL PLANS AND SPECIFICATIONS, COORDINATE ALL WORK WITH OTHER TRADES.
13. ALL CIRCUIT BREAKER / PANEL SHUTDOWNS WILL REQUIRE MUN ELECTRICIAN PRESENT TO PROVIDE LOCK OUT/TAG OUT. CONTRACTOR SHALL CONTACT PROJECT COORDINATOR 48Hrs IN ADVANCE TO SCHEDULE MUN ELECTRICIAN. LIVE ELECTRICAL WORK IS NOT PERMITTED.
14. CONTRACTOR TO OBTAIN AND PAY FOR ANY PERMITS REQUIRED BY LOCAL CODES AND REGULATIONS.
15. CONTRACTOR TO REVIEW EXISTING SITE CONDITIONS, VERIFY ALL DIMENSIONS AND SCOPE OF WORK AND REPORT ANY DISCREPANCIES TO THE MUN PROJECT COORDINATOR PRIOR TO SUBMISSIONS OF TENDER.
16. WHERE DRAWINGS INDICATE TO MATCH EXISTING, NO CHARGES AFTER TENDER ACCEPTANCE FOR MINIMUM QUANTITIES OR SPECIAL SHIPPING COSTS WILL BE CONSIDERED.
17. NO CHANGES OR REVISIONS TO THE WORK ARE TO BE EXECUTED WITHOUT THE PRIOR APPROVAL OF THE OWNER.
18. CONTRACTORS SHALL AWAIT WRITTEN APPROVAL FOR ANY CHANGE ORDERS BY THE OWNER'S REPRESENTATIVE PRIOR TO COMMENCING ANY WORK OR ORDER OF ANY MATERIALS RELATING TO A CHANGE.
19. PROVIDE CERTIFICATE OF GUARANTEE OF WORKMANSHIP AND MATERIAL FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE BY OWNER.
20. **ISOLATION OF WORK AREAS IN OCCUPIED FACILITIES:**

20.1. MATERIALS:

20.1.1. POLYETHYLENE SHEET: REINFORCED, FIRE–RESISTIVE SHEET, 0.25mm MINIMUM THICKNESS, WITH FLAME–SPREAD RATING OF 15 OR LESS PER ASTM E 84.

20.1.2. DUCT CONTROL ADHESIVE–SURFACE WALK–OFF MATS: PROVIDE MATS MINIMUM 914 X 1624mm.

20.2. INSTALLATION:

20.2.1. PREVENT DUST, FUMES, AND ODOURS FROM ENTERING OCCUPIED AREAS.

20.2.2. PRIOR TO COMMENCING WORK, ISOLATE THE HVAC SYSTEM IN AREA WHERE WORK IS TO BE PERFORMED IN ACCORDANCE WITH APPROVED COORDINATION DRAWINGS. COORDINATE WITH OWNER.

20.2.3. DISCONNECT SUPPLY AND RETURN DUCTWORK IN WORK AREA FROM HVAC SYSTEMS SERVICING OCCUPIED AREAS.

20.2.4. MAINTAIN NEGATIVE AIR PRESSURE WITHIN WORK AREA USING HEPA–EQUIPPED AIR FILTRATION UNITS, STARTING WITH COMMENCEMENT OF TEMPORARY PARTITION CONSTRUCTION, AND CONTINUING UNTIL REMOVAL OF TEMPORARY PARTITIONS IS COMPLETE. AT THE DISCRETION OF THE PROJECT COORDINATOR.

20.2.5. MAINTAIN DUST PARTITIONS DURING THE WORK. USE VACUUM COLLECTION ATTACHMENTS ON DUST–PRODUCING EQUIPMENT. ISOLATE LIMITED WORK WITHIN OCCUPIED AREAS USING PORTABLE DUST CONTAINMENT DEVICES.

20.2.6. PERFORM DAILY CONSTRUCTION CLEANUP AND FINAL CLEANUP USING APPROVED, HEPA–FILTER–EQUIPPED VACUUM EQUIPMENT.

***** CONTRACTOR'S ARE TO TAKE NOTE THAT LEAD CONTAINING PAINT IS PRESENT IN THE WASHROOMS IN THE QEII LIBRARY BUILDING. A LEAD SURVEY HAS BE INCLUDED IN SECTION 02 26 00 OUTLINING SPECIFIC INFORMATION. CMU BLOCK WALLS ARE TO BE REMOVED USING APPROPRIATE LEAD ABATEMENT PROCEDURES AS PER THE PROVINCIAL REGULATIONS. *****

***** CONTRACTOR'S ARE TO TAKE NOTE THAT ASBESTOS CONTAINING MATERIALS (ACMs) ARE PRESENT IN VARIOUS BUILDING MATERIALS IN THE QEII LIBRARY BUILDING. AN ASBESTOS SURVEY HAS BE INCLUDED IN SECTION 02 26 00 OUTLINING SPECIFIC INFORMATION. MECHANICAL INSULATION, TAR MASTIC AT PIPING, AND GOLD MASTIC AT SINKS ARE TO BE REMOVED USING APPROPRIATE ASBESTOS ABATEMENT PROCEDURES AS PER THE PROVINCIAL REGULATIONS. *****

ARCHITECTURAL SYMBOL LEGEND:

- NEW WALL CONSTRUCTION, SEE WALL TYPE (#)
- EXISTING WALL CONSTRUCTION TO REMAIN
- EXISTING CONCRETE BLOCK WALL CONSTRUCTION TO REMAIN
- EXISTING WALL CONSTRUCTION TO BE REMOVED
- EXISTING CONCRETE BLOCK WALL CONSTRUCTION TO BE REMOVED
- EXISTING DOOR TO REMAIN
- EXISTING DOOR TO BE REMOVED
- NEW DOOR
- (####) NEW DOOR NUMBERS
- (####) DEMOLITION DOOR NUMBERS
- (#) REFER TO CONSTRUCTION NOTE
- [#] REFER TO DEMOLITION NOTE
- = LAT CEILING SYSTEM TO BE REMOVED
- = LAT CEILING SYSTEM TO REMAIN
- = NEW LAT CEILING SYSTEM, SEE SPEC
- (####) = NEW CEILING INSTALLATION HEIGHT ABOVE FINISH FLOOR

WALL TYPES:

(EXISTING FLOOR TO U/S OF CONCRETE SLAB IS APPROXIMATELY 4267 mm)

ALL WALL TYPES NOTED BELOW TO EXTEND TO U/S OF CONC SLAB (UNLESS OTHERWISE SPECIFIED) ABOVE SHALL BE CONSTRUCTED TO ACCOMMODATE EXISTING STRUCTURAL, MECHANICAL AND ELECTRICAL ITEMS. CONSTRUCT WALLS TO TIGHTLY WRAP AROUND ALL ELEMENTS.

(1) WALL TYPE 1: 105mm

- 13mm WATER RESISTANT GYPSUM BOARD
- 92mm METAL STUD FRAMING @ 400 O.C.
- ACOUSTIC SOUND BATTS TO FILL STUD CAVITY
- POLYPROPYLENE NETTING MESH (BY ADO PRODUCTS, OR APPROVED EQUAL)

WALL CONSTRUCTION TO EXTEND TO 200mm ABOVE FINISHED CEILING.

(2) WALL TYPE 2: 118mm

- 13mm WATER RESISTANT GYPSUM BOARD
- 92mm METAL STUD FRAMING @ 400 O.C.
- ACOUSTIC SOUND BATTS TO FILL STUD CAVITY
- 13mm WATER RESISTANT GYPSUM BOARD

WALL CONSTRUCTION TO EXTEND TO 200mm ABOVE FINISHED CEILING.

(3) WALL TYPE 3: 176mm

- 13mm WATER RESISTANT GYPSUM BOARD
- 150mm METAL STUD FRAMING @ 400 O.C.
- 13mm WATER RESISTANT GYPSUM BOARD

(4) WALL TYPE 4: 100mm

- 100mm CONCRETE MASONRY BLOCK UNIT
- INSTALL USING TOOTHED TECHNIQUE

WALL CONSTRUCTION TO EXTEND TO U/S CONCRETE SLAB LEVEL 3.

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE–ISSUED FOR PERMIT	MAY 27, 2024
R0	ISSUED FOR PERMIT	MAY, 2024

GENERAL NOTES

1. DRAWINGS TO BE READ AS A SET.
2. DO NOT SCALE FROM DRAWINGS.
3. THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS AND SITE CONDITIONS. PRIOR TO SUBMISSION OF TENDERS.
4. ALL DISCREPANCIES FOUND IN THESE DRAWINGS TO BE BROUGHT TO THE ATTENTION OF FACILITIES MANAGEMENT PRIOR TO SUBMISSION OF TENDERS.

NORTH

MEMORIAL UNIVERSITY

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- Dedication plaque, Arts & Administration Building, St. John's Campus

PROJECT NAME:

QEII LIBRARY LEVEL 2 WASHROOM RENOVATIONS Project #: L-119-22

DRAWING TITLE:

GENERAL NOTES AND SUBMITTALS

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. L-119-22	DRAWING No. A-0.1

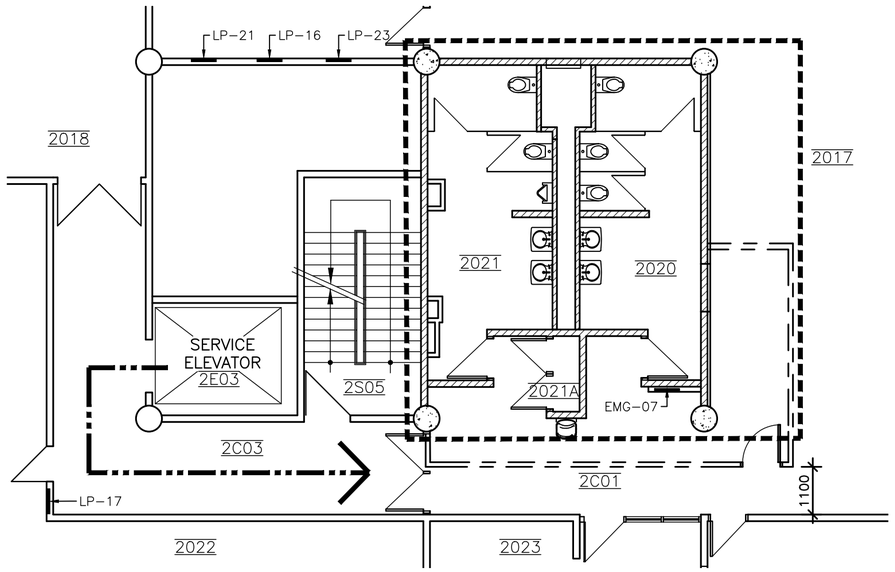
SYMBOL LEGEND:

HOARDING WALL:

- POLYETHYLENE SHEET: REINFORCED, FIRE–RESISTIVE SHEET, 0.25mm MINIMUM THICKNESS, WITH FLAME–SPREAD RATING OF 15 OR LESS PER ASTM E 84. "WHITE RIP–PROOF"
- METAL STUDS @ 600 O.C.
  - FASTEN BOTTOM TRACK TO EXISTING FLOORING USING VELCRO.
  - FASTEN TOP TRACK TO EXISTING CEILING GRID USING GREEN/BLUE WIDE PAINTERS TAPE.
- SEAL POLYETHYLENE SHEET TO EXISTING FLOORING AND LAT GRID USING GREEN/BLUE WIDE PAINTERS TAPE. DO NOT USE DUCT TAPE!
- SEAL LAPS IN POLYETHYLENE SHEET USING WHITE SHEATHING TUCK TAPE.

GENERAL CONSTRUCTION NOTES:

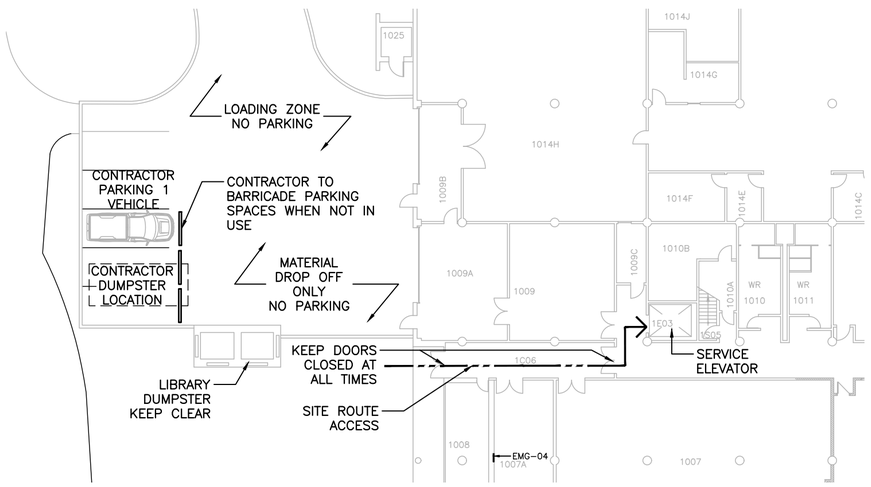
1. CONTRACTOR SHALL NOT USE ANY INTERIOR SPACES, OTHER THAN CONSTRUCTION AREAS INSIDE HOARDING WALLS, FOR STORAGE OR LAY–DOWN AREAS.
2. INSTALL PROTECTIVE COVERING OVER EXISTING FLOORING AS REQUIRED IN ACCESS ROUTES AND IN HOARDING AREA. MAINTAIN COVERINGS FOR DURATION OF THE PROJECT OR UNTIL AGREED TO WITH THE CONTRACTOR AND OWNER.
3. EXIT DOOR FROM 1009A TO EXTERIOR SHALL NOT BE PROPPED OR HELD OPEN OR LEFT UNATTENDED WHILE OPENED.
4. CONTRACTOR SHALL OBTAIN PARKING PERMITS FROM CAMPUS ENFORCEMENT PATROL (CEP) FOR THE DURATION OF THE PROJECT. PARKING IS NOT PERMITTED IN LOADING ZONES OR MATERIAL DROP–OFF AREA.
5. CONTRACTORS SHALL BE RESPONSIBLE FOR PAYING ALL PARKING TICKETS ISSUED BY CAMPUS ENFORCEMENT PATROL. CONTESTED OR DISPUTED TICKETS SHALL BE BETWEEN THE CONTRACTOR AND CAMPUS ENFORCEMENT PATROL.
6. CONSTRUCT HOARDING WALLS TO UNDERSIDE OF EXISTING CONCRETE SLAB CEILINGS TO PREVENT DUST MOVEMENT THROUGH WALL CONSTRUCTION. CONTRACTOR TO REPAIR/REPLACE DAMAGED CEILING, WALL AND FLOOR FINISHES IN THE EVENT OF DAMAGE INCURRED THROUGH THIS SCOPE OF WORK. EXISTING PAINT AT CMU BLOCK IS TO BE TREATED AS LEAD CONTAINING. EXISTING MECHANICAL INSULATION, TAR MASTIC AT PIPING, AND GOLD MASTIC AT SINKS TO BE TREATED AS ASBESTOS CONTAINING.
7. CONTRACTOR SHALL KEEP GRASS, SIDEWALKS, AND PAVED AREAS AROUND DUMPSTER CLEAR OF DEBRIS AND MATERIALS. DUMPSTER TO BE COVERED AT ALL TIMES. DUMPSTER TO BE EMPTIED WHEN FULL.
8. ALL SCOPE OF WORK LOCATED OUTSIDE CONSTRUCTION AREAS & HOARDING ON LEVEL 2 AND ABOVE CEILING SYSTEMS ON LEVEL 1 SHALL BE DONE AFTER REGULAR BUSINESS HOURS OF 8:30AM TO 5PM EACH DAY TO ENSURE THE SAFETY OF BUILDING OCCUPANTS. ALSO, THE EXACT DATE AND TIME OF WORK TO BE SCHEDULED WITH PROJECT COORDINATOR TO PROVIDE BUILDING OCCUPANTS NOTICE OF WORK TO BE DONE IN CORRIDORS AND ADJACENT OFFICES AND TO ENSURE WORK IS NOT CARRIED OUT DURING EVENING CLASSES.
9. REFER TO SECTION 01 10 00 FOR WORK RESTRICTIONS.



LEVEL 2 LOCATION/HOARDING PLAN

SCALE: 1:100

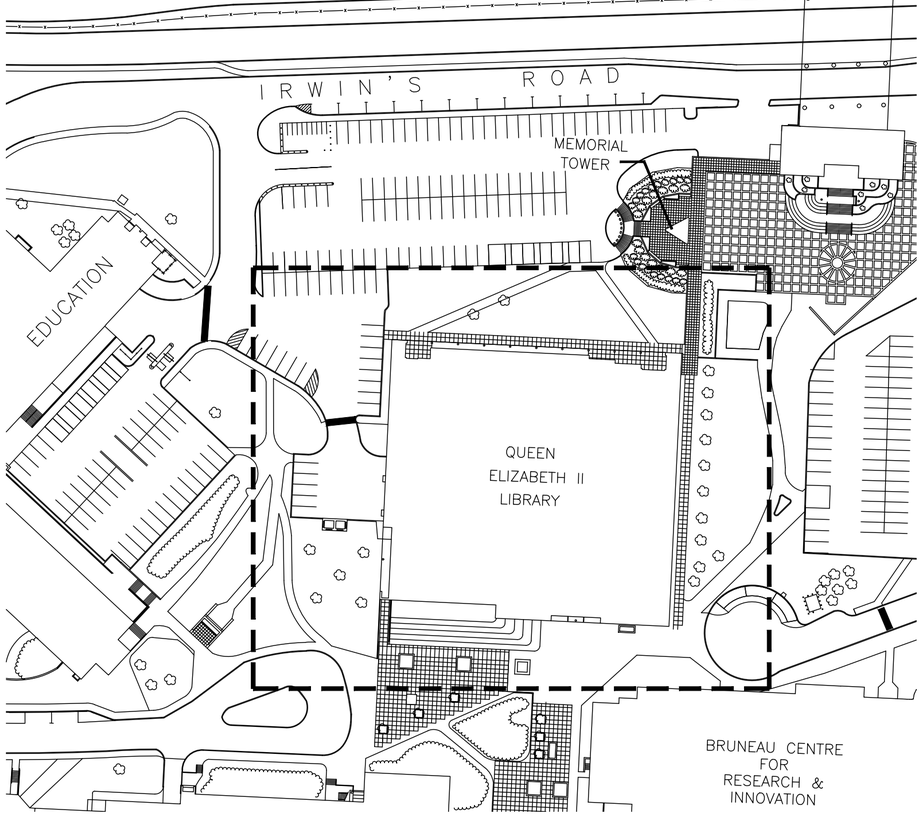
3 A–1.0



SITE ACCESS & LEVEL 1 LOCATION PLAN

SCALE: NTS

2 A–1.0



SITE/BUILDING LOCATION PLAN

SCALE: NTS

1 A–1.0

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE–ISSUED FOR PERMIT	MAY 27, 2024
R0	ISSUED FOR PERMIT	MAY, 2024

GENERAL NOTES

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PROJECT NAME:

QEII LIBRARY LEVEL 2 WASHROOM RENOVATIONS Project #: L-119-22

DRAWING TITLE:

LOCATION & HOARDING PLANS

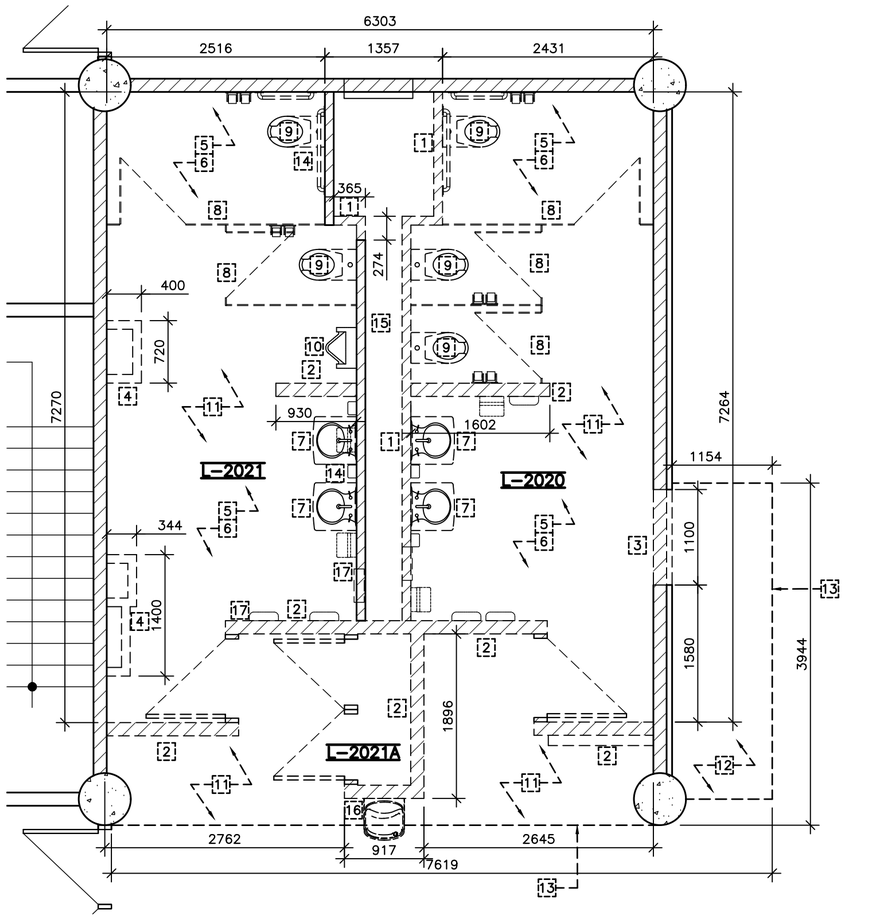
REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. L-119-22	DRAWING No. A-1.0

FLOOR PLAN DEMOLITION NOTES: [#]

1. REMOVE PORTION OF CONCRETE BLOCK WALL FOR NEW LAYOUT USING TOOTHED TECHNIQUE WHERE REQUIRED FOR NEW WALL INFILL. CARE TO BE TAKEN WHERE REMOVING PORTIONS OF WALL INTERSECTING WITH REMAINING CONCRETE BLOCK WALLS. REMOVE CONCRETE BLOCK FULL HEIGHT. WALL CONSTRUCTED OF 100mm CMU. ASSUME LEAD PAINT. SALVAGE CONCRETE BLOCK FOR REUSE AT LOCATIONS INDICATED ON DWG A–2.1.
2. REMOVE PORTION OF CONCRETE BLOCK WALL FOR NEW LAYOUT USING TOOTHED TECHNIQUE WHERE REQUIRED FOR NEW WALL INFILL. CARE TO BE TAKEN WHERE REMOVING PORTIONS OF WALL INTERSECTING WITH REMAINING CONCRETE BLOCK WALLS. REMOVE CONCRETE BLOCK FULL HEIGHT. WALL CONSTRUCTED OF 150mm CMU. ASSUME LEAD PAINT.
3. REMOVE PORTION OF CONCRETE BLOCK WALL FOR NEW OPENINGS USING TOOTHED, OR SAW CUT TECHNIQUE. REMOVE CONCRETE BLOCK TO HEIGHT INDICATED ON ELEVATION DWG A–4.4. WALL CONSTRUCTED OF 150mm CMU. ASSUME LEAD PAINT.
4. REMOVE EXISTING GYPSUM BOARD PARTITION WALLS FOR NEW LAYOUT. CARE TO BE TAKEN REMOVING EXISTING CHASE WALLS. EXISTING CONDUIT AND PIPING TO REMAIN.
5. REMOVING EXISTING ACCESSORIES TO BE STORED, AND REUSED AS INDICATED. ITEMS NOT REUSED TO BE TURNED OVER TO OWNER. ACCESSORIES INCLUDE:
   - 5.1. TOILET TISSUE DISPENSERS
   - 5.2. SHARPS CONTAINER
   - 5.3. SOAP DISPENSERS
   - 5.4. PAPER TOWEL DISPENSERS
6. EXISTING ACCESSORIES TO BE REMOVED AND DISPOSED OF. ACCESSORIES INCLUDE:
   - 6.1. GRAB BARS
   - 6.2. HAND DRYER
   - 6.3. MIRRORS
   - 6.4. SANITARY NAPKIN DISPOSAL
   - 6.5. PAPER TOWEL DISPENSER/WASTE RECEPTACLE COMBINATION
7. EXISTING SINKS AND ASSOCIATED FIXTURES TO BE REMOVED AND DISPOSED (TYP.). HOT AND COLD WATER LINES TO BE CAPPED FOR FUTURE USE IN THIS PACKAGE.
8. EXISTING WATER CLOSET PARTITIONS TO BE REMOVED AND DISPOSED (TYP.)
9. EXISTING WATER CLOSETS AND WALL RECESSED FLUSH VALVE TO BE REMOVED AND DISPOSED (TYP).
10. EXISTING URINALS TO BE REMOVED AND DISPOSED (TYP.)
11. REMOVE EXISTING VCT FLOORING AND ASSOCIATED COMPONENTS TO CONCRETE SLAB.
12. REMOVE EXISTING CARPET FLOORING AND ASSOCIATED COMPONENTS TO CONCRETE SLAB. SLAB TO BE PREPPED AS REQUIRED TO ACCEPT NEW FLOORING.
13. APPROXIMATE LINE OF EXISTING FLOOR SYSTEM TO BE REMOVED.
14. REMOVE WALL HATCHES AND DISPOSE OF. PREPARE EXISTING BLOCK WALL FOR NEW 600mmX600mm HATCH. LOCATIONS OF NEW HATCHES TO BE DETERMINED BY NEW PLUMBING LAYOUT.
15. CONTRACTOR TO REMOVE AS MUCH WALL AS NECESSARY TO FACILITATE PLUMBING FIXTURE INSTALLATION. PATCH AND REPAIR BLOCK WALL TO MATCH ADJACENT FINISHES.
16. REMOVE AND STORE EXISTING WATER/BOTTLE FILLING STATION FOR RE–USE. WATER LINES TO BE CAPPED FOR RE–USE IN THIS PACKAGE.
17. EXISTING CERAMIC WALL TILE TO BE REMOVED. WALL TO BE PREPPED TO RECEIVE NEW FINISH

GENERAL DEMOLITION NOTES:

1. PERFORM DEMOLITION WORK SHOWN AND/OR REQUIRED TO COMPLETE THE WORK. DO NOT ASSUME DEMOLITION DRAWINGS SHOW THE FULL EXTENT OF DEMOLITION WORK REQUIRED.
2. REFER TO SHEET A–0 AND SECTION 02 41 19 FOR ADDITIONAL REQUIREMENTS AND INSTRUCTIONS FOR DEMOLITION WORK.
3. GENERAL CONTRACTOR MUST REFER TO ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR EXTENT OF WORK AND COORDINATE WITH OTHER TRADES PRIOR TO THE COMMENCEMENT OF ANY WORK.
4. MAINTAIN FIRE RATINGS BETWEEN FLOOR AND WALL ASSEMBLIES. FILL AND PATCH HOLES IN FLOORS AND WALLS AS A RESULT OF DEMOLITION WORK. APPROPRIATELY FIRE SEAL PENETRATIONS TO MAINTAIN 1 HOUR FIRE RESISTANCE RATING.
5. ALL HEAT DETECTOR ISOLATIONS WILL REQUIRE MUN ELECTRICIAN PRESENT AT THE MAIN FIRE ALARM PANEL. CONTRACTOR SHALL BE RESPONSIBLE TO PERFORM FIRE WATCH FOR ANY HEAT DETECTOR ISOLATIONS REQUIRED OUTSIDE REGULAR BUSINESS HOURS OF 8:30AM–4:30PM. CONTRACTOR SHALL CONTACT PROJECT COORDINATOR 48hrs IN ADVANCE TO SCHEDULE HEAT DETECTOR ISOLATIONS.
6. REMOVE AND SALVAGE LOCKSETS, CLOSURES, AND OPERATOR SYSTEMS UNLESS OTHERWISE NOTED AND TURN OVER TO OWNER.
7. REFER TO SECTION 01 10 00 FOR WORK RESTRICTIONS
8. ALL WORK REQUIRED TO BE PERFORMED OUTSIDE HOARDING/CONSTRUCTION SITE SHALL BE DONE BETWEEN 5PM TO 8AM. PROVIDE 24 HOURS NOTICE PRIOR TO EACH WORK SHIFT.
9. ALL CMU BLOCK WALLS IN WASHROOM AREA TO BE TREATED AS LEAD PAINT CONTAINING. GENERAL CONTRACTOR TO CARRY FOR APPLICABLE ABATEMENT.
10. ALL MECHANICAL INSULATION, TAR MASTIC AT PIPING, AND GOLD MASTIC AT SINKS IN WASHROOM AREA TO BE TREATED AS ACM CONTAINING. GENERAL CONTRACTOR TO CARRY FOR APPLICABLE ABATEMENT.
11. PROVIDE CUTTING, FITTING, HOLE CORING, PATCHING, FRAMING, FURRING, BLOCKING AND MISCELLANEOUS RELATED COMPONENTS REQUIRED TO EXECUTE THE WORK OF THIS CONTRACT, INCLUDING WORK REQUIRED BY MECHANICAL, ELECTRICAL AND OTHER TRADES. REINSTATE AND/OR MAKE GOOD ALL EXISTING SURFACES AFFECTED BY THE WORK. TO BE PREPARED TO RECEIVE NEW FINISHES OR FINISH TO MATCH ADJACENT CONDITIONS. COORDINATE EXTENT WITH SUB–TRADES.
12. WHEREVER EXCESSIVE DEMOLITION OCCURS OR IF DAMAGE OCCURS TO ADJACENT SURFACES NOT INTENDED FOR DEMOLITION OR REMOVAL, REINSTATE ALL AFFECTED SURFACES AND PREPARE THEM TO RECEIVE NEW FINISHES IF SPECIFIED, OTHERWISE REFINISH TO MATCH EXISTING ADJACENT CONDITIONS.



DEMOLITION FLOOR PLAN
SCALE: 1:50

1
A–2.0

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE–ISSUED FOR PERMIT	MAY 27, 2024
R0	ISSUED FOR PERMIT	MAY, 2024

GENERAL NOTES

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PROJECT NAME:

QEII LIBRARY
LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

DRAWING TITLE:

DEMOLITION FLOOR PLAN

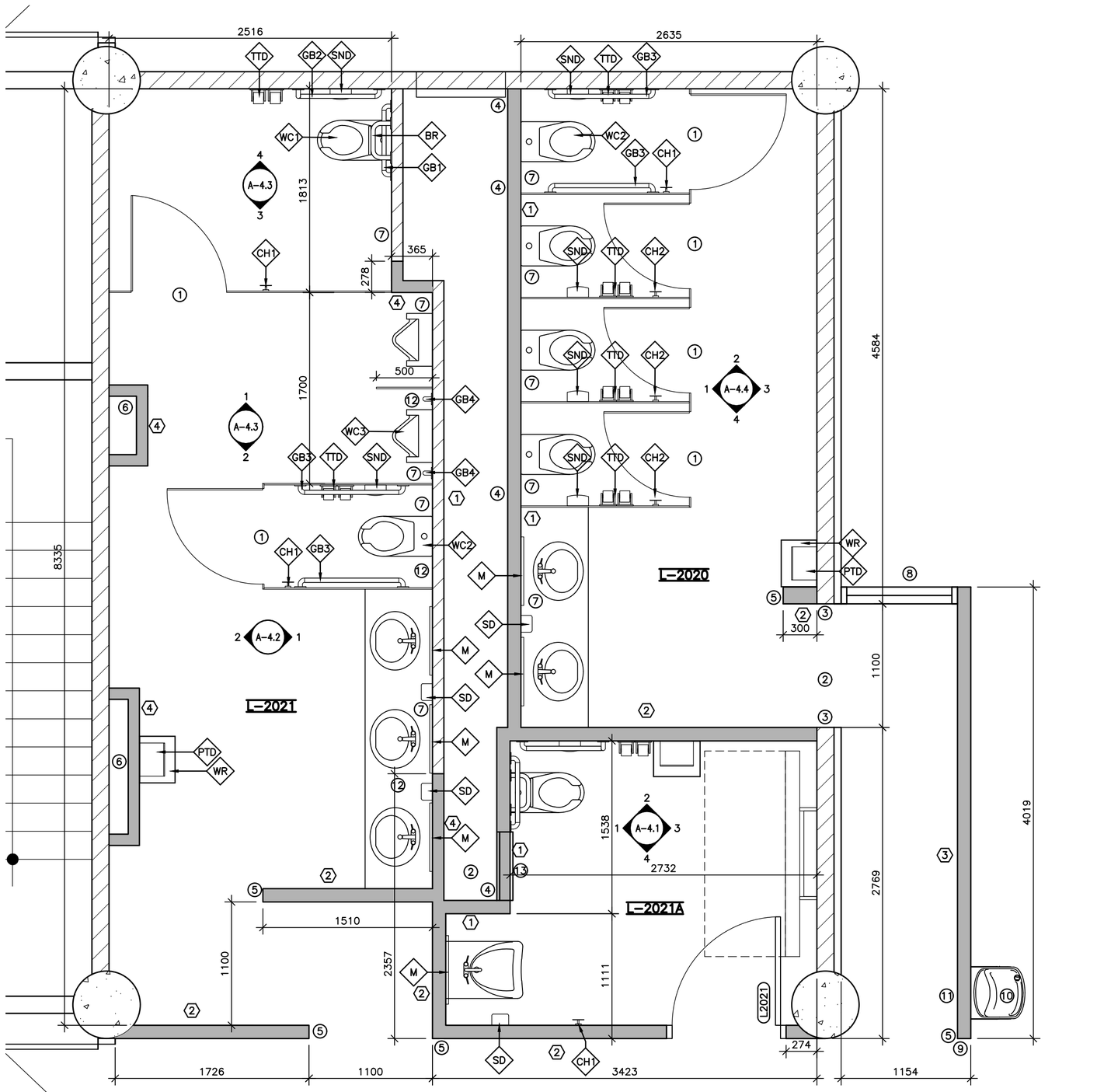
REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. **L-119-22**	DRAWING No. **A-2.0**

GENERAL CONSTRUCTION NOTES:

1. PREP AND LEVEL ENTIRE FLOOR SLAB AS REQUIRED TO FACILITATE THE INSTALLATION OF NEW FLOORING. SEE ROOM FINISH SCHEDULE AND NEW FINISHES PLAN.
2. PROVIDE CONTINUOUS SOLID WOOD BLOCKING IN WALLS/PARTITIONS AT LOCATIONS WHERE ACCESSORIES SHALL BE INSTALLED.

FLOOR PLAN CONSTRUCTION NOTES: (#)

1. INSTALL NEW METAL TOILET PARTITIONS AS PER PLAN. CONTRACTOR TO ENSURE ALL ACCESSIBILITY CLEARANCES ARE MET AS PER A–2.2. DIMENSIONS TO ACCOUNT FOR ANY WALL FINISHES.
2. INSTALL NEW STRUCTURAL STEEL ANGLE LINTEL OVER NEW OPENING. TWO (2) ANGELS SIZED 50Dx75Hx13W, LINTEL TO EXTEND 205mm EACH SIDE OF OPENING. SEE DWG 3/A–2.3 FOR ADDITIONAL INFO.
3. ENSURE NEW OPENING IN CONCRETE BLOCK WALL TO BE SMOOTH FINISH
4. INSTALL NEW PLUMBING CHASE WALL IS FRAMED AS TIGHT AS POSSIBLE TO EXISTING SANITARY/VENT/SUPPLY/ STORM LINES AND FIREHOSE CABINET LOCATED WITHIN CHASE. SEEK APPROVAL BEFORE INSTALLATION.
5. ENDWALL/CORNER GUARD: STAINLESS STEEL MOUNTED AS PER MANUFACTURERS INSTRUCTIONS (WHERE INDICATED ON DRAWINGS).
   - 5.1. SIZE: WALL/PARTITION THICKNESS x 50mm x 1220 mm HIGH
   - 5.2. TYPE 304 ALLOY WITH #4 SATIN FINISH. 1.2mm MINIMUM THICKNESS
   - 5.3. ACCEPTABLE PRODUCT: WALLGUARD, OR APPROVED ALTERNATE.
6. CONTRACTOR TO ENSURE WALL TO BE POSITIONED TO SIT AS TIGHT AS POSSIBLE TO EXISTING CONDUIT. SEEK APPROVAL BEFORE INSTALLATION.
7. INSTALL NEW HYGIENIC WALL CLADDING ALONG WALL. SEE INTERIOR WASHROOM ELEVATIONS A–4.2 AND A–4.4 FOR VERTICAL DIMENSIONS. SEAMS TO BE WELDED CONNECTION. STANDARD OF ACCEPTANCE TO BE ALTRO WHITEROCK OR APPROVED ALTERNATE. SEE FINISH SCHEDULE A–2.4 FOR COLOR SELECTION.
8. NEW PRESSED STEEL FRAME WINDOW. SEE 5/A–3.0 FOR DIMENSIONS.
9. SECURELY ATTACH NEW METAL STUD WALL TO EXISTING BULKHEAD ABOVE
10. INSTALL RELOCATED WATER FOUNTAIN AS CLOSE TO CORRIDOR AS POSSIBLE.
11. NEW LOCATION OF ACCESS HATCH FOR WATER FOUNTAIN PLUMBING. HATCH TO BE 1200mmX1200mm.
12. REPAIR OPENINGS IN CONCRETE BLOCK WALL WHERE WASHROOM ACCESSORIES AND ACCESS HATCHES WERE REMOVED. RE–USE SALVAGED CONCRETE BLOCK TO REPAIR.
13. NEW MAPLE VENEER SHELF. SEE DETAILS ON A–5.0 FOR ADDITIONAL INFORMATION
14. ALL WALL MOUNTED ACCESSORIES REQUIRE SOLID WOOD BLOCKING



NEW FLOOR PLAN
SCALE: 1:30

1
A–2.1

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE–ISSUED FOR PERMIT	MAY 27, 2024
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5, DIMENSIONS ARE TO FINISHED EDGE OF WALL CONSTRUCTION

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PROJECT NAME:

QEII LIBRARY
LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

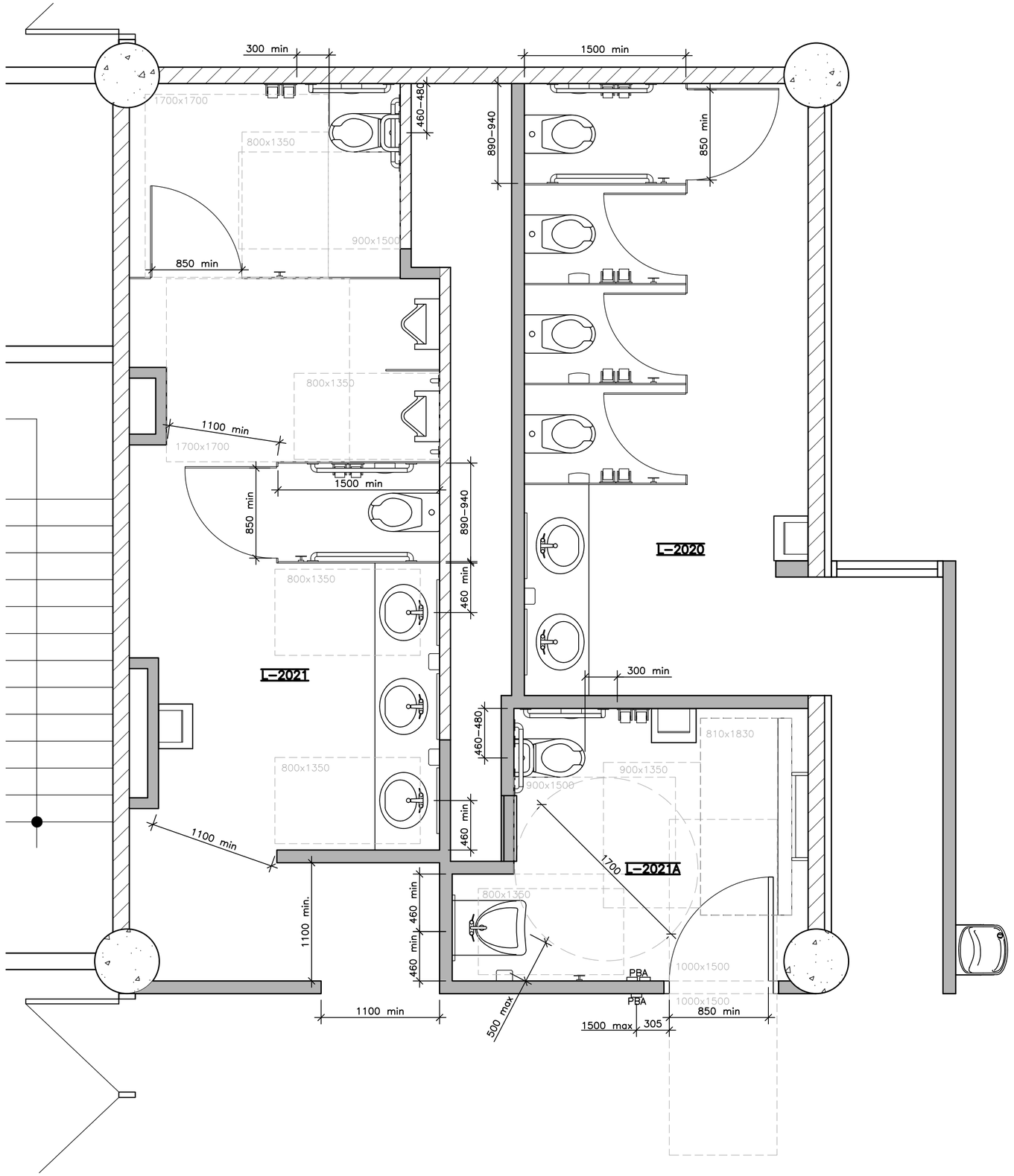
DRAWING TITLE:

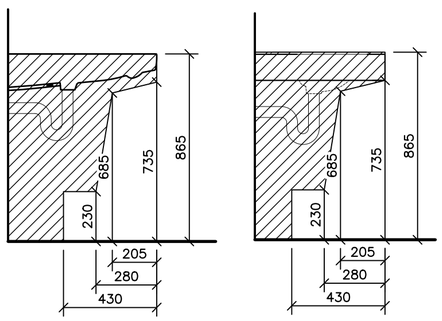
NEW FLOOR PLAN

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. **L-119-22**	DRAWING No. **A-2.1**

GENERAL ACCESSIBILITY NOTES:

1. ALL ACCESSIBILITY CLEARANCE DIMENSIONS TO BE MEASURED FROM FINAL WALL FINISH.
2. CONTRACTOR RESPONSIBLE TO ENSURE ALL CLEARANCES ARE MET AS INDICATED. IN THE EVENT CLEARANCES ARE NOT MET, IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CORRECT.
3. SEE DWG A–4.0 FOR HORIZONTAL CLEARANCES REQUIRED FOR GRAB BARS AND THE VERTICAL MOUNTING HEIGHTS FOR ALL WASHROOM ACCESSORIES AND PLUMBING FIXTURES.
4. ACCESSIBILITY CLEARANCES ARE DICTATED BY PROVINCIAL AND NATIONAL REGULATIONS. MEMORIAL UNIVERSITY HAS NO AUTHORITY IN ACCEPTING A DEVIATION FROM THESE CLEARANCES.
5. ALL DOORS ON ACCESSIBLE AND LIMITED MOBILITY STALLS TO BE EQUIPPED WITH A SELF CLOSING MECHANISM.





ACC. SINK CLEARANCES
SCALE: 1:20

1
A–2.2

ACCESSIBILITY CLEARANCES PLAN
SCALE: 1:30

1
A–2.2

No.	REVISION	DATE
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LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

DRAWING TITLE:

ACCESSIBILITY CLEARANCES

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. **L-119-22**	DRAWING No. **A-2.2**

GENERAL CEILING NOTES:

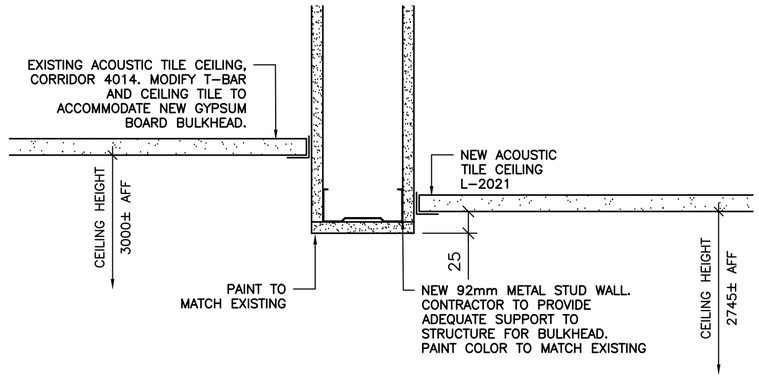
1. PERFORM DEMOLITION WORK SHOWN AND/OR REQUIRED TO COMPLETE THE WORK. DO NOT ASSUME DEMOLITION DRAWINGS SHOW THE FULL EXTENT OF DEMOLITION WORK REQUIRED.
2. REFER TO SHEET A–0 AND SECTION 02 41 19 FOR ADDITIONAL REQUIREMENTS AND INSTRUCTIONS FOR DEMOLITION WORK.
3. GENERAL CONTRACTOR MUST REFER TO ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR EXTENT OF WORK AND COORDINATE WITH OTHER TRADES PRIOR TO THE COMMENCEMENT OF ANY WORK.
4. ALL HEAT DETECTOR ISOLATIONS WILL REQUIRE MUN ELECTRICIAN PRESENT AT THE MAIN FIRE ALARM PANEL TO PLACE THE FIRE ALARM SYSTEM INTO BYPASS FOR THE AFFECTED BUILDING AREA.
5. CONTRACTOR SHALL BE RESPONSIBLE TO PERFORM FIRE WATCH FOR ANY HEAT DETECTOR ISOLATIONS REQUIRED OUTSIDE REGULAR BUSINESS HOURS OF 8:30AM –4:30PM.
6. CONTRACTOR SHALL CONTACT PROJECT COORDINATOR 48hrs IN ADVANCE TO SCHEDULE HEAT DETECTOR ISOLATIONS.
7. REFER TO SECTION 01 10 00 FOR WORK RESTRICTIONS.
8. SEE ROOM FINISH SCHEDULE DWG 1/A–2.4.

NEW CEILING NOTES (#)

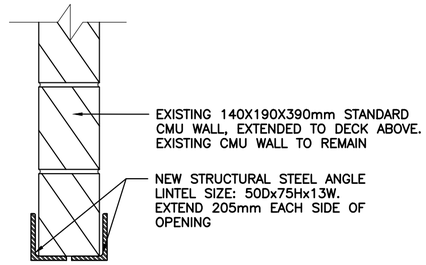
1. SUPPLY AND INSTALL NEW T–BAR CEILING 610x610mm GRID LAYOUT THROUGHOUT. USE EXISTING SUSPENSION WIRE WHERE POSSIBLE, EXACT LAYOUT TO BE DETERMINE ON SITE TO ALLOW FOR NO INTERFERENCE OF T–BAR GRID WITH EXISTING FIRE AND LIFE SAFETY EQUIPMENT.
2. EXISTING CEILING TO REMAIN.
3. NEW GYPSUM BOARD BULK HEAD. SEE DETAIL 4/A–2.3
4. NEW CONCRETE BLOCK BULKHEAD. SEE DETAIL 3/A–2.3

DEMOLITION CEILING NOTES [#]

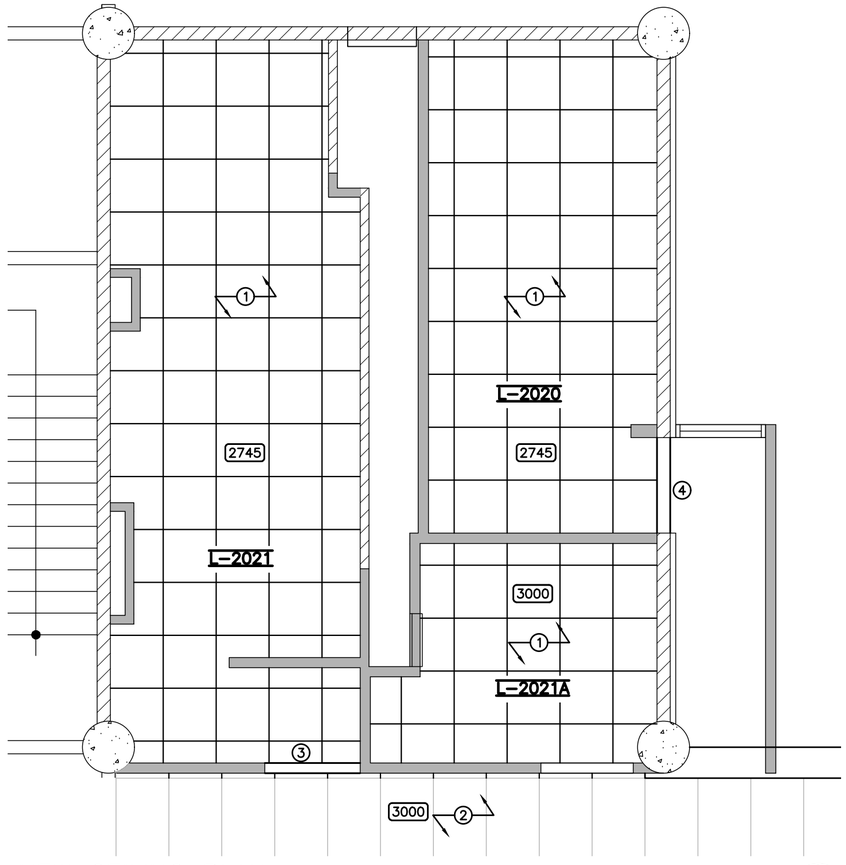
1. REMOVE AND DISPOSE OF ALL EXISTING CEILING TILE AND T–BAR CEILING GRID SYSTEM. EXISTING TIES TO REMAIN TO BE RE–USED WHERE POSSIBLE. EXISTING FIRE AND LIFE SAFETY EQUIPMENT TO REMAIN IN PLACE. CONTRACTOR TO ENSURE NO DAMAGE TO OCCUR AS A RESULT OF CEILING REMOVAL
2. LINE OF EXISTING TO NEW CEILING REMOVAL.



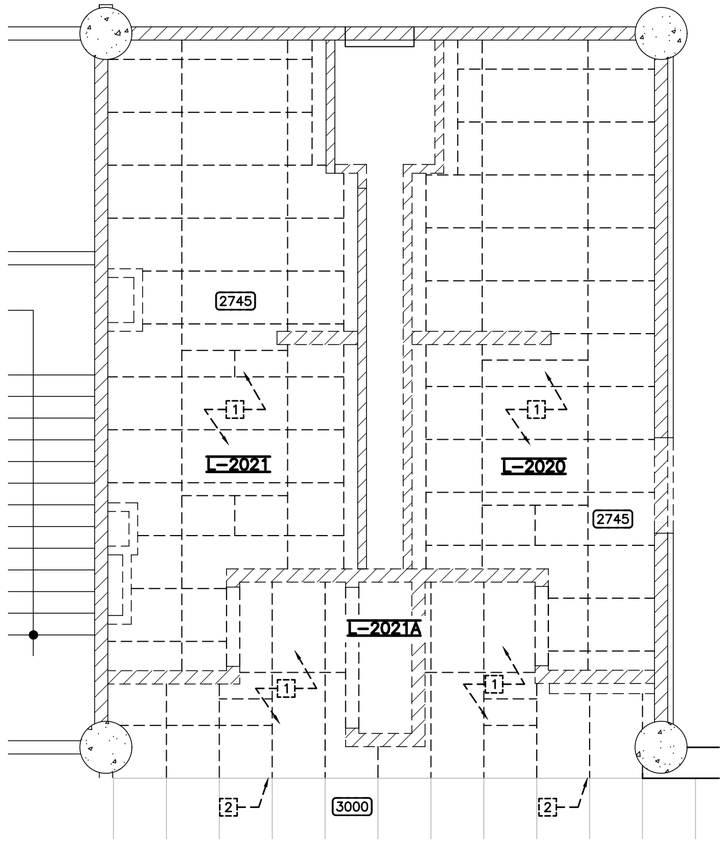
TYPICAL GYPSUM BULKHEAD DETAIL — 4 / A–2.3
SCALE: 1:5



CMU BLOCK LINTEL DETAIL — 3 / A–2.3
SCALE: 1:10



NEW CEILING PLAN — 2 / A–2.3
SCALE: 1:50



DEMOLITION CEILING PLAN — 1 / A–2.3
SCALE: 1:50

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE–ISSUED FOR PERMIT	MAY 27, 2024
R0	ISSUED FOR PERMIT	MAY, 2024

GENERAL NOTES

1. DRAWINGS TO BE READ AS A SET.
2. DO NOT SCALE FROM DRAWINGS.
3. THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS AND SITE CONDITIONS. PRIOR TO SUBMISSION OF TENDERS.
4. ALL DISCREPANCIES FOUND IN THESE DRAWINGS TO BE BROUGHT TO THE ATTENTION OF FACILITIES MANAGEMENT PRIOR TO SUBMISSION OF TENDERS.

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MEMORIAL UNIVERSITY

Department of Facilities Management

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- Dedication plaque, Arts & Administration Building, St. John's Campus

PROJECT NAME:

QEII LIBRARY
LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

DRAWING TITLE:

CEILING PLANS AND DETAILS

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. L-119-22	DRAWING No. A-2.3

GENERAL COSNTRUCTION NOTES:

1. REFER TO SHEET A–0 AND SECTION 02 41 19 FOR ADDITIONAL REQUIREMENTS AND INSTRUCTIONS FOR DEMOLITION WORK.
2. ALL EXISTING FLOORING TO BE REMOVED
3. REMOVE AND REINSTATE WALL MOUNTED ITEMS AS INSTRUCTED BY OWNER.
4. REFER TO SECTION 01 10 00 FOR WORK RESTRICTIONS.
5. ALL WORK TO BE PREFORMED OUTSIDE HOARDING / CONSTRUCTION SITE SHALL BE DONE AFTER 5PM TO 8AM. PROVIDE 24 HOURS NOTICE PRIOR TO EACH WORK SHIFT.

FINISH PLAN CONSTRUCTION NOTES: (#)

1. SUITABLE TRANSITION STRIP BETWEEN NEW AND EXISTING FLOORING
2. CONTRACTOR TO NOTIFY PROJECT COORDINATOR OF ANY CRACKS IN CONCRETE FLOOR BEFORE POLISHING. COORDINATOR TO DETERMINE IF ANY OR ALL CRACKS MUST BE FILLED AND SANDED BEFORE POLISHING.

FINISH IDENTIFICATION SCHEDULE

ABBR.	MATERIAL	MANUFACTURER	SERIES	COLOUR	SIZE	INSTALLATION	COMMENTS
CONC–1	POLISHED CONCRETE						TYPICAL FOR WASHROOM FLOOR
TL–1	CERAMIC TILE	ARQUITECTURA	GLOSSY TILE	GRIS	100mm x 305mm	WALL – 1000mm A.F.F	UNIVERSAL WASHROOM
TL–2	PORCELAIN TILE	SOMER TILE	HUDSON PENNY ROUND	GLOSSY WHITE	305mm x 321mm	MOSIAC	
VB–1	VINYL BASE	JOHNSONITE		CHARCOAL ST020	100mm x1220mm		
SS–1	SOLID SURFACE	CORIAN		RAINCLOUD			
PT–1	PAINT	BENJAMIN MOORE	SEMI–GLOSS	MANUFACTURER FULL COLOUR RANGE			SEE NOTE 2 BELOW
PVC–1	PVC SHEET	ALTRO	WHITEROCK	LINEN		WELDED SEAM 1100 A.F.F	
PVC–2	PVC SHEET	ALTRO	WHITEROCK	PROMENADE		WELDED SEAM	SEE ELEVATIONS FOR HEIGHT
PVC–3	PVC SHEET	ALTRO	WHITEROCK	VIOLA		WELDED SEAM	SEE ELEVATIONS FOR HEIGHT

NOTES:
1. TRANSITION STRIPS REQUIRED WHERE ALL NEW FLOORING INSTALLATIONS MEET EXISTING FLOORING, SEE SPECIFICATION SECTION 09 30 15. CONTRACTOR TO ENSURE EXISTING AND NEW FLOOR ELEVATIONS ARE THE SAME.

FINISH IDENTIFICATION SCHEDULE — 4 / A–2.4
SCALE: NTS

FLOORING LEGEND

CONC–1 NEW POLISHED CONCRETE

FLOORING LEGEND — 3 / A–2.4
SCALE: NTS

ROOM FINISH SCHEDULE

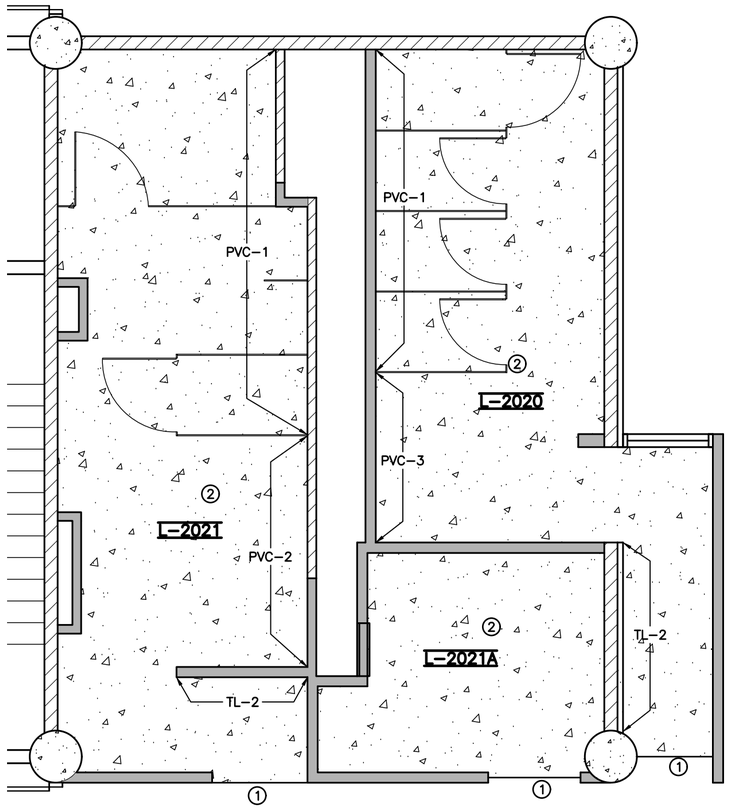
NEW ROOM NUMBER	ROOM NAME	FLOOR FINISH: EXISTING FLOORING	FLOOR FINISH: NEW POLISHED CONCRETE	BASE: EXISTING BASE	BASE: NEW VINYL BASE	BASE: NEW TILE BASE TL–1	WALL MAT: EXISTING CMU	WALL MAT: NEW GYPSUM BOARD	WALL MAT: NEW CERAMIC TILE TL–1	WALL MAT: SEE REMARKS	WALL FINISH: EXISTING	WALL FINISH: NEW PAINT PT–1	WALL FINISH: MATCH EXISTING	CEILING MAT: EXISTING ACOUSTIC TILE	CEILING MAT: NEW ACOUSTIC TILE	CEILING FINISH: EXISTING	CEILING FINISH: NEW PRE–FINISHED	CEILING FINISH: SEE REMARKS	CEILING HEIGHT: EXISTING	CEILING HEIGHT: MATCH EXISTING	CEILING HEIGHT: SEE NEW CEILING PLAN	REMARKS
L–2020	FEMALE WASHROOM		X		X		X	X				X			X		X			X		
L–2021	MENS WASHROOM		X		X		X	X				X			X		X			X		
L–2021A	UNIVERSAL WASHROOM		X			X	X	X	X			X			X		X			X		
L–2C01	CORRIDOR	X		X	X		X				X		X	X		X			X			

SYMBOL LEGEND:

4C01 ← ROOM NUMBER
CPT–2 ← FLOOR FINISH
VB–1 ← WALL BASE
PT–3 ← WALL PAINT

PT–1 — NEW FINISH FOR PORTION OF WALL AREA AS INDICATED

ROOM FINISH SCHEDULE — 2 / A–2.4
SCALE: NTS



NEW FINISH PLAN — 1 / A–2.4
SCALE: 1:50

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE–ISSUED FOR PERMIT	MAY 27, 2024
R0	ISSUED FOR PERMIT	MAY, 2024

GENERAL NOTES

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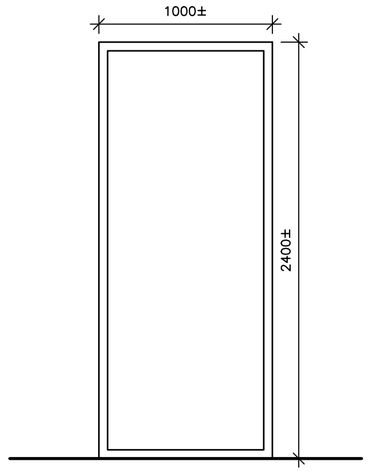
PROJECT NAME:
QEII LIBRARY
LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

DRAWING TITLE:
NEW FINISH PLAN AND SCHEDULE

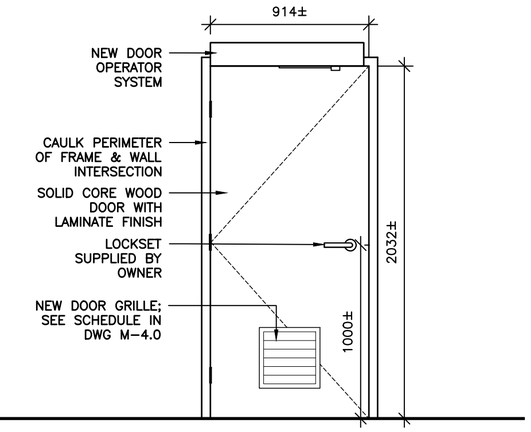
REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. L-119-22	DRAWING No. A-2.4



WINDOW ELEVATION

SCALE: NTS

5 A-3.0



ELEVATION "1"

GENERAL DOOR SCHEDULE NOTES:

1. VERIFY WALL TYPE THICKNESS FOR ALL NEW DOOR FRAME THROAT DEPTHS PRIOR TO INSTALLATION.

HARDWARE GROUPS:

HG01:
- NEW "SW-100" SWING DOOR OPERATOR BY ASSA ABLOY OR APPROVED ALTERNATE
- NEW CX-WC17VR-PS COLUMN SWITCH RESTROOM SYSTEM W/ SENSOR AND PS
- NEW (X3) - STANLEY HINGES FBB 179, 114 X 101, NRP
- NEW LOCKSET SUPPLIED AND INSTALLED BY OWNER

DOOR HARDWARE GROUP

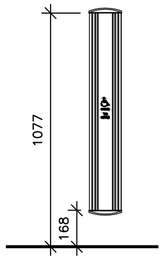
SCALE: NTS

3 A-3.0

DOOR ELEVATION

SCALE: 1:25

2 A-3.0



PBA MOUNTING HEIGHT

SCALE: NTS

4 A-3.0

DOOR SCHEDULE

RELO/EX DOOR NUMBER	NEW DOOR NUMBER	FROM (NEW ROOM #)	TO (NEW ROOM #)	QUANTITY	SIZE: WIDTH: NEW 813mm	SIZE: WIDTH: NEW 914mm	SIZE: WIDTH: NEW 965mm	SIZE: WIDTH: EXISTING	SIZE: HEIGHT: NEW 2032mm	SIZE: HEIGHT: NEW 2134mm	SIZE: HEIGHT: EXISTING	ELEVATION TYPE	MATERIAL: SOLID WOOD CORE	MATERIAL: ALUMINUM	MATERIAL: HOLLOW CORE METAL	MATERIAL: EXISTING	FINISH: PLASTIC LAMINATE	FINISH: PAINT	FINISH: EXISTING	GL: NEW 6mm SAFETY	GL: EXISTING	ALUMINUM THRESHOLD	FRAME: FRAME TYPE	FRAME: FINISH: PAINT	FRAME: FINISH: EXISTING	WALL TYPE	FIRE RATING (min)	HARDWARE GROUP	REMARKS
-	2021A	2017	2021A	1			●			●		1	●					●					PSF	●				HG01	

DOOR SCHEDULE

SCALE: NTS

1 A-3.0

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE-ISSUED FOR PERMIT	MAY 27, 2024
R0	ISSUED FOR PERMIT	MAY, 2024

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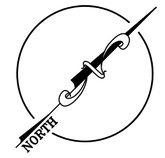

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PROJECT NAME:

QEII LIBRARY LEVEL 2 WASHROOM RENOVATIONS Project #: L-119-22

DRAWING TITLE:

DOOR AND WINDOW SCHEDULE

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. L-119-22	DRAWING No. A-3.0

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE-ISSUED FOR PERMIT	MAY 27, 2024
R0	ISSUED FOR PERMIT	MAY, 2024

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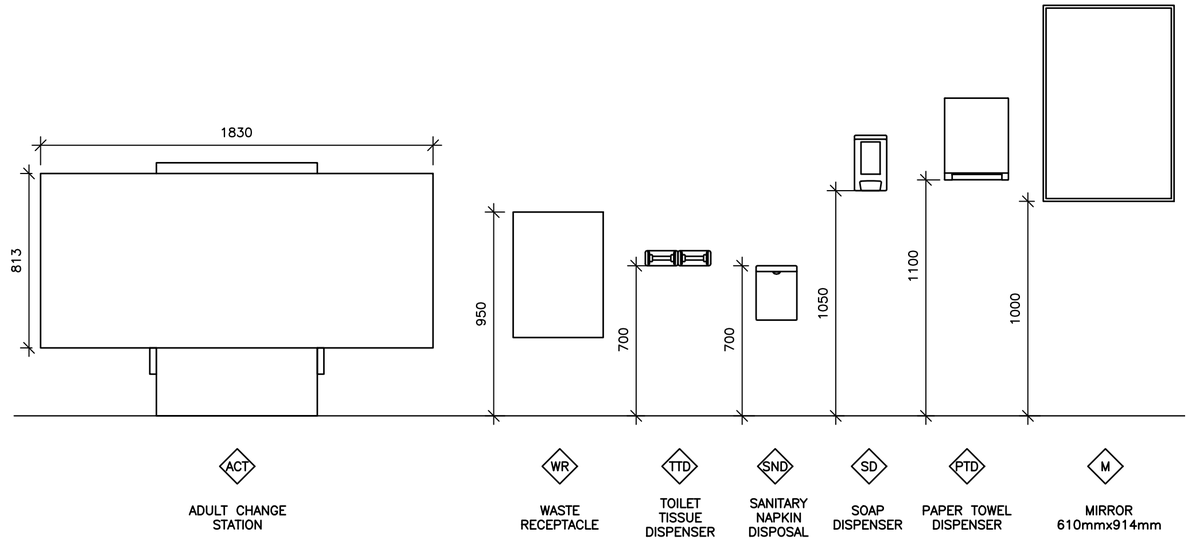
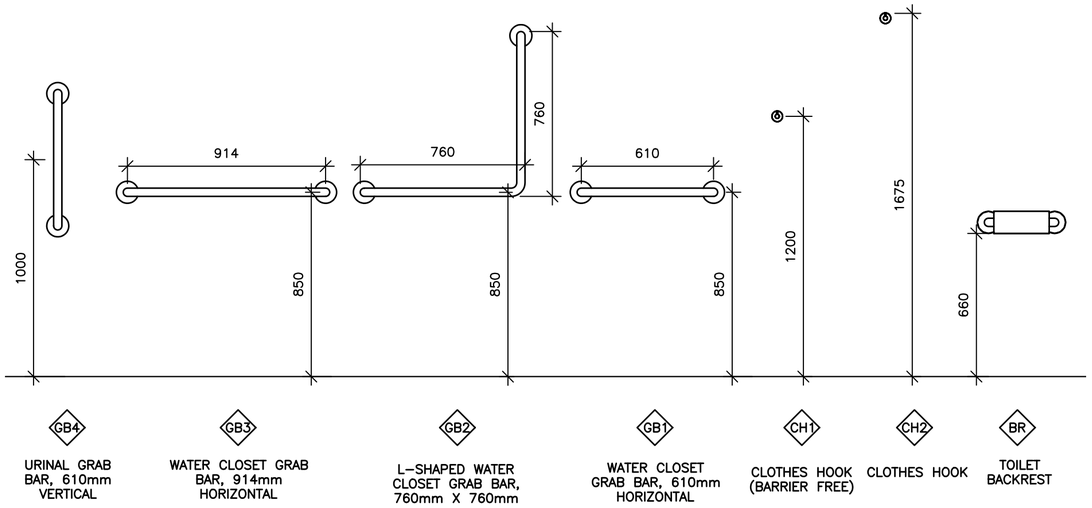


WASHROOM ACCESSORIES LEGEND				
ACCESSORY	DESCRIPTION	PRODUCT	QUANTITY	
			EXISTING	NEW
BR	BACK REST	FROST 1028	–	2
CH1	COAT HOOK ACCESSIBLE HEIGHT	BOBRICK B-542	–	4
CH2	COOK HOOK	BOBRICK B-542	–	3
GB1	GRAB BAR, 610mm HORIZONTAL	BOBRICK B-5806	–	2
GB2	GRAB BAR, L-SHAPED 760mm X 760mm	BOBRICK B-5898	–	0
GB3	GRAB BAR, 914mm HORIZONTAL	BOBRICK B-5806	–	6
GB4	GRAB BAR, 610mm VERTICAL	BOBRICK B-5806	–	2
M	MIRROR 610mm X 915mm	BOBRICK M-290	–	6
PTD	PAPER TOWEL DISPENSER	OWNER SUPPLIED	–	3
SD	SOAP DISPENSER	–	4	–
SND	SANITARY NAPKIN DISPOSAL	BOBRICK B-270	–	7
TTD	TOILET TISSUE DISPENSER	–	16	–
WR	WASTE RECEPTACLE	BOBRICK B-275	–	3
ACT	ADULT CHANGE TABLE	PRESSALIT CT4000	–	1

WASHROOM ACCESSORIES LEGEND

SCALE: NTS

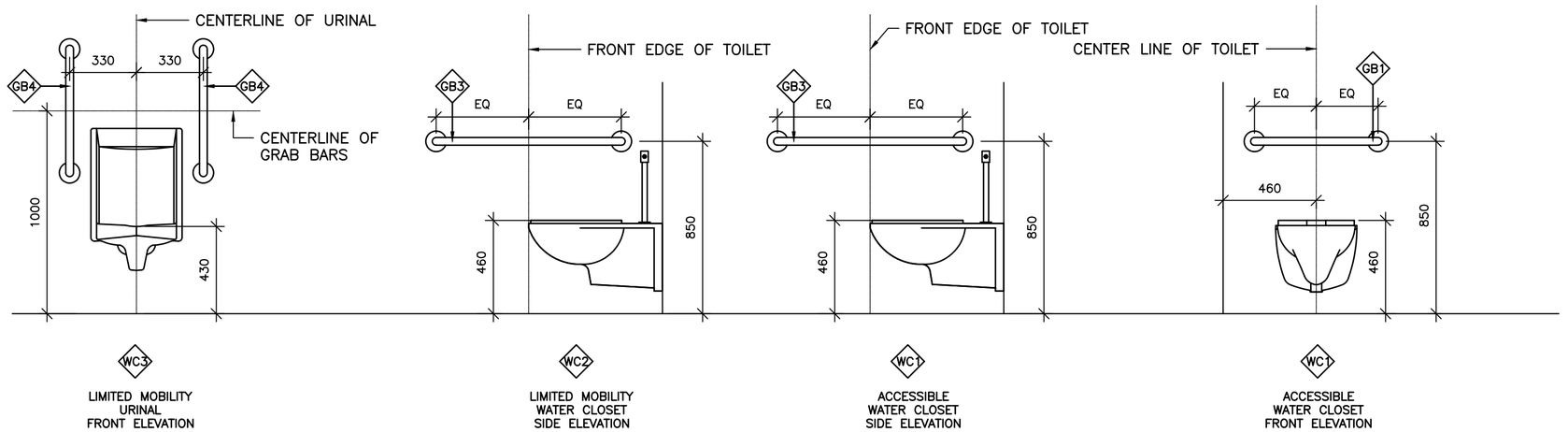
3 / A-4.0



INTERIOR ELEVATION – WASHROOM ACCESSORIES MOUNTING HEIGHTS

SCALE: NTS

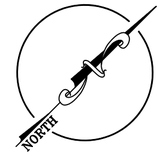
2 / A-4.0



INTERIOR ELEVATION – GRAB BAR MOUNTING LOCATIONS

SCALE: NTS

1 / A-4.0



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PROJECT NAME:

QEII LIBRARY LEVEL 2 WASHROOM RENOVATIONS Project #: L-119-22

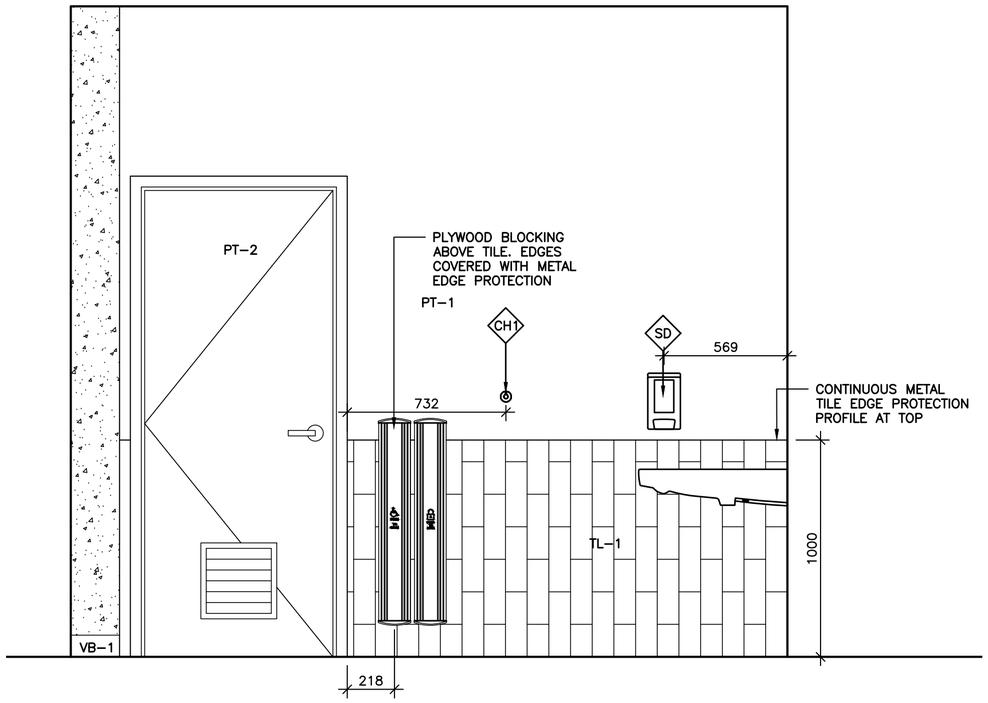
DRAWING TITLE:

WASHROOM ACCESSORIES

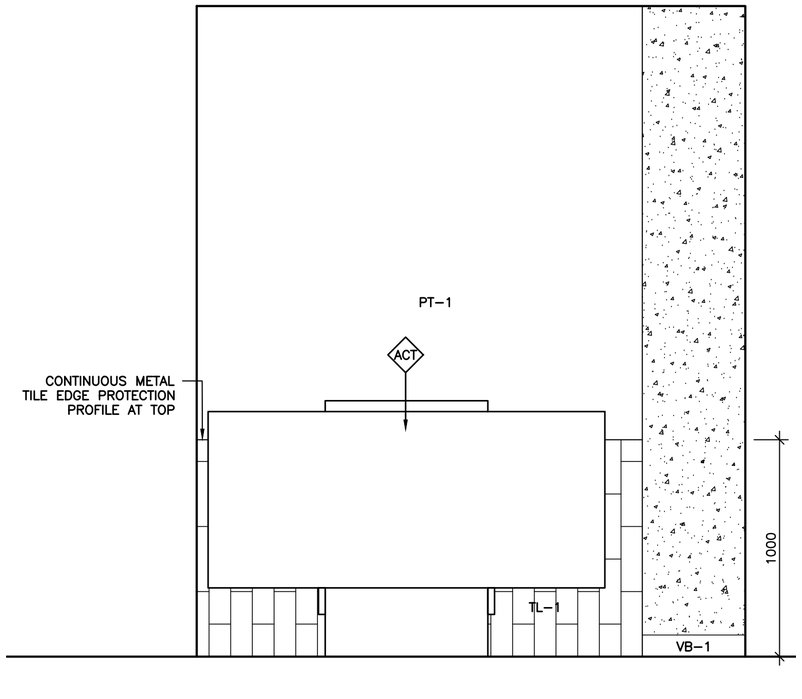
REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. L-119-22	DRAWING No. A-4.0

GENERAL COSNTRUCTION NOTES:

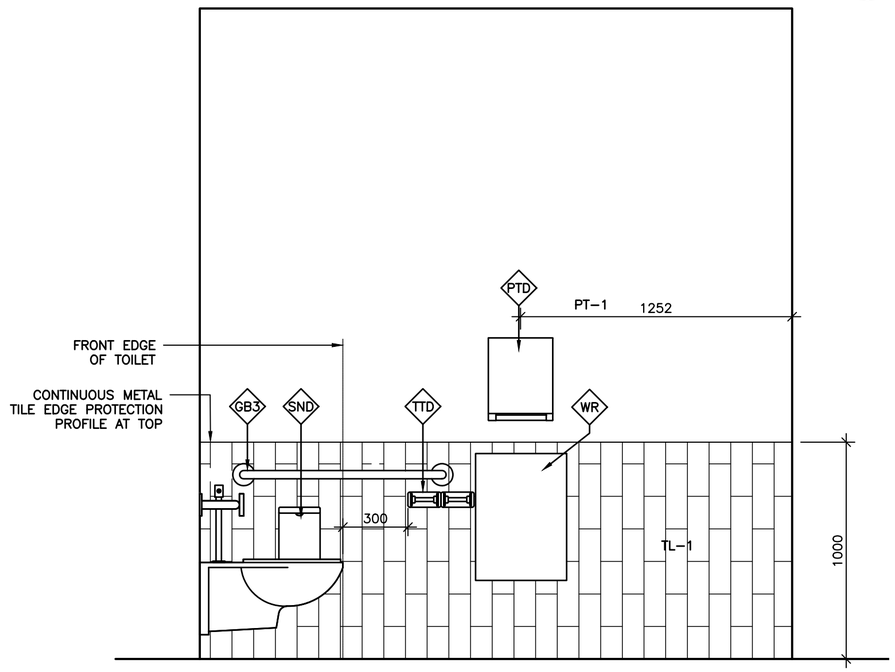
1. SEE SHEET A–4.0 FOR VERTICAL MOUNTING HEIGHTS OF WASHROOM ACCESSORIES
2. SEE SHEET A–4.0 FOR VERTICAL AND HORIZONTAL MOUNTING HEIGHTS OF GRAB BARS
3. FINAL HATCH LOCATIONS TO BE DETERMINED ON–SITE. ADDITIONAL HATCHES TO BE INSTALLED NEAR CLEANOUTS AND SHUT OFF VALVES WHERE NECESSARY.



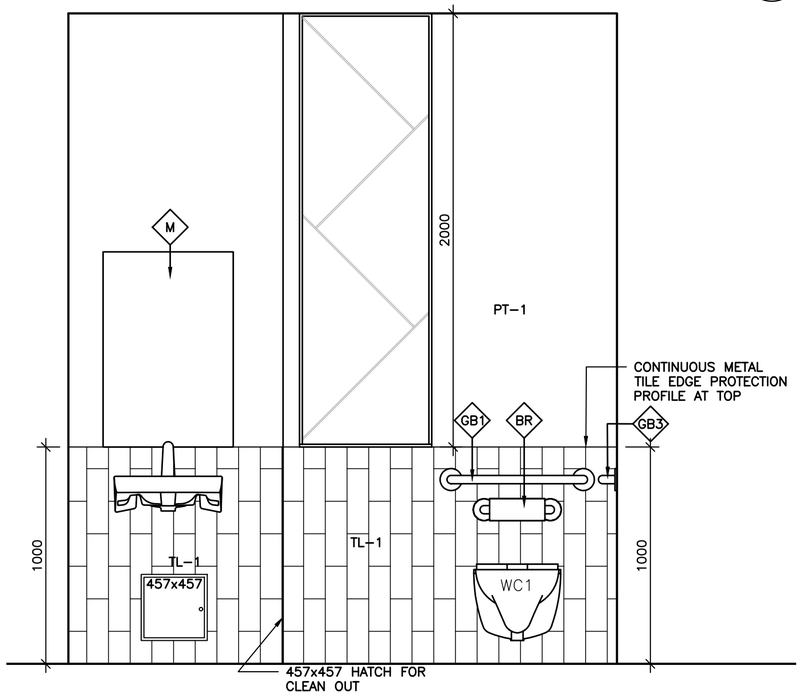
L–2021A WASHROOM INTERIOR ELEVATION – SOUTH (4 / A–4.1)
SCALE: 1:20



L–2021A WASHROOM INTERIOR ELEVATION – EAST (3 / A–4.1)
SCALE: 1:20



L–2021A WASHROOM INTERIOR ELEVATION – NORTH (2 / A–4.1)
SCALE: 1:20



L–2021A WASHROOM INTERIOR ELEVATION – WEST (1 / A–4.1)
SCALE: 1:20

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE–ISSUED FOR PERMIT	MAY 27, 2024
R0	ISSUED FOR PERMIT	MAY, 2024

GENERAL NOTES

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PROJECT NAME:

QEII LIBRARY
LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

DRAWING TITLE:

WASHROOM ELEVATIONS
L-2021A

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. **L-119-22**	DRAWING No. **A-4.1**

GENERAL COSNTRUCTION NOTES:

1. SEE SHEET A–4.0 FOR VERTICAL MOUNTING HEIGHTS OF WASHROOM ACCESSORIES
2. SEE SHEET A–4.0 FOR VERTICAL AND HORIZONTAL MOUNTING HEIGHTS OF GRAB BARS
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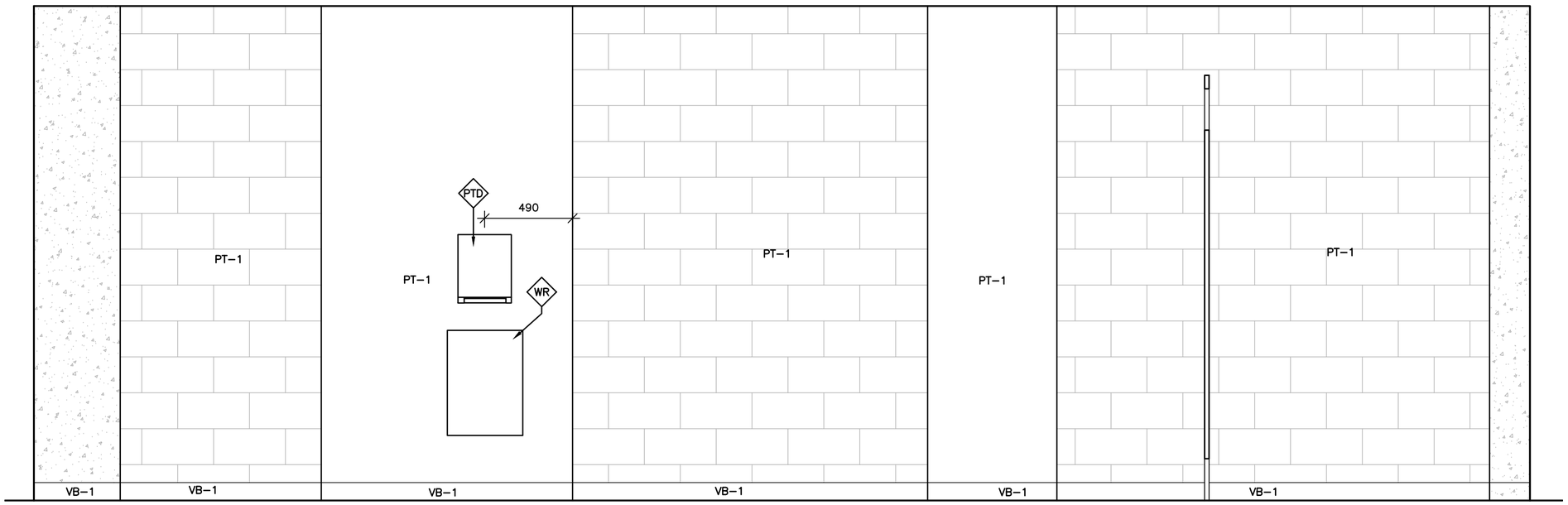
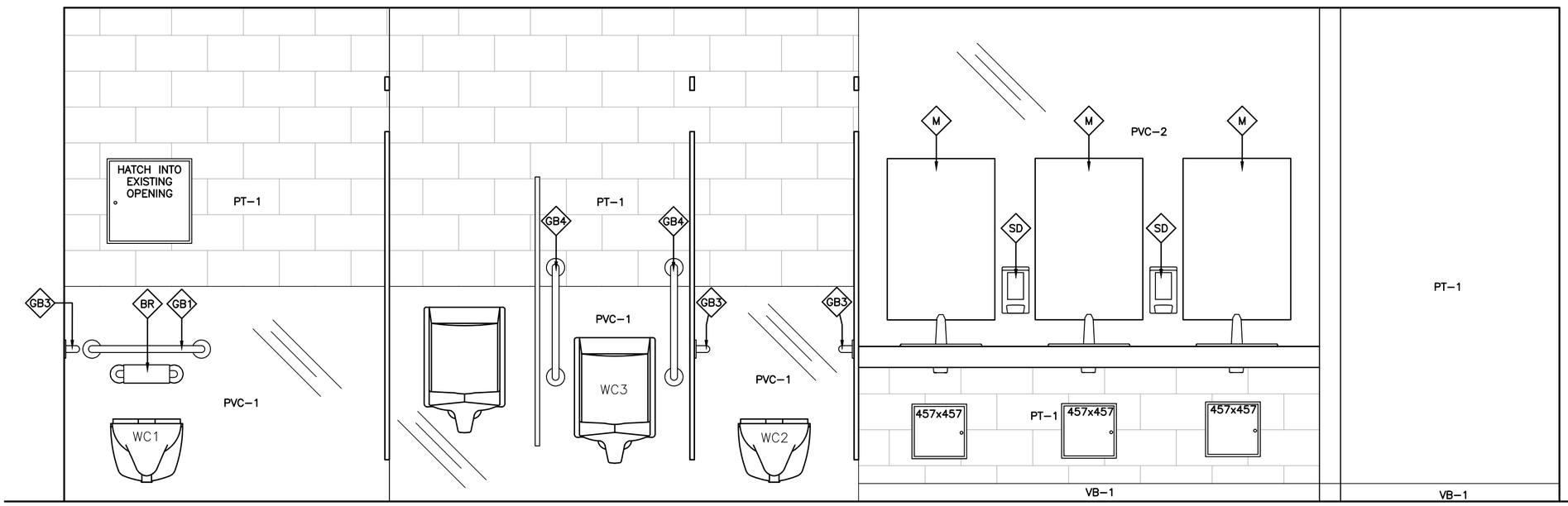


L–2021 INTERIOR ELEVATION – WEST

SCALE: 1:20

2
A–4.2



L–2021 INTERIOR ELEVATION – EAST

SCALE: 1:20

1
A–4.2

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE–ISSUED FOR PERMIT	MAY 27, 2024
R0	ISSUED FOR PERMIT	MAY, 2024

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MEMORIAL UNIVERSITY

Department of Facilities Management

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- Dedication plaque, Arts & Administration Building, St. John's Campus

PROJECT NAME:

QEII LIBRARY
LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

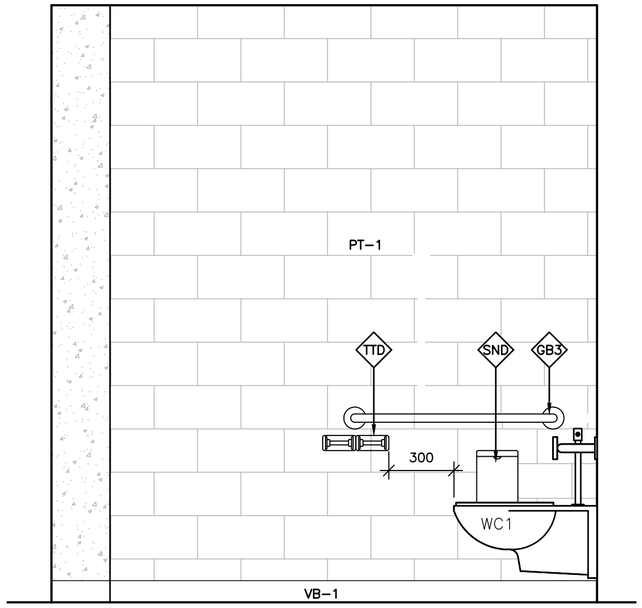
DRAWING TITLE:

WASHROOM ELEVATIONS
L-2021

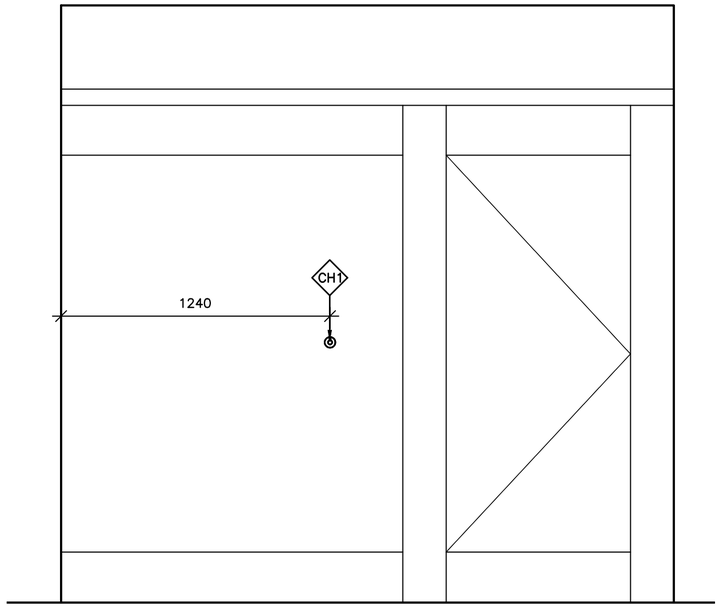
REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. **L-119-22**	DRAWING No. **A-4.2**

GENERAL COSNTRUCTION NOTES:

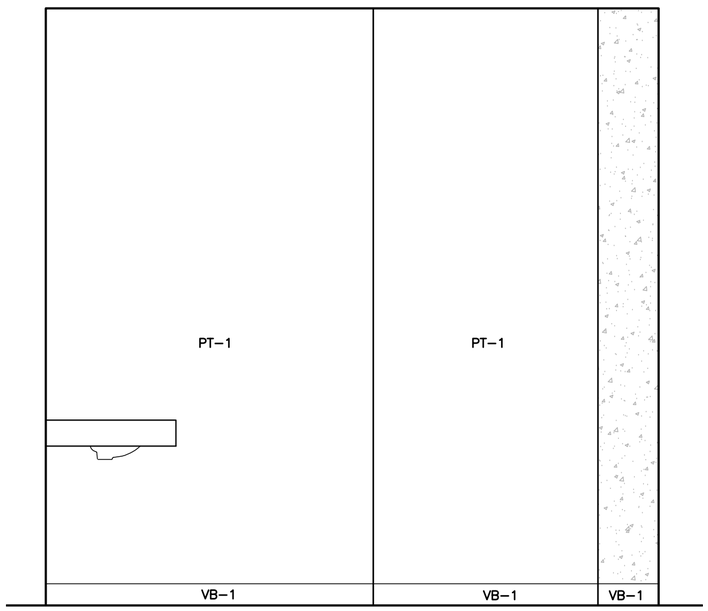
1. SEE SHEET A–4.0 FOR VERTICAL MOUNTING HEIGHTS OF WASHROOM ACCESSORIES
2. SEE SHEET A–4.0 FOR VERTICAL AND HORIZONTAL MOUNTING HEIGHTS OF GRAB BARS
3. FINAL HATCH LOCATIONS TO BE DETERMINED ON–SITE. ADDITIONAL HATCHES TO BE INSTALLED NEAR CLEANOUTS AND SHUT OFF VALVES WHERE NECESSARY.



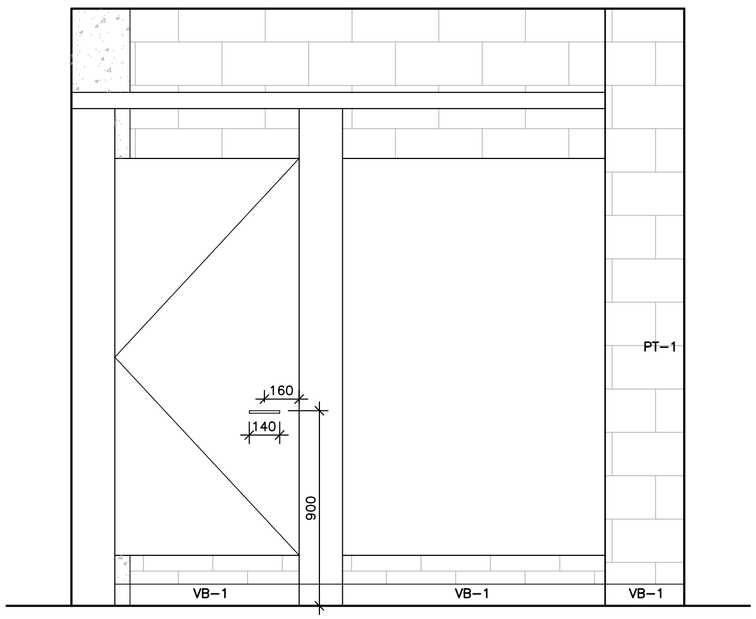
L–2021 ACCESSIBLE STALL ELEVATION – NORTH 2 (4 / A–4.3)
SCALE: 1:20



L–2021 ACCESSIBLE STALL ELEVATION – SOUTH 2 (3 / A–4.3)
SCALE: 1:20



L–2021 INTERIOR ELEVATION – SOUTH 1 (2 / A–4.3)
SCALE: 1:20



L–2021 INTERIOR ELEVATION – NORTH 1 (1 / A–4.3)
SCALE: 1:20

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE–ISSUED FOR PERMIT	MAY 27, 2024
R0	ISSUED FOR PERMIT	MAY, 2024

GENERAL NOTES

1. DRAWINGS TO BE READ AS A SET.
2. DO NOT SCALE FROM DRAWINGS.
3. THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS AND SITE CONDITIONS. PRIOR TO SUBMISSION OF TENDERS.
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PROJECT NAME:

QEII LIBRARY
LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

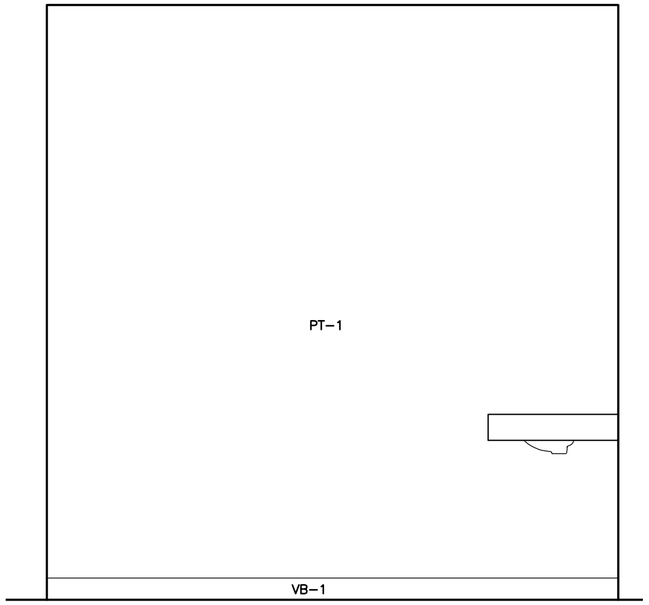
DRAWING TITLE:

WASHROOM ELEVATIONS
L-2021

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. **L-119-22**	DRAWING No. **A-4.3**

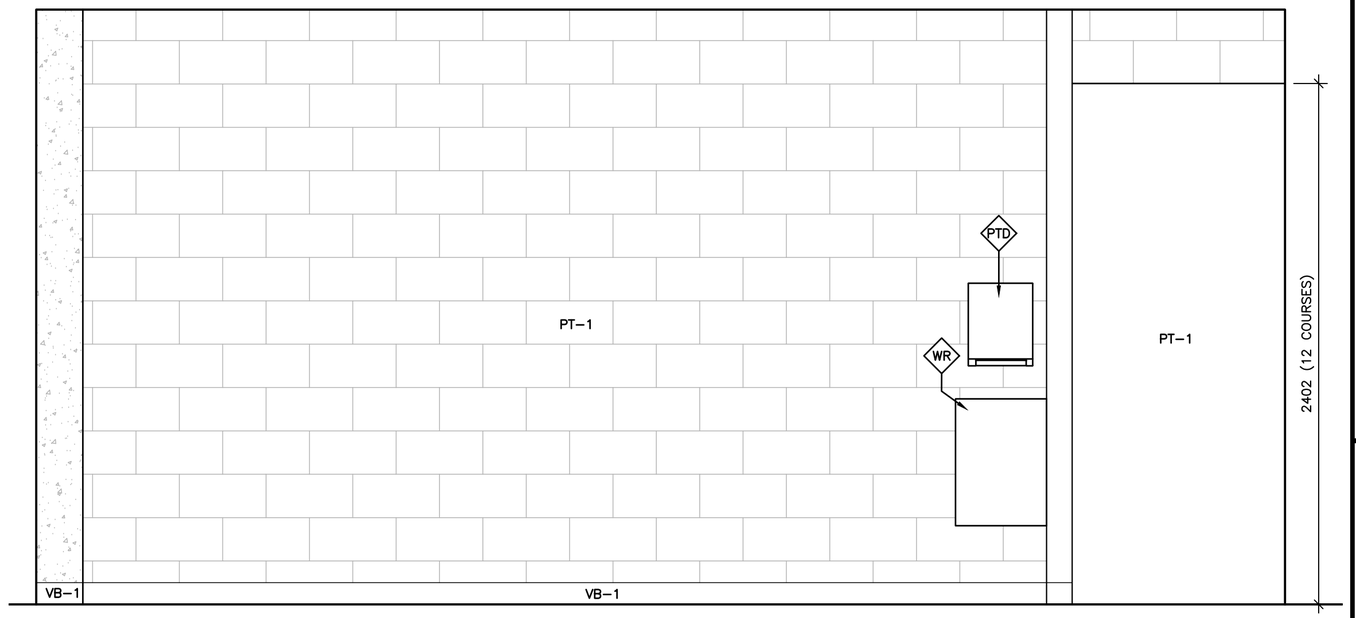
GENERAL COSNTRUCTION NOTES:

1. SEE SHEET A-4.0 FOR VERTICAL MOUNTING HEIGHTS OF WASHROOM ACCESSORIES
2. SEE SHEET A-4.0 FOR VERTICAL AND HORIZONTAL MOUNTING HEIGHTS OF GRAB BARS
3. FINAL HATCH LOCATIONS TO BE DETERMINED ON-SITE. ADDITIONAL HATCHES TO BE INSTALLED NEAR CLEANOUTS AND SHUT OFF VALVES WHERE NECESSARY.



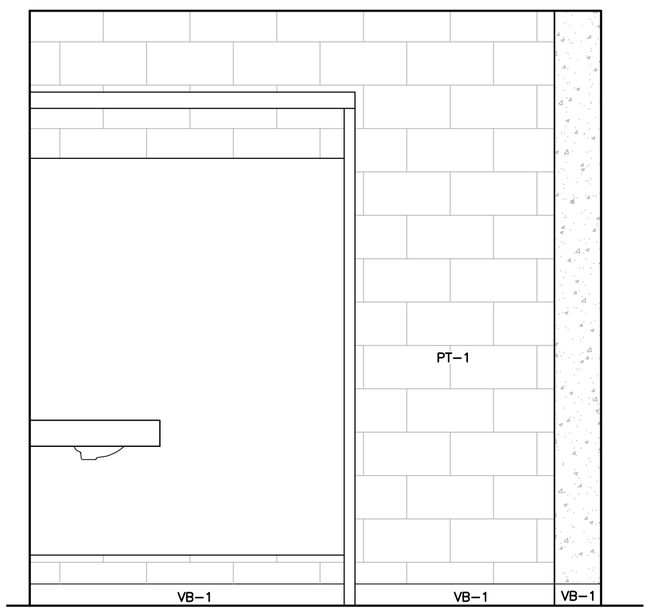
L-2020 INTERIOR ELEVATION - SOUTH (4 / A-4.4)

SCALE: 1:20



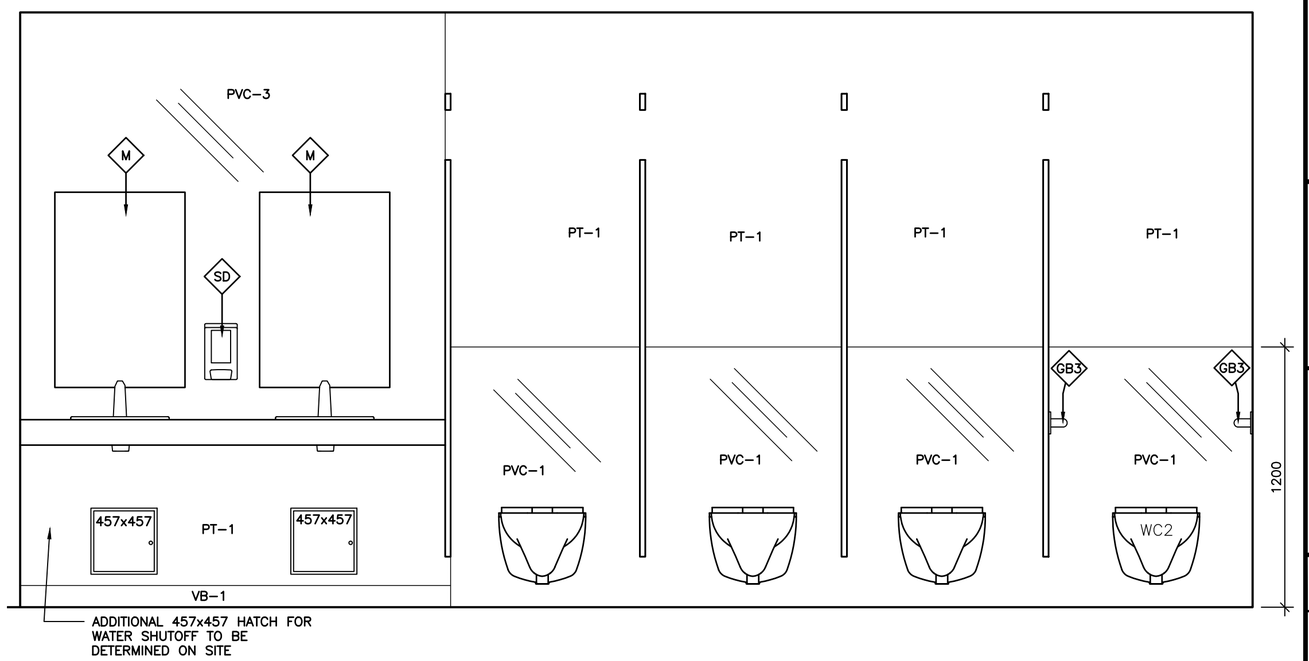
L-2020 INTERIOR ELEVATION - EAST (3 / A-4.4)

SCALE: 1:20



L-2020 INTERIOR ELEVATION - NORTH (2 / A-4.4)

SCALE: 1:20



L-2020 INTERIOR ELEVATION - WEST (1 / A-4.4)

SCALE: 1:20

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE-ISSUED FOR PERMIT	MAY 27, 2024
R0	ISSUED FOR PERMIT	MAY, 2024

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PROJECT NAME:

QEII LIBRARY
LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

DRAWING TITLE:

WASHROOM ELEVATIONS
L-2020

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. L-119-22	DRAWING No. A-4.4

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE–ISSUED FOR PERMIT	MAY 27, 2024
R0	ISSUED FOR PERMIT	MAY, 2024

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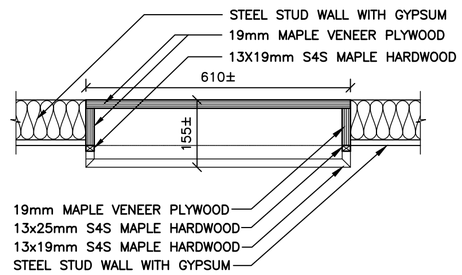
PROJECT NAME:

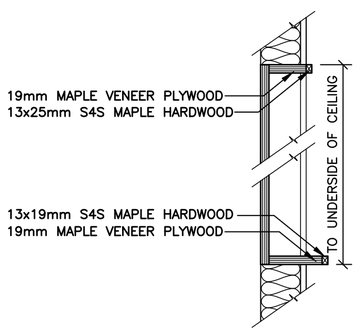
QEII LIBRARY
LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

DRAWING TITLE:

MILLWORK DETAILS

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. **L-119-22**	DRAWING No. **A-5.0**



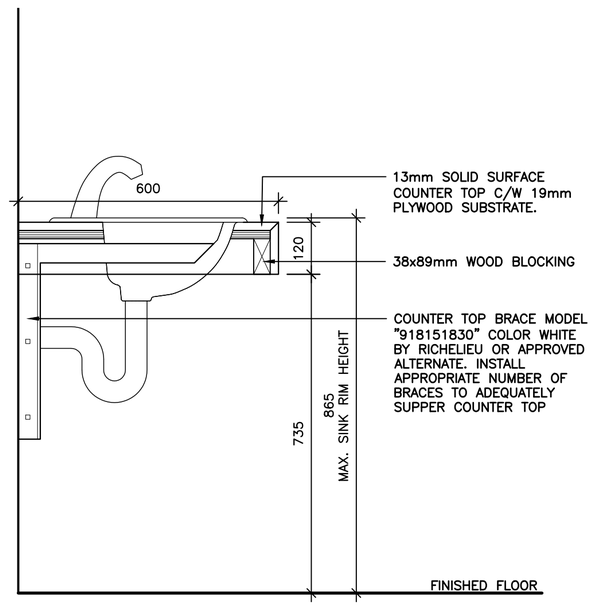


NOTES:
1. ALL EXPOSED MAPLE VENEER PLYWOOD AND HARDWOOD TO BE FINISHED WITH TWO COATS CLEAR POLYURETHANE FINISH.
2. ROUTER 6mm SCORE LINE DESIGN INTO BACK MAPLE VENEER PANEL AS SHOWN IN DWG 1/A–4.1
3. SHELF TO BE LOCATED 1000mm A.F.F

L–2021A MILLWORK SHELF DETAIL

SCALE: 1:10

2
A–5.0



BATHROOM COUNTER MILLWORK DETAIL

SCALE: 1:10

1
A–5.0

PLUMBING FITTINGS

- GATE VALVE
- GLOBE VALVE
- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- ANGLE GATE VALVE
- ANGLE GLOBE VALVE
- SOLENOID VALVE
- MOTORIZED VALVE
- PRESSURE REDUCING VALVE
- THREE WAY MIXING VALVE
- THREE WAY DIVERTING VALVE
- PRESSURE RELIEF VALVE
- HOSE END DRAIN VALVE
- Y STRAINER
- BASKET STRAINER
- UNION
- FLEXIBLE VIBRATION ISOLATOR
- VB — VACUUM BREAKER
- MAV — MANUAL AIR VENT
- CIRCUIT BALANCING VALVE
- CAP AT END OF PIPE
- DIRECTION OF FLOW
- PIPE RISER UP
- PIPE RISER DN
- PIPE RISER UP THROUGH FLOOR SLAB
- PIPE DROP OFF BOTTOM OF MAIN
- PIPE RISE OFF TOP OF MAIN
- C.O. — CLEAN OUT IN WALL/CEILING
- C.O. — CLEAN OUT IN FLOOR
- FLOOR DRAIN
- BFP — BACKFLOW PREVENTER
- SA — SHOCK ABSORBER
- X — PLUMBING FIXTURE LETTERS INDICATE TYPE
- AAV — AUTOMATIC AIR VENT

PLUMBING LINES

- SANITARY DRAIN BELOW SLAB\GRADE
- SANITARY DRAIN ABOVE SLAB\GRADE
- SD — SOAP DISPENSER PIPING
- RWL — RAIN WATER LEADER PIPING
- VENT PIPING
- COLD WATER PIPING
- HOT WATER PIPING
- HOT WATER RECIRC PIPING
- TP — TRAP SEAL PRIMER PIPING
- OF — EQUIPMENT OVERFLOW DRAIN PIPING
- TW — TEMPERED WATER PIPING
- CD — CONDENSATE DRAIN PIPING
- ARD — ACID RESISTANT DRAIN PIPING
- ARV — ACID RESISTANT VENT PIPING

FIRE PROTECTION

- SP — SPRINKLER PIPING
- F — STANDPIPE LINE
- EXISTING SPRINKLER HEAD TO BE REMOVED
- C — CONCEALED PENDANT TYPE SPRINKLER HEAD
- CHROME STANDARD PENDANT TYPE SPRINKLER HEAD
- CHROME UPRIGHT TYPE SPRINKLER HEAD
- DRY TYPE SIDEWALL SPRINKLER
- X — SURFACE MOUNTED FIRE EXTINGUISHER, LETTER INDICATES TYPE.

HEATING

- LTHWS — LOW TEMPERATURE WATER HEATING SUPPLY
- LTHWR — LOW TEMPERATURE WATER HEATING RETURN
- GSHPS — GROUND SOURCE HEAT PUMP SUPPLY
- GSHPR — GROUND SOURCE HEAT PUMP RETURN
- HTHWS — HIGH TEMP. HOT WATER HEATING SUPPLY
- HTHWR — HIGH TEMP. HOT WATER HEATING RETURN
- CONVECTOR RADIATOR
- WALL MOUNTED FORCE FLOW CONVECTOR
- CEILING MOUNTED FORCE FLOW CONVECTOR
- DUCT HEATER
- RADIANT HEATING PANEL
- V — CONTROL VALVE (H.W. HEATING)
- T — THERMOSTAT

VENTILATION

- EXISTING DUCTWORK — DUCT SIZE = ### WIDTH / ### DEPTH
- EXISTING DUCTWORK TO BE REMOVED
- NEW REGULAR DUCTWORK — DUCT SIZE = ### WIDTH / ### DEPTH
- NEW DUCTWORK WITH INTERIOR ACOUSTIC LINING — DUCT SIZE = ### WIDTH / ### DEPTH
- NEW DUCTWORK WITH EXTERIOR THERMAL INSULATION — DUCT SIZE = ### WIDTH / ### DEPTH
- NEW ROUND DUCTWORK — DUCT SIZE (Inside Diameter) = ### ø
- NEW SPIRAL DUCTWORK — DUCT SIZE (Inside Diameter) = ### ø
- NEW FLEXIBLE ROUND DUCTWORK — DUCT SIZE (Inside Diameter) = ### ø

MAXIMUM ALLOWABLE LENGTH PER DIFFUSER DROP 1830mm ~ 72"

VENTILATION

- F/A — FRESH AIR DUCTS UP & DOWN
- S/A — SUPPLY AIR DUCTS UP & DOWN
- R/A — RETURN AIR DUCTS UP & DOWN
- E/A — EXHAUST AIR DUCTS UP & DOWN
- ROUND DUCTS UP & DOWN
- TYPICAL 90° DUCT ELBOWS; (R/W = 1.0 & w TURNING VANES)
- TYPICAL 45° DUCT ELBOW; R/W = 1.0
- TYPICAL DUCT TRANSITION; (RECTANGULAR – RECTANGULAR)
- TYPICAL DUCT TRANSITION; (RECTANGULAR – ROUND)
- TYPICAL TAP FITTING (BOOT TAKE–OFF)
- VE — TYPICAL TAP FITTING w VOLUME EXTRACTOR
- SD — TYPICAL BRANCH TAKE–OFF w SPLITTER DAMPER (c/w LOCKING QUADRANT)
- BD — TYPICAL BUTTERFLY TYPE BALANCING DAMPER (c/w LOCKING QUADRANT)
- TYPICAL DUCT SILENCER
- CTS — TYPICAL ACOUSTICALLY INSULATED CEILING TRANSFER SLEEVE (CROSS–TALK SILENCER) SEE DWG FOR CONFIGURATION
- MVCD BD — TYPICAL MANUAL VOLUME CONTROL AND/OR BALANCING DAMPER (OPPOSED BLADE).
- MD PBD OBD — TYPICAL MOTORIZED DAMPER PBD= PARALLEL BLADE OBD= OPPOSED BLADE
- MSD — TYPICAL MOTORIZED SMOKE CONTROL DAMPER SEE SPECIFICATIONS FOR DESCRIPTION.
- FD — TYPICAL FIRE DAMPER
- FC — TYPICAL AIRTIGHT FLEXIBLE DUCT CONNECTION
- EH–# — TYPICAL DUCT MTD. RE–HEAT COIL; TAG DENOTES COIL No.
- VARIABLE VOLUME TERMINAL UNIT
- SA–# / 50 L/S — TYPICAL CEILING MTD. SUPPLY AIR DIFFUSER TAG DENOTES TYPE (SEE SCHEDULE) AIR FLOW IN LITERS PER SECOND

VENTILATION

- RA–# — TYPICAL CEILING MTD. RETURN AIR GRILLE / REGISTER TAG DENOTES TYPE (SEE SCHEDULE)
- RA–# — TYPICAL CEILING MTD. RETURN AIR GRILLE / REGISTER TAG DENOTES TYPE (SEE SCHEDULE)
- SA–# / ## L/S — TYPICAL LINEAR–SLOT TYPE SUPPLY AIR DIFFUSER, AIR FLOW IN LITERS PER SECOND
- EF–# — TYPICAL IN–LINE FAN MTD. IN CEILING SPACE OR AS NOTED. (TAG DENOTES FAN No.)
- EF–# — TYPICAL ROOF CURB MTD. EXHAUST FAN TAG DENOTES FAN No.
- EF–# — TYPICAL ROOF CURB MTD. EXHAUST FAN TAG DENOTES FAN No.
- TU–#–# — TYPICAL TERMINAL UNIT TAG
- TYPICAL AIRFLOW/DIRECTIONAL ARROWS
- T S — SPACE TEMPERATURE SENSOR (D.D.C. SYSTEM)
- T — LOW VOLTAGE THERMOSTAT (TYPE AS REQ'D FOR OPERATING SEQUENCE)
- T — PNEUMATIC THERMOSTAT (TYPE AS REQ'D FOR OPERATING SEQUENCE)
- CO2 — TYPICAL CARBON DIOXIDE SENSOR
- AQS — TYPICAL AIR QUALITY SENSOR
- TYPICAL L.V. CONTROL WIRING
- SA–3 / 600/609 / 50 L/S — TAG; WIDTH / DEPTH IN mm; AIRFLOW IN L/S
- RISE DROP / RISE DROP — TYPICAL DUCT RISES AND DROPS

LIST OF SUBSCRIPTS

N	INDICATES NEW DEVICE
E	INDICATES EXISTING TO REMAIN
ER	INDICATES EXISTING TO BE REMOVED
RL	INDICATES EXISTING TO BE RELOCATED
NL	INDICATES EXISTING IN NEW LOCATION

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE–ISSUED FOR PERMIT	MAY 27, 2024
R0	ISSUED FOR PERMIT	MAY, 2024

GENERAL NOTES

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PROJECT NAME:

QEII LIBRARY
LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

DRAWING TITLE:

MECHANICAL SYMBOL LEGEND
PLUMBING, HEATING, AND FIRE PROTECTION

REVIEWED:	DRAWN:
MF	WF
SCALE: NTS	DATE: MAY. 2024
MUN PROJECT No. **L-119-22**	DRAWING No. **M-0.1**

GENERAL PLUMBING NOTES:

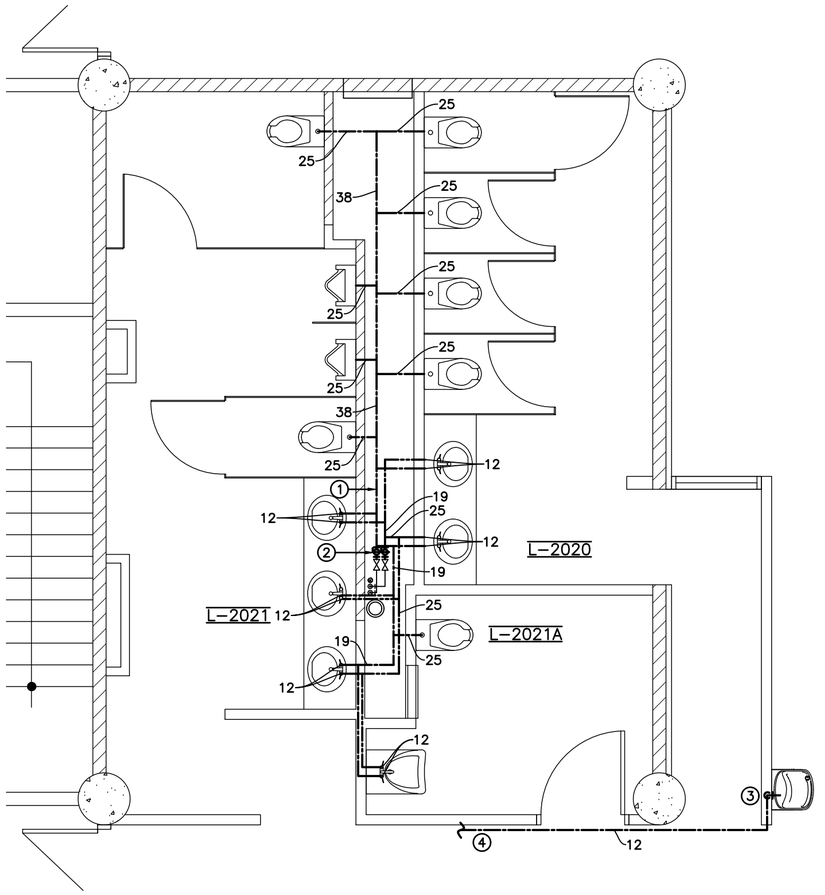
1. ALLOW FOR EXTRA PIPE, OFFSETS, FITTINGS, ETC. AS REQUIRED TO AVOID ANY INTERFERENCE AND COMPLETE INSTALLATION.
2. CONTRACTOR TO PROVIDE P–TRAPS, WASTE, S.S. BRAIDED WATER LINES, VALVES, CARRIERS, ETC. FOR ALL PLUMBING FIXTURES AS REQUIRED.
3. PROVIDE ACCESS DOORS AT ALL CONCEALED VALVES AND CLEANOUTS. ACCESS DOORS TO BE MAINTAIN FIRE RATING OF ASSEMBLES IN WHICH THEY ARE INSTALLED. APPROXIMATE LOCATION OF KNOWN ACCESS DOORS SHOWN ON DWG A–4.1,A–4.2, & A–4.4.
4. ALL CUTTING AND PATCHING SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR.
5. ACCESS TO PLUMBING VIA LEVELS 1 TO BE SCHEDULED WITH PROJECT COORDINATOR PRIOR TO MOBILIZATION.
6. ALL PLUMBING SHUTDOWNS WILL REQUIRE MUN PLUMBER TO BE PRESENT TO PROVIDE LOCK OUT/TAG OUT. CONTRACTOR SHALL CONTACT PROJECT COORDINATOR 48Hrs IN ADVANCE TO SCHEDULE MUN PLUMBER.

DEMOLITION PLUMBING NOTES: (#)

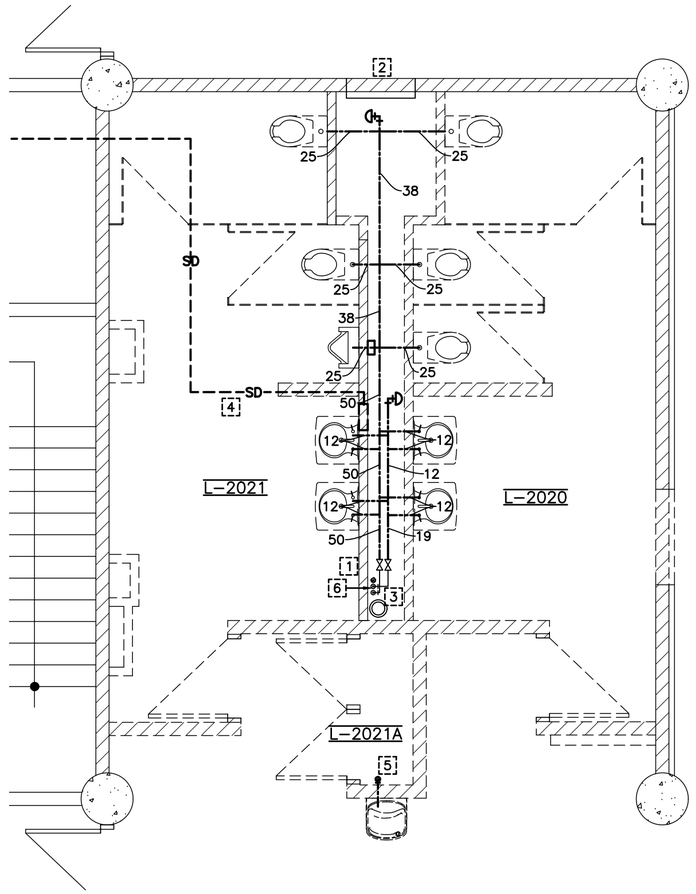
1. ALL EXISTING HOT & COLD WATER PIPING TO BE REMOVED BACK TO EXISTING SHUT OFF VALVES. PROJECT COORDINATOR SHALL BE NOTIFIED OF ANY HOT AND COLD WATER PIPING PRESENT NOT SHOWN ON DRAWINGS.
2. EXISTING FIRE HOSE CABINET PIPING TO REMAIN.
3. EXISTING STACKS TO REMAIN. CONTRACTOR TO ENSURE NO DAMAGE TO OCCUR TO PLUMBING STACK AND RAIN WATER LEADER AS A RESULT OF DEMOLITION WORK.
4. CAP AND REMOVE EXISTING SOAP DISPENSER SUPPLY LINE. REMOVE AND DISPOSE OF EXISTING SOAP PRESSURE REDUCING TANK FROM WALL.
5. EXISTING WATER FOUNTAIN WATER LINE AND WATER FILTER TO BE REMOVED AND CAPPED BELOW SLAB. WATER FILTER TO BE SALVAGED FOR RE–USE AT NEW WATER FOUNTAIN LOCATION.
6. APPROXIMATE LOCATION OF EXISTING VERTICAL HOT/COLD WATER LINES.

NEW PLUMBING NOTES: (#)

1. ALL NEW PIPING TO BE INSTALLED BEYOND SHUT OFF VALVES.
2. NEW BALL VALVE ON NEW HOT AND COLD WATER LINES TO ISOLATE LINES AND ALLOW NEW PLUMBING LINE INSTALLATION.
3. NEW COLD WATER SUPPLY LINE TO WATER FOUNTAIN TO TIE INTO EXISTING COLD WATER SUPPLY OF WATER FOUNTAIN. FILTER SYSTEM TO BE MOUNTED INSIDE 150mm METAL STUD WALL.
4. CONTINUE NEW COLD WATER SUPPLY TO EXISTING CAPPED WATER SUPPLY LINE.



NEW DOMESTIC WATER PLAN
SCALE: 1:50
2 MP–1.0



DEMOLITION DOMESTIC WATER PLAN
SCALE: 1:50
1 MP–1.0

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE–ISSUED FOR PERMIT	MAY 27, 2024
R0	ISSUED FOR PERMIT	MAY, 2024

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PROJECT NAME:

QEII LIBRARY
LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

DRAWING TITLE:

DOMESTIC WATER PLAN

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. **L-119-22**	DRAWING No. **MP-1.0**

GENERAL PLUMBING NOTES:

1. ALLOW FOR EXTRA PIPE, OFFSETS, FITTINGS, ETC. AS REQUIRED TO AVOID ANY INTERFERENCE AND COMPLETE INSTALLATION.
2. CONTRACTOR TO PROVIDE P–TRAPS, WASTE, S.S. BRAIDED WATER LINES, VALVES, CARRIERS, ETC. FOR ALL PLUMBING FIXTURES AS REQUIRED.
3. PROVIDE ACCESS DOORS AT ALL CONCEALED VALVES AND CLEANOUTS. ACCESS DOORS TO BE MAINTAIN FIRE RATING OF ASSEMBLES IN WHICH THEY ARE INSTALLED. APPROXIMATE LOCATION OF KNOWN ACCESS DOORS SHOWN ON DWG A–4.1,A–4.2, & A–4.4.
4. ALL CUTTING AND PATCHING SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR.
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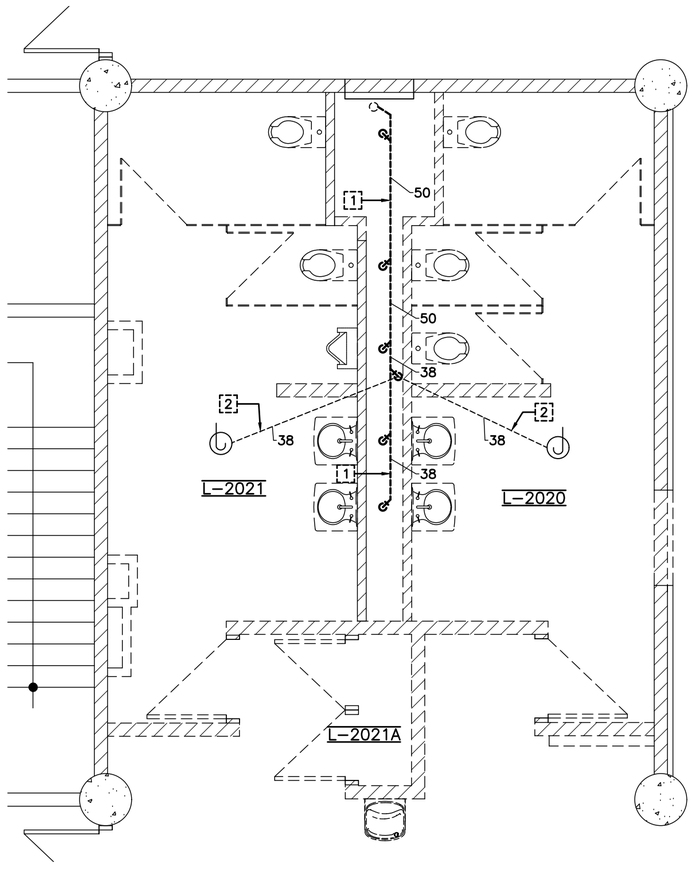
6. ALL PLUMBING SHUTDOWNS WILL REQUIRE MUN PLUMBER TO BE PRESENT TO PROVIDE LOCK OUT/TAG OUT. CONTRACTOR SHALL CONTACT PROJECT COORDINATOR 48Hrs IN ADVANCE TO SCHEDULE MUN PLUMBER.

DEMOLITION DRAIN WASTE PLUMBING NOTES: [#]

1. REMOVE ALL EXISTING DRAIN WASTE PLUMBING ABOVE SLAB BACK TO EXISTING STACK.
2. EXISTING DRAIN WASTE PLUMBING BELOW SLAB TO REMAIN. PREP PIPE FOR TIE IN OF NEW DRAIN WASTE PIPE. SEE 1/MP–1.2 FOR NEW DRAIN WASTE LAYOUT
3. REMOVE WATER FOUNTAIN DRAIN WASTE PLUMBING TO BELOW CONCRETE SLAB. PREP PIPE FOR TIE IN OF NEW DRAIN WASTE PIPE TO NEW WATER FOUNTAIN LOCATION

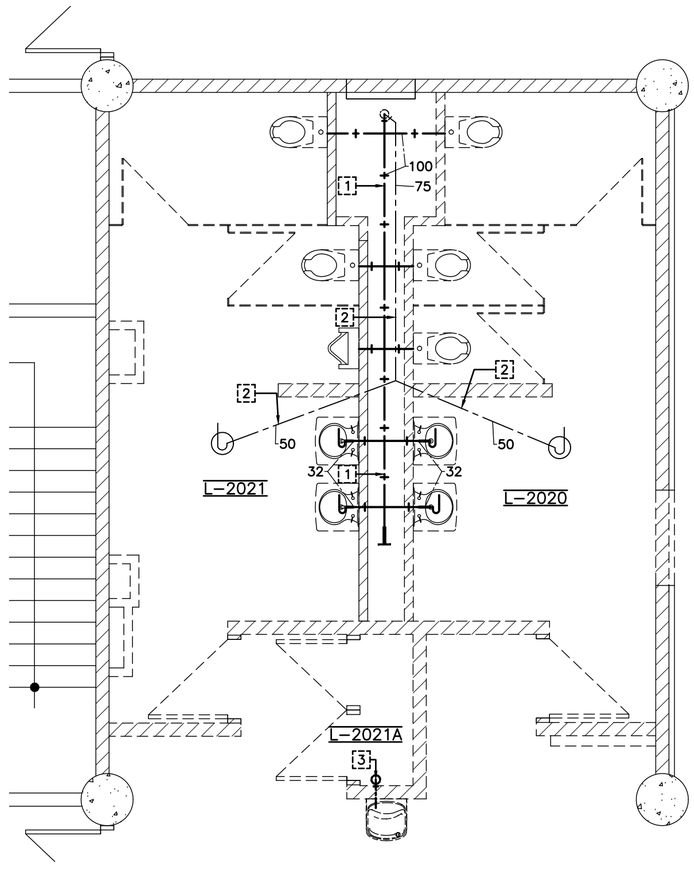
DEMOLITION VENT PLUMBING NOTES: [#]

1. REMOVE ALL EXISTING VENT PIPING ABOVE SLAB BACK TO EXISTING STACK.
2. EXISTING VENT PIPE BELOW SLAB TO REMAIN. PREP PIPE FOR TIE IN OF NEW VENT PIPE. SEE 2/MP–1.2 FOR NEW VENT LAYOUT



DEMOLITION VENT PLAN
SCALE: 1:20

2
MP–1.1



DEMOLITION DRAIN WASTE PLAN
SCALE: 1:50

1
MP–1.1

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE–ISSUED FOR PERMIT	MAY 27, 2024
R0	ISSUED FOR PERMIT	MAY, 2024

GENERAL NOTES

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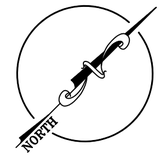

MEMORIAL UNIVERSITY

Department of Facilities Management

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- Dedication plaque, Arts & Administration Building, St. John's Campus

PROJECT NAME:

QEII LIBRARY
LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

DRAWING TITLE:

DEMOLITION D.W.V PLUMBING PLAN

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. **L-119-22**	DRAWING No. **MP-1.1**

GENERAL PLUMBING NOTES:

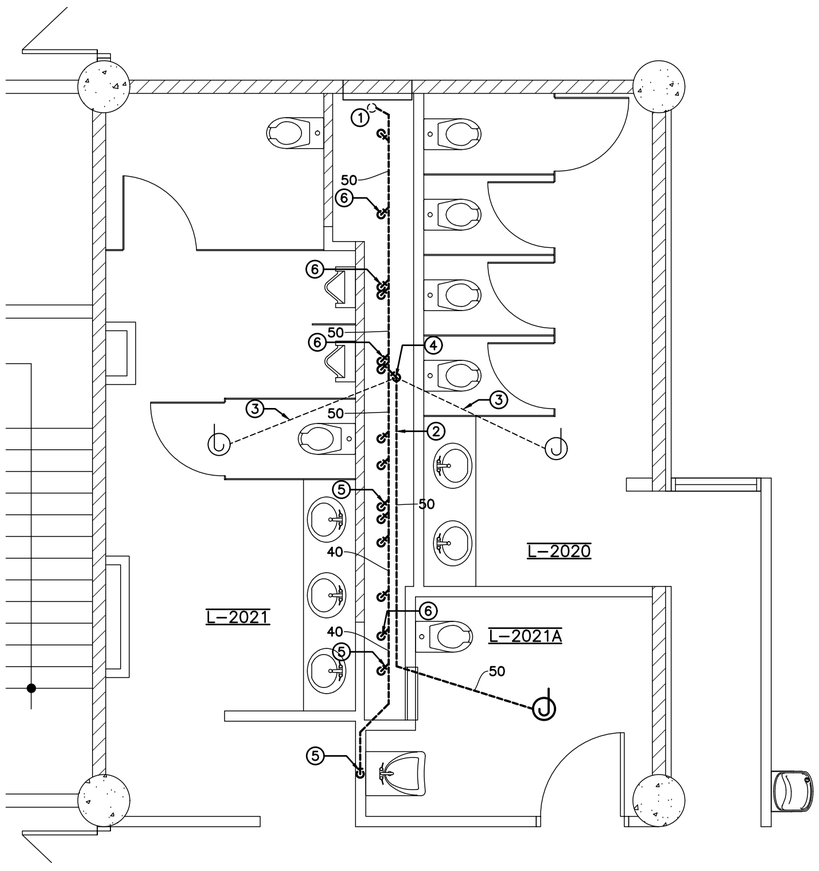
1. ALLOW FOR EXTRA PIPE, OFFSETS, FITTINGS, ETC. AS REQUIRED TO AVOID ANY INTERFERENCE AND COMPLETE INSTALLATION.
2. CONTRACTOR TO PROVIDE P-TRAPS, WASTE, S.S. BRAIDED WATER LINES, VALVES, CARRIERS, ETC. FOR ALL PLUMBING FIXTURES AS REQUIRED.
3. PROVIDE ACCESS DOORS AT ALL CONCEALED VALVES AND CLEANOUTS. ACCESS DOORS TO BE MAINTAIN FIRE RATING OF ASSEMBLES IN WHICH THEY ARE INSTALLED. APPROXIMATE LOCATION OF KNOWN ACCESS DOORS SHOWN ON DWG A-4.1,A-4.2, & A-4.4.
4. ALL CUTTING AND PATCHING SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR.
5. ACCESS TO PLUMBING VIA LEVELS 1 TO BE SCHEDULED WITH PROJECT COORDINATOR PRIOR TO MOBILIZATION.
6. ALL PLUMBING SHUTDOWNS WILL REQUIRE MUN PLUMBER TO BE PRESENT TO PROVIDE LOCK OUT/TAG OUT. CONTRACTOR SHALL CONTACT PROJECT COORDINATOR 48Hrs IN ADVANCE TO SCHEDULE MUN PLUMBER.

NEW DRAIN WASTE PLUMBING NOTES: (#)

1. TIE INTO EXISTING 100mm WASTE STACK. ALL NEW WASTE PIPES TO TOILETS, SINKS, AND URINALS.
2. TIE INTO EXISTING 75mm DRAIN PIPE BELOW SLAB.
3. EXISTING 75mm DRAIN PIPE BELOW SLAB TO REMAIN
4. NEW EXPOSED SINK DRAINS AND TRAPS TO BE STAINLESS STEEL. DETLA MODEL 33T311 & DELTA MODEL 33T290-1 OR APPROVED ALTERNATE.
5. NEW WATER FOUNTAIN DRAIN PIPE BELOW SLAB TO TIE INTO EXISTING PIPE LOCATION. EXPOSED PORTIONS OF DRAIN PIPE ON LEVEL TO BE PAINTED.
6. CONTRACTOR TO CUT AND INSTALL 2 900mmx900mm HATCHES IN LEVEL 1 DRYWALL CEILING TO FACILITATE THE INSTALLATION OF THE NEW FLOOR DRAIN AND PIPING. CEILING TO BE TREATED AS ASBESTOS CONTAINING.

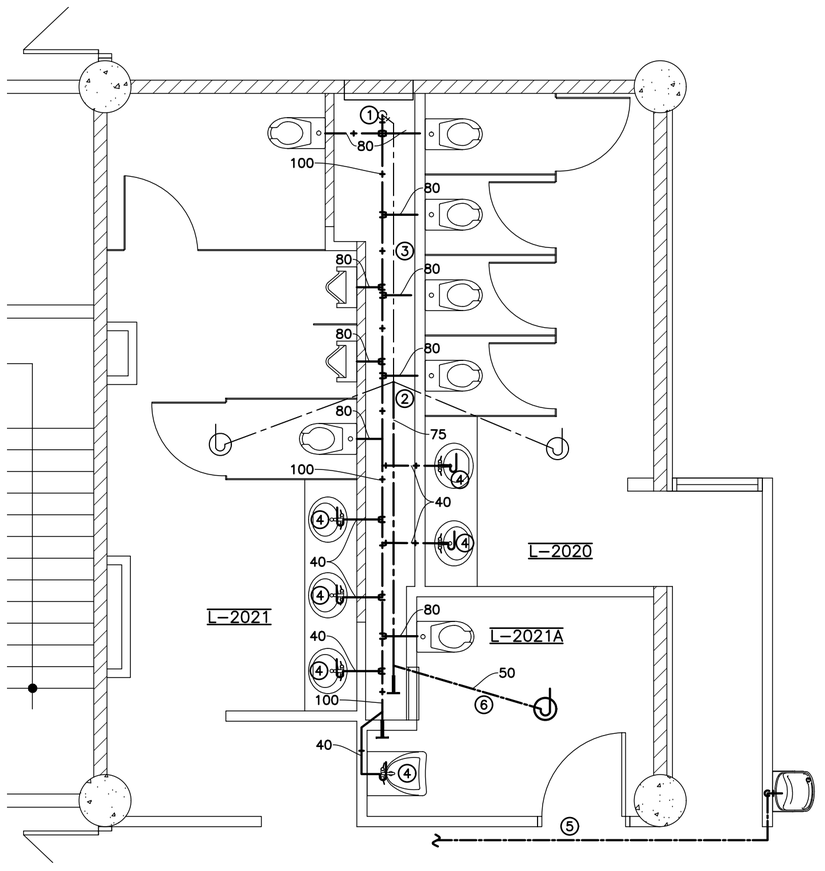
NEW VENT PLUMBING NOTES: (#)

1. TIE INTO EXISTING 75mm VENT STACK. ALL NEW VENT PIPES TO TOILETS, SINKS, AND URINALS.
2. NEW VENT PIPE TO FLOOR DRAIN BELOW SLAB TO USE EXISTING CORE HOLE.
3. EXISTING 40mm VENT PIPE BELOW SLAB TO REMAIN.
4. NEW 40Mmm VENT PIPE TO TIE INTO EXISTING 40mm VENT PIPE BELOW SLAB.
5. NEW VERTICAL VENT PIPE TO LAVATORIES TO BE MINIMUM 40mm DIA.
6. NEW VERTICAL VENT PIPE TO WATER CLOSETS AND URINALS TO BE MINIMUM 50mm DIA



NEW VENT PLAN
SCALE: 1:50

2
MP-1.2



NEW DRAIN WASTE PLAN
SCALE: 1:50

1
MP-1.2

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE-ISSUED FOR PERMIT	MAY 27, 2024
R0	ISSUED FOR PERMIT	MAY, 2024

GENERAL NOTES

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PROJECT NAME:

QEII LIBRARY
LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

DRAWING TITLE:

NEW D.W.V PLUMBING PLAN

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. **L-119-22**	DRAWING No. **MP-1.2**

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE-ISSUED FOR PERMIT	MAY 27, 2024
R0	ISSUED FOR PERMIT	MAY, 2024

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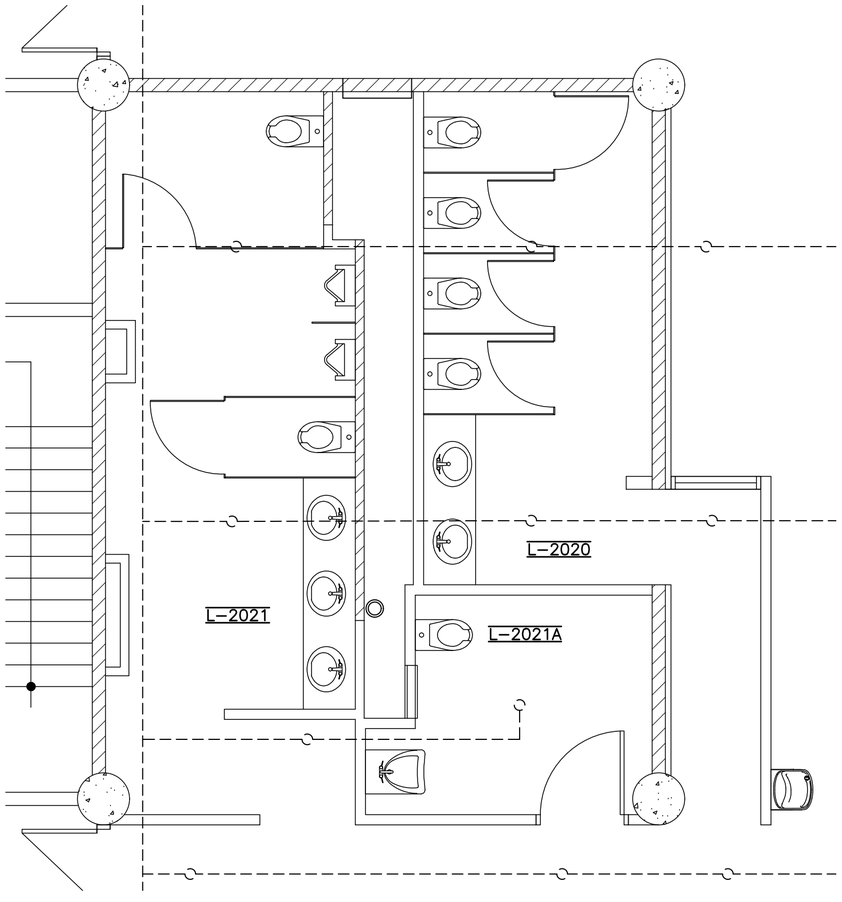
GENERAL SPRINKLER NOTES:

1. ALL EXISTING SPRINKLER HEAD AND PIPING TO REMAIN. CONTRACTOR RESPONSIBLE TO ENSURE NO DAMAGE TO SPRINKLER HEADS OR PIPES DURING CONSTRUCTION.



NEW SPRINKLER PLAN
SCALE: 1:50

1
MP-1.3

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PROJECT NAME:

QEII LIBRARY
LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

DRAWING TITLE:

SPRINKLER PLAN

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. **L-119-22**	DRAWING No. **MP-1.3**

VENTILATION DEMOLITION NOTES: [#]

1. REMOVE EXISTING TRANSFER DUCT AND GRILLES.
2. REMOVE AND DISPOSE OF EXISTING EXHAUST AIR DIFFUSERS. PREP EXISTING EXHAUST AIR DUCT FOR NEW DIFFUSER.

NEW VENTILATION NOTES: (#)

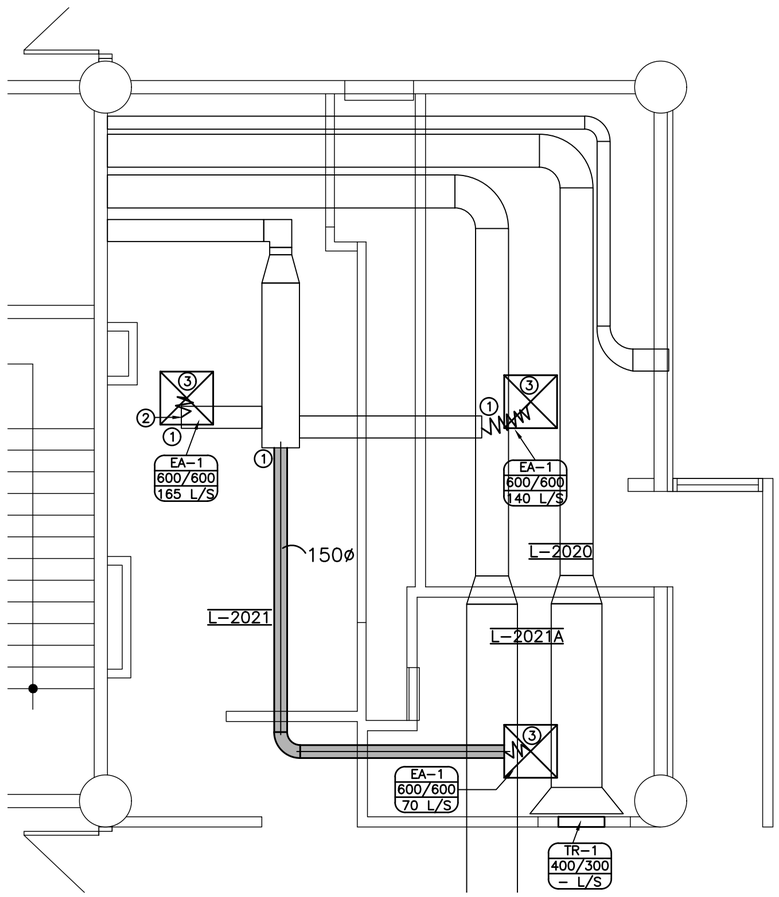
1. NEW EXHAUST AIR GRILLES, BRANCHES, & FLEX DUCT TO BE CONNECTED TO EXISTING PORTION OF EXHAUST AIR DUCT.
2. REMOVED EXHAUST AIR DUCT TO BE CAPPED IN THIS APPROXIMATE LOCATION.
3. NEW BALANCING DAMPER TO BE INSTALLED AT NEW EXHAUST AIR GRILLE LOCATIONS.

GENERAL VENTILATION NOTES:

1. THE COMPLETE VENTILATION SYSTEM SHALL CONFORM TO THE LATEST EDITION OF THE NATIONAL BUILDING CODE, CANADIAN PLUMBING CODE, NFPA, ASHRAE AND SMACNA STANDARDS, THE DEPT. OF FACILITIES MANAGEMENT STANDARDS AND LOCAL BY-LAWS CURRENTLY IN FORCE IN THE PROVINCE AND MUNICIPALITY.
2. BEFORE COMMENCING ANY DEMOLITION OR NEW WORK, THE CONTRACTOR SHALL THOROUGHLY INSPECT THE SITE SO AS TO BECOME FAMILIAR WITH ALL EXISTING CONDITIONS. CONTRACTOR IS RESPONSIBLE FOR CONFIRMING ON SITE THE ACTUAL SIZE, LOCATION, AND ROUTING OF ALL EXISTING DEVICES, EQUIPMENT AND SYSTEMS.
3. TRACE OUT ALL LINES AND SYSTEMS BEFORE INITIATING WORK. COORDINATE SHUTDOWNS AND SERVICE INTERRUPTIONS WITH THE PROJECT COORDINATOR, AND PROVIDE WRITTEN DESCRIPTION OF WORK FOR REVIEW BY OWNER. THE OWNER RESERVES THE RIGHT TO CHANGE SCHEDULES TO PROTECT ONGOING OPERATIONS.
4. MAKE GOOD ANY DAMAGE AS A RESULT OF THE CONSTRUCTION WORK.
5. DUCTWORK: NEW GALVANIZED STEEL OF LOCK FORMING QUALITY TO ASTM 525 M-80 ZINC COATING WITH GAUGES AND FABRICATION DETAILS TO SMACNA STANDARDS.
6. HANGERS & SUPPORTS: TO SMACNA & ASHRAE RECOMMENDATIONS & STANDARDS.
7. SEAMS, JOINTS & CONNECTIONS TO BE MADE AIRTIGHT WITH SEALING COMPOUND & TAPE.
8. DUCT SEALER: OIL RESISTANT, POLYMER TYPE FLAME RESISTANT HIGH VELOCITY DUCT SEALING COMPOUND.
9. NEW REGISTERS TO BE CENTERED IN CEILING TILES.

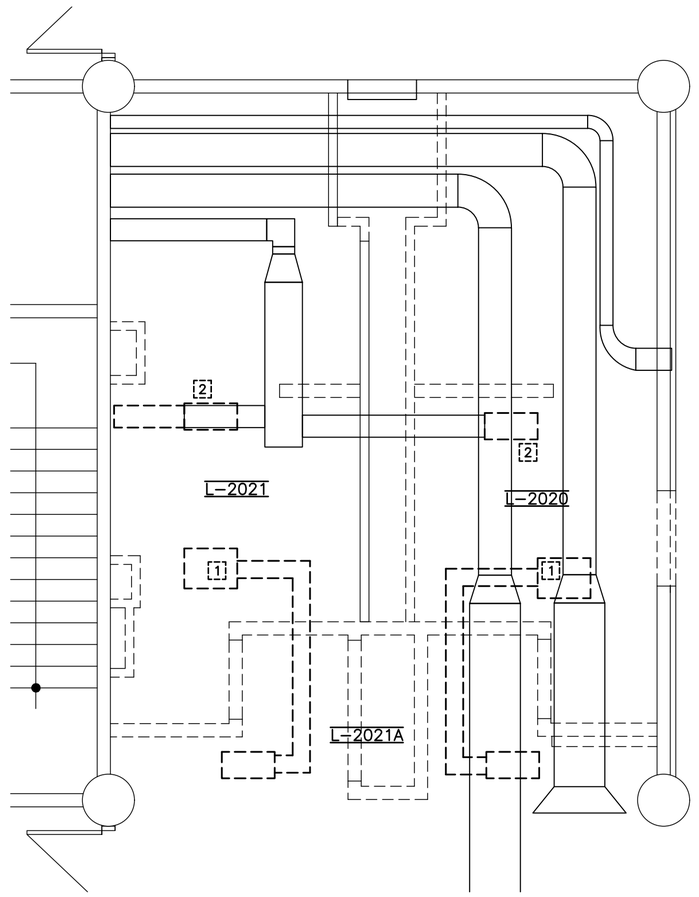
GRILLE AND DIFFUSER SCHEDULE

DIFFUSER TAG	TYPE	NOMINAL SIZE	MOUNTING	MANUFACTURER & MODEL	REMARKS
EA-1	EXHAUST	600/600	T-BAR CEILING	PRICE EGG CRATE	
TR-1	TRANSFER	400/300	DOOR SURFACE	PRICE ATG1	



NEW VENTILATION PLAN
SCALE: 1:50

2
MV-1.0



DEMOLITION VENTILATION PLAN
SCALE: 1:50

1
MV-1.0

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE-ISSUED FOR PERMIT	MAY 27, 2024
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PROJECT NAME:

QEII LIBRARY
LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

DRAWING TITLE:

VENTILATION PLAN

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. **L-119-22**	DRAWING No. **MV-1.0**

POWER

- NEW 800 SERIES WIREMOLD RACE WAY (BY LEGRAND OR APPROVED ALTERNATE):
  - 1.1. EXTEND RACEWAY FROM ABOVE FINISHED CEILING TO 400mm AFF.
  - 1.2. 800BAC RACEWAY
  - 1.3. INCLUDE BANK END FITTING, ENTRANCE END FITTING, COVER CLIP, AND OTHER REQUIRED COMPONENTS TO COMPLETE FULL INSTALLATION.
  - 1.4. INCLUDE 2348 DEVICE BOX, AND "5507R" RECTANGULAR SPACER FOR RECEPTACLE
- 15amp, 120v DUPLEX RECEPTACLE
- 15amp, 120v DUPLEX RECEPTACLE IN SURFACE MOUNTED NON–METALLIC CONDUIT
- 15amp, 120v QUADPLEX RECEPTACLE IN SURFACE MOUNTED NON–METALLIC CONDUIT
- 15amp, 120v ISOLATED GROUND RECEPTACLE
- 15amp, 120v DUPLEX RECEPTACLE MOUNTED 175mm ABOVE BACKSPLASH
- 15amp, 120v SPLIT DUPLEX RECEPTACLE MOUNTED 175mm ABOVE BACKSPLASH
- SURGE SUPPRESSION DUPLEX RECEPTACLE
- 5–150R SIMPLEX RECEPTACLE, CSA CONFIG AS INDICATED
- 6–15R SIMPLEX RECEPTACLE, CSA CONFIG AS INDICATED
- 6–30R SIMPLEX RECEPTACLE, CSA CONFIG AS INDICATED
- FLOOR RECEPTACLE
- POWER POLE
- 15amp, 120v QUADPLEX RECEPTACLE MOUNTED IN CEILING SPACE
- 15amp, 120v DUPLEX RECEPTACLE MOUNTED IN CEILING SPACE
- DIRECT CONNECTION TO ELECTRICAL EQUIPMENT
- JB JUNCTION OR OUTLET BOX

LIST OF SUBSCRIPTS

a	LOWER CASE LETTERS INDICATE SWITCHING ARRANGEMENT
GFCI	INDICATES GROUND FAULT CIRCUIT INTERRUPTER
USB	INDICATES RECEPTACLE WITH X2 3.6A USB PORTS
LV	INDICATES LOW VOLTAGE
3	INDICATES 3–WAY
4	INDICATES 4–WAY
D	INDICATES DIMMER
US	INDICATES UN–SWITCHED FIXTURE
WP	INDICATES WEATHER PROOF
EM	INDICATES EMERGENCY POWER SUPPLY
W	INDICATES WALL MOUNTED
N	INDICATES NEW DEVICE
E	INDICATES EXISTING TO REMAIN
ER	INDICATES EXISTING TO BE REMOVED
RL	INDICATES EXISTING TO BE RELOCATED
NL	INDICATES EXISTING IN NEW LOCATION
MS	INDICATES MOTION SENSOR

COMMUNICATIONS

- △ DATA DROP
- ▲ TELEPHONE OUTLET
- ⊘△ OBSOLETE DATA OUTLET

FIRE ALARM

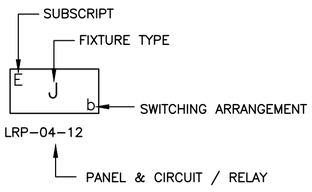
- F MANUAL FIRE ALARM PULL STATION
- HD HEAT DETECTOR
- R END OF LINE RESISTOR
- SD SMOKE DETECTOR
- DD DUCT TYPE SMOKE DETECTOR
- SA SMOKE ALARM
- WA CONNECTION TO SPRINKLER SYSTEM WET ALARM VALVE
- S/S SPEAKER/STROBE WALL MOUNTED
- S/S SPEAKER/STROBE CEILING MOUNTED
- SL STROBE LIGHT WALL MOUNTED
- SL STROBE LIGHT CEILING MOUNTED
- MDL CONNECTION TO MAGNETIC DOOR LOCK
- MDH CONNECTION TO MAGNETIC DOOR HOLDER

SWITCH / CONTROLS

- $_{a}\$_{b}$ GANGED SWITCH – a b INDICATES SWITCHING ARRANGEMENT WITH FIXTURES
- $_{a}\$_{3}$ 3–WAY TOGGLE SWITCH – a INDICATES SWITCHING ARRANGEMENT WITH FIXTURES
- $_{a}\$$ SINGLE POLE TOGGLE SWITCH – a INDICATES SWITCHING ARRANGEMENT WITH FIXTURES
- PBA PUSH BUTTON ACTUATOR – H/C DOOR OPERATOR PUSH BUTTON. DEVICE BY DIVISION 8, WIRING AND CONDUIT BY DIVISION 26.
- (MS) CEILING MOUNTED MOTION SENSOR LIGHTING CONTROL

LIGHTING

TYPICAL FIXTURE INFORMATION:



- E J b — 610x1220 RECESSED L.A.T. LIGHT FIXTURE
- N (J) b — DOWNLIGHT RECESSED LIGHT FIXTURE
- E J b — 305x1220 SURFACE MOUNT LIGHT FIXTURE
- E J b — 305x1220 SURFACE MOUNT LIGHT FIXTURE ON EMERGENCY POWER CIRCUIT OR UN–SWITCHED (NIGHT LIGHT)
- N J (X) PP–EC–4 — CEILING MOUNTED ILLUMINATED EXIT LIGHT FIXTURE, ARROW INDICATES DIRECTION OF EXIT SUPPLIED BY OWNER
- N J (X) PP–EC–4 — WALL MOUNTED ILLUMINATED EXIT LIGHT FIXTURE SUPPLIED BY OWNER
- J EM — EMERGENCY LIGHTING BATTERY UNIT 2 HEADS C/W A/C & DC OUTLETS
- REMOTE EMERGENCY LUMINARE HEADS

No.	REVISION	DATE
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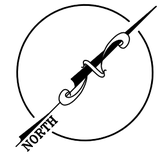

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PROJECT NAME:

QEII LIBRARY
LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

DRAWING TITLE:

ELECTRICAL SYMBOL LEGEND

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. L-119-22	DRAWING No. E-0.1

GENERAL ELECTRICAL NOTES:

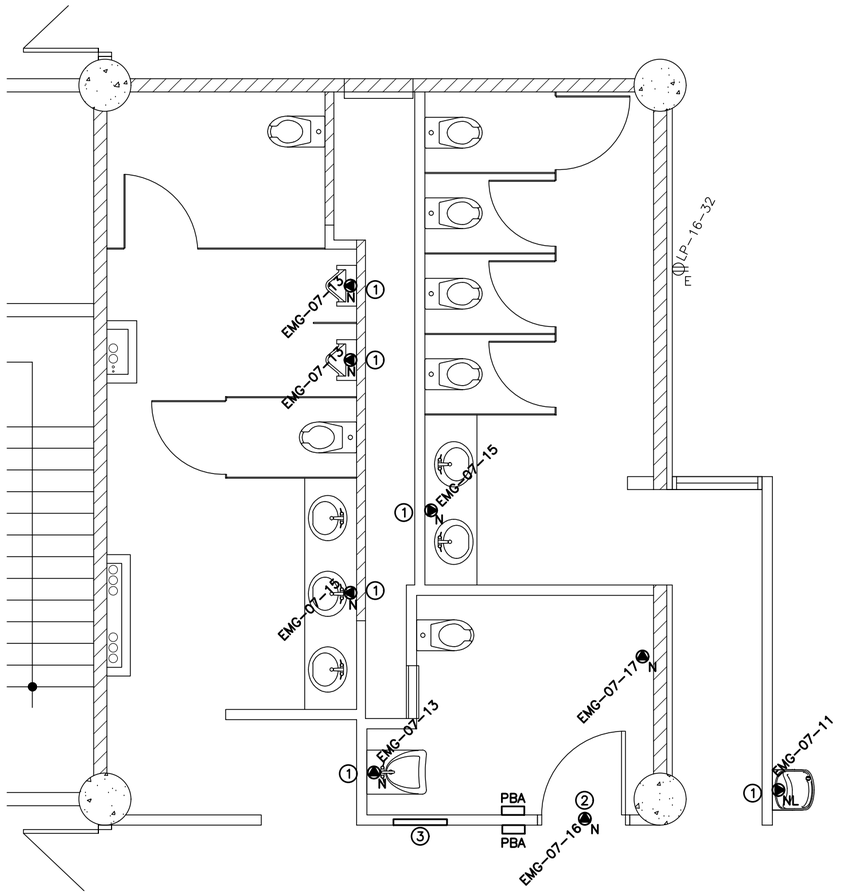
1. ALL CIRCUIT BREAKER/PANEL SHUTDOWNS WILL REQUIRE MUN ELECTRICIAN PRESENT TO PROVIDE LOCK OUT/TAG OUT. CONTRACTOR SHALL CONTACT PROJECT COORDINATOR 24hrs IN ADVANCE TO SCHEDULE MUN ELECTRICIAN. LIVE ELECTRICAL WORK IS NOT PERMITTED. CONTRACTOR TO VERIFY ELECTRICAL CIRCUITS PRIOR TO THE START OF WORK.
2. ALL DATA DROPS NOTED TO BE REMOVED SHALL BE DISCONNECTED BY MUN FORCES PRIOR TO DEMOLITION WORK BY ELECTRICAL SUB–TRADE. CONTRACTOR SHALL CONTACT PROJECT COORDINATOR 48hrs IN ADVANCE TO NOTIFY / SCHEDULE DATA DROP DISCONNECTION. DO NOT CUT OR DISCONNECT DATA CABLES.
3. REMOVE ALL WIRING AND CONDUIT BACK TO NEAREST JUNCTION BOXES FOR RECEPTACLES, SWITCHES, ETC. THAT ARE INDICATED TO BE REMOVED OR RELOCATED.
4. ELECTRICAL CONTRACTOR RESPONSIBLE TO VERIFY INDICATED CIRCUITS AND TRACE OUT ANY UNKNOWN POWER AND LIGHTING CIRCUITS PRIOR TO ANY WORK TAKING PLACE.
5. REUSE EXISTING LIGHTING POWER CIRCUITS AS INDICATED. RE–ROUTE, EXTEND, OR MODIFY POWER FEEDS AS REQUIRED TO FACILITATE ALL NEW LOCATIONS OF LIGHT FIXTURES, ILLUMINATED EXIT SIGNS, LINE VOLTAGE DIMMER SWITCHES, AND LOW VOLTAGE SWITCHES.

ELECTRICAL FLOOR PLAN DEMOLITION NOTES:

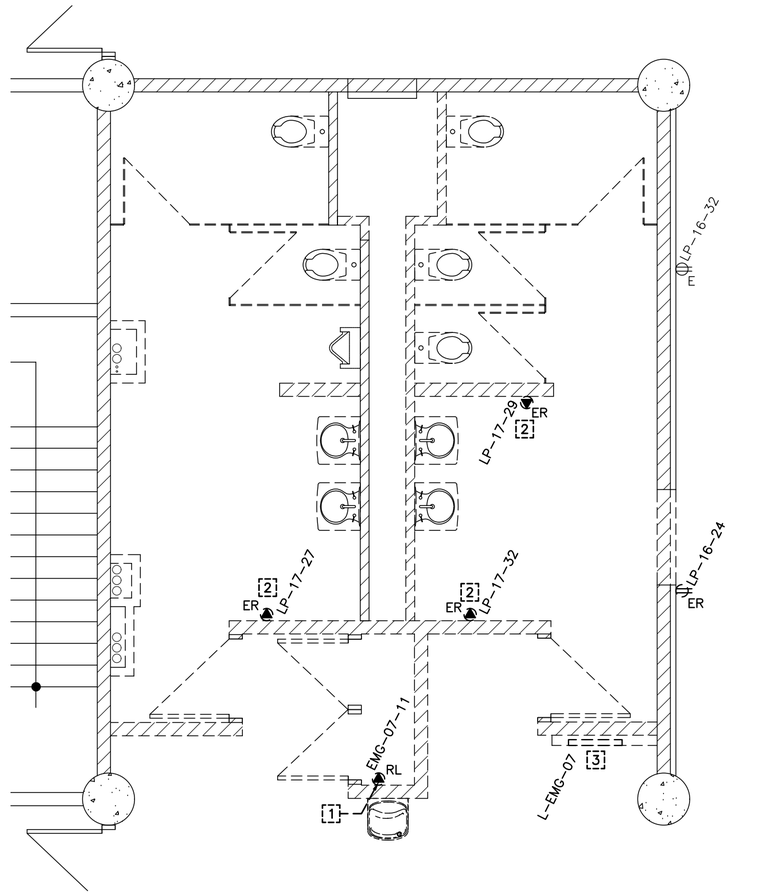
1. DISCONNECT WIRING TO EXISTING WATER FOUNTAIN AND REMOVE WIRING BACK TO NEAREST JUNCTION BOX. CONTRACTOR TO USE SAME CIRCUIT TO CONNECT WATER FOUNTAIN AT NEW LOCATION.
2. DISCONNECT WIRING TO EXISTING HAND DRYERS. REMOVE WIRING BACK TO NEAREST JUNCTION BOX ABOVE CEILING.
3. EXISTING POWER PANEL TO BE RELOCATED. CONTRACTOR TO MOVE POWER PANEL AFTER HOURS. PROJECT COORDINATOR TO BE NOTIFIED 48 HOURS PRIOR TO COORDINATE SHUTDOWN WITH MUN ELECTRICAL SHOP.

ELECTRICAL FLOOR PLAN CONSTRUCTION NOTES: (#)

1. NEW DIRECT POWER CONNECTION FOR AUTOMATED LAVATORY FAUCETS, URINALS, AND WATER FOUNTAIN. INSTALL SURFACE MOUNTED JUNCTION BOX ABOVE CEILING, EXTEND RECESSED CONDUIT DOWN TO FAUCETS AND BACK TO PANEL. COORDINATE INSTALLATION WITH GENERAL CONTRACTOR.
2. NEW DIRECT POWER CONNECTION FOR NEW AUTOMATIC DOOR OPERATOR. INSTALL SURFACE MOUNTED JB ABOVE CEILING, EXTEND RECESSED CONDUIT DOWN TO DOOR OPERATOR. COORDINATE INSTALLATION WITH GENERAL CONTRACTOR.
3. RELOCATED ELECTRICAL PANEL. ANY NEW BREAKERS TO BE INSTALLED IN PANEL DURING SHUTDOWN.



NEW POWER PLAN
SCALE: 1:50
2 E–1.0



DEMOLITION POWER PLAN
SCALE: 1:50
1 E–1.0

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE–ISSUED FOR PERMIT	MAY 27, 2024
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PROJECT NAME:

QEII LIBRARY
LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

DRAWING TITLE:

ELECTRICAL POWER PLANS

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. **L-119-22**	DRAWING No. **E-1.0**

GENERAL ELECTRICAL NOTES:

1. ALL CIRCUIT BREAKER/PANEL SHUTDOWNS WILL REQUIRE MUN ELECTRICIAN PRESENT TO PROVIDE LOCK OUT/TAG OUT. CONTRACTOR SHALL CONTACT PROJECT COORDINATOR 24hrs IN ADVANCE TO SCHEDULE MUN ELECTRICIAN. LIVE ELECTRICAL WORK IS NOT PERMITTED. CONTRACTOR TO VERIFY ELECTRICAL CIRCUITS PRIOR TO THE START OF WORK.
2. ALL DATA DROPS NOTED TO BE REMOVED SHALL BE DISCONNECTED BY MUN FORCES PRIOR TO DEMOLITION WORK BY ELECTRICAL SUB–TRADE. CONTRACTOR SHALL CONTACT PROJECT COORDINATOR 48hrs IN ADVANCE TO NOTIFY / SCHEDULE DATA DROP DISCONNECTION. DO NOT CUT OR DISCONNECT DATA CABLES.
3. REMOVE ALL WIRING AND CONDUIT BACK TO NEAREST JUNCTION BOXES FOR RECEPTACLES, SWITCHES, ETC. THAT ARE INDICATED TO BE REMOVED OR RELOCATED.
4. ELECTRICAL CONTRACTOR RESPONSIBLE TO VERIFY INDICATED CIRCUITS AND TRACE OUT ANY UNKNOWN POWER AND LIGHTING CIRCUITS PRIOR TO ANY WORK TAKING PLACE.
5. REUSE EXISTING LIGHTING POWER CIRCUITS AS INDICATED. RE–ROUTE, EXTEND, OR MODIFY POWER FEEDS AS REQUIRED TO FACILITATE ALL NEW LOCATIONS OF LIGHT FIXTURES, ILLUMINATED EXIT SIGNS, LINE VOLTAGE DIMMER SWITCHES, AND LOW VOLTAGE SWITCHES.
6. REUSE EXISTING POWER CIRCUITS AND RELAY CIRCUITS TO ENSURE SEPARATE LIGHT SWITCHING CONTROL IN INDIVIDUAL ROOMS OR MULTIPLE SWITCHING CONTROL AS INDICATED.
6. CONTRACTOR TO ENSURE THAT ALL EXISTING OR NEW CONDUIT PENETRATIONS THROUGH THE FLOOR AND WALLS ARE APPROPRIATELY FIRE STOPPED.

ELECTRICAL CEILING PLAN DEMOLITION NOTES:

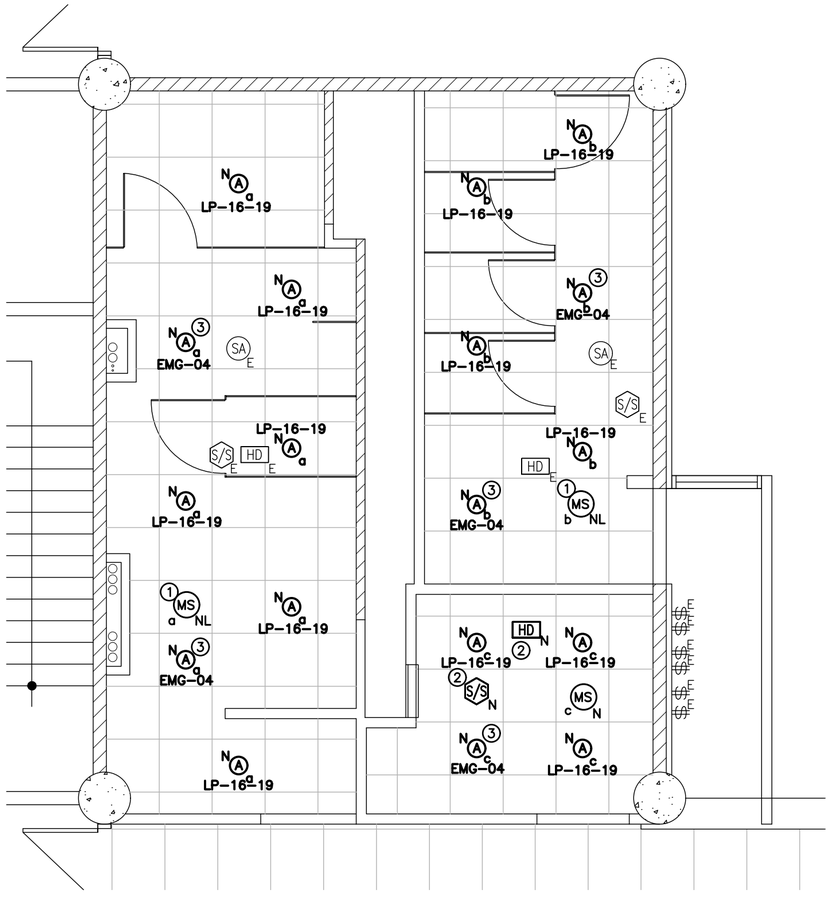
1. REMOVE EXISTING SWITCH. PULL BACK WIRING TO NEAREST JUNCTION BOX ABOVE CEILING.
2. EXISTING FIRE DETECTION/ALARM DEVICES TO REMAIN. CONTRACTOR TO ENSURE DEVICES ARE LEFT AS–IS.

ELECTRICAL CEILING PLAN NEW NOTES:

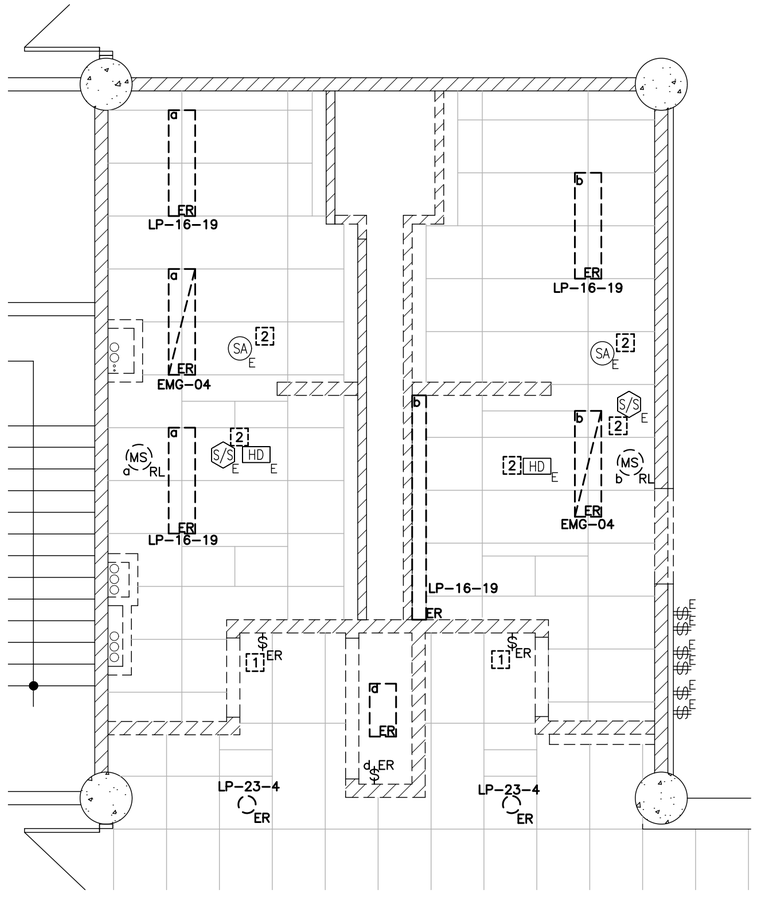
1. RELOCATED LIGHTING OCCUPANCY SENSORS AS INDICATED. CONTRACTOR TO ENSURE SENSORS ARE CENTERED ON CEILING TILE.
2. NEW SMOKE DETECTOR, HEAT DETECTOR, AND SPEAKER STROBE DEVICES. WIRING, CONDUIT, AND BOXES BY CONTRACTOR. TESTING AND SUPPLY OF NEW DEVICES TO BE BY CHUBB EDWARDS AND COVERED UNDER CASH ALLOWANCE
3. NEW LIGHT FIXTURE TO BE CONNECTED TO EMERGENCY POWER CIRCUIT

LIGHTING SCHEDULE

SYM.	LIGHT SOURCE	COLOR TEMP	VOLT	WATT	MANUFACTURER	CATALOGUE NUMBER	QTY.
A	LED	4000K	120	10.5W	LITHONIA LIGHTING	WF4 LED 30K40K50K 90CRI MW M6	18



NEW ELECTRICAL CEILING PLAN
SCALE: 1:50
2 E–2.0



DEMOLITION ELECTRICAL CEILING PLAN
SCALE: 1:50
1 E–2.0

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE–ISSUED FOR PERMIT	MAY 27, 2024
R0	ISSUED FOR PERMIT	MAY, 2024

GENERAL NOTES

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NORTH

MEMORIAL UNIVERSITY

Department of Facilities Management

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- Dedication plaque, Arts & Administration Building, St. John's Campus

PROJECT NAME:

QEII LIBRARY
LEVEL 2 WASHROOM RENOVATIONS
Project #: L-119-22

DRAWING TITLE:

ELECTRICAL CEILING PLAN

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. **L-119-22**	DRAWING No. **E-2.0**

PANEL L-LP-17

TYPE CIRCUIT BREAKER

RATING 120/208V, 3ø, 4W, 225A

PANEL SCHEDULE

CIRCUIT DESCRIPTION	BRKR. SIZE	CIRCUIT NO.		BRKR. SIZE	CIRCUIT DESCRIPTION
NOT IN SCOPE	20	1	2	15	NOT IN SCOPE
NOT IN SCOPE	15	3	4	15	NOT IN SCOPE
NOT IN SCOPE	15	5	6	15	NOT IN SCOPE
NOT IN SCOPE	15	7	8	15	NOT IN SCOPE
NOT IN SCOPE	15	9	10	15	NOT IN SCOPE
NOT IN SCOPE	15	11	12	15	NOT IN SCOPE
NOT IN SCOPE	15	13	14	15	NOT IN SCOPE
NOT IN SCOPE	15	15	16	15	NOT IN SCOPE
NOT IN SCOPE	15	17	18	15	NOT IN SCOPE
NOT IN SCOPE	15	19	20	15	NOT IN SCOPE
NOT IN SCOPE	15	21	22	15	NOT IN SCOPE
NOT IN SCOPE	15	23	24	15	NOT IN SCOPE
NOT IN SCOPE	15	25	26	15	NOT IN SCOPE
HAND DRYER MALE WASHROOM TO BE REMOVED	15	27	28	20	NOT IN SCOPE
HAND DRYER FEMALE WASHROOM TO BE REMOVED	15	29	30	30	NOT IN SCOPE
		31	32	15	HAND DRYER FEMALE WASHROOM TO BE REMOVED
		33	34	15	HAND DRYER MALE WASHROOM
		35	36	30	HAND DRYER MALE WASHROOM
		37	38		
		39	40		
		41	42		

CONNECTED LOAD:

DEMAND LOAD:

PANEL L-EMG-07

TYPE CIRCUIT BREAKER

RATING 120/208V, 3ø, 4W, 225A

PANEL SCHEDULE

CIRCUIT DESCRIPTION	BRKR. SIZE	CIRCUIT NO.		BRKR. SIZE	CIRCUIT DESCRIPTION
RECEPTACLE ON PILLAR	20	1	2	15	RECEPTACLE MONITOR MAKER SPACE
RECEPTACLE MAKER SPACE	15	3	4	15	3D PRINTER MAKER SPACE
RECEPTACLE MONITOR MAKER SPACE	15	5	6	15	RECEPTACLE MAKER SPACE
RECEPTACLE JIFFY POLE	15	7	8	15	RECEPTACLE PILLAR
XEROX	15	9	10	15	RECEPTACLE (L-3022)
WATER DRINKING FOUNTAIN	15	11	12	15	MICROFICHE
		13	14	15	RECEPTACLE MONITOR (L-2024)
		15	16		

CONNECTED LOAD:

DEMAND LOAD:

No.	REVISION	DATE
R2	ISSUED FOR TENDER	JUNE 7, 2024
R1	RE-ISSUED FOR PERMIT	MAY 27, 2024
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PROJECT NAME:

QEII LIBRARY
LEVEL 2 WASHROOM
RENOVATIONS
Project #: L-119-22

DRAWING TITLE:

EXISTING PANEL SCHEDULE

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. L-119-22	DRAWING No. E-3.0

PANEL L-LP-17

TYPE CIRCUIT BREAKER

RATING 120/208V, 3ø, 4W, 225A

PANEL SCHEDULE

	CIRCUIT DESCRIPTION	BRKR. SIZE	CIRCUIT NO.		BRKR. SIZE	CIRCUIT DESCRIPTION
	NOT IN SCOPE	20	1	2	15	NOT IN SCOPE
	NOT IN SCOPE	15	3	4	15	NOT IN SCOPE
	NOT IN SCOPE	15	5	6	15	NOT IN SCOPE
	NOT IN SCOPE	15	7	8	15	NOT IN SCOPE
	NOT IN SCOPE	15	9	10	15	NOT IN SCOPE
	NOT IN SCOPE	15	11	12	15	NOT IN SCOPE
	NOT IN SCOPE	15	13	14	15	NOT IN SCOPE
	NOT IN SCOPE	15	15	16	15	NOT IN SCOPE
	NOT IN SCOPE	15	17	18	15	NOT IN SCOPE
	NOT IN SCOPE	15	19	20	15	NOT IN SCOPE
	NOT IN SCOPE	15	21	22	15	NOT IN SCOPE
	NOT IN SCOPE	15	23	24	15	NOT IN SCOPE
	NOT IN SCOPE	15	25	26	15	NOT IN SCOPE
NEW	SPARE	15	27	28	20	NOT IN SCOPE
NEW	SPARE	15	29	30	30	NOT IN SCOPE
			31	32	15	SPARE NEW
			33	34	15	HAND DRYER MALE WASHROOM
			35	36	30	HAND DRYER MALE WASHROOM
			37	38		
			39	40		
			41	42		

CONNECTED LOAD:

DEMAND LOAD:

PANEL L-EMG-07

TYPE CIRCUIT BREAKER

RATING 120/208V, 3ø, 4W, 225A

PANEL SCHEDULE

	CIRCUIT DESCRIPTION	BRKR. SIZE	CIRCUIT NO.		BRKR. SIZE	CIRCUIT DESCRIPTION	
	RECEPTACLE ON PILLAR	20	1	2	15	RECEPTACLE MONITOR MAKER SPACE	
	RECEPTACLE MAKER SPACE	15	3	4	15	3D PRINTER MAKER SPACE	
	RECEPTACLE MONITOR MAKER SPACE	15	5	6	15	RECEPTACLE MAKER SPACE	
	RECEPTACLE JIFFY POLE	15	7	8	15	RECEPTACLE PILLAR	
	XEROX	15	9	10	15	RECEPTACLE (L-3022)	
	WATER DRINKING FOUNTAIN	15	11	12	15	MICROFICHE	
NEW	URINALS (L-2021)	15	13	14	15	RECEPTACLE MONITOR (L-2024)	
NEW	FAUCETS (L-2020,2021,2021A)	15	15	16	15	POWER DOOR OPERATOR (L-2021A)	NEW
NEW	ADULT CHANGE TABLE (L-2021A)	15	17	18			
			19	20			
			21	22			
			23	24			
			25	26			
			27	28			
			29	30			
			31	32			
			33	34			
			35	36			
			37	38			
			39	40			
			41	42			

CONNECTED LOAD:

DEMAND LOAD:

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PROJECT NAME:

QEII LIBRARY
LEVEL 2 WASHROOM
RENOVATIONS
Project #: L-119-22

DRAWING TITLE:

NEW PANEL SCHEDULE

REVIEWED:	DRAWN:
MF	WF
SCALE: AS SHOWN	DATE: MAY. 2024
MUN PROJECT No. L-119-22	DRAWING No. E-3.1