Waterloo Region District School Board

REQUEST FOR TENDER

Kitchener Waterloo Collegiate and Vocational School (KCI)

Health and Physical Education Renovation

PROJECT NO. 26-7857-RFT

ISSUE DATE: April 10, 2026

The Bidding System will receive ELECTRONIC SUBMISSIONS, no later than **2:00:00 p.m. local time, on April 30, 2026 ("Closing Date and Time")**

00 01 00 Consultant/Professional Seals 6
DIVISION 00 – BIDDING AND CONTRACT DOCUMENTS 7
00 21 13 - Instructions to Bidders 7
00 21 14– General Contractors, Subcontractors, Prequalified Rosters 20
00 21 15 – Scope of Work 22
00 31 34 – Subsurface Investigation Report 23
Appendix 00 31 34A – Soil Report 24
Appendix 00 41 13A – Asset and Warranty Card 25
00 56 13 – Definitions Stipulated Price 26
00 72 13 – Standard Terms and Condition 28
00 73 00 "The Supplementary Conditions" 66
DIVISION 01 - GENERAL REQUIREMENTS 124
01 14 00 – Work Restrictions 124
01 19 00 – Specifications and Documents 126
01 21 00 – Allowances 128
01 31 00 – Project Managing And Coordination 131
01 32 00 – Construction Progress Documentation 137
01 33 00 – Submittal Procedures 140
01 35 17 – Fire Safety Procedures 145
Appendix 013517-A Contractor Hot Work Permit 153
01 35 23 – Health And Safety 154
01 35 43 –Designated Substances 159
Appendix 01 35 43A Asbestos Audit Report 164
Appendix 01 35 34B– Lead Report 165
01 42 00 – References 166
01 45 00 – Quality Control 171
01 51 00 – Temporary Utilities 178
01 53 00 – Temporary Construction Facilities 183
01 54 00 – Materials and Equipment 189
01 61 00 – Product Requirements 192
01 70 00 – Examination and Preparation 197
01 73 30 – Execution and Cutting and Patching 200
01 74 00 – Cleaning and Waste Management 204
01 78 10 – Closeout Submittals and Requirements 208
01 78 40 – Maintenance Requirements 214
01 79 00 – Demonstration and Training 217

DIVISION 00 – BIDDING AND CONTRACT DOCUMENTS

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

00 31 00 Available Project Information

DIVISION 01 – GENERAL REQUIREMENTS

01 35 00 Delegated Design
01 35 16 Alteration Project Requirements
01 73 29 Cutting and Patching

DIVISION 02 – EXISTING CONDITIONS
02 41 20 Selective Interior Demolition

DIVISION 03 – CONCRETE
03 35 00 Concrete Finishing

DIVISION 04 – MASONRY
04 22 00 Concrete Unit Masonry

DIVISION 05 – METALS
05 50 00 Metal Fabrications

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES
06 10 00 Rough Carpentry
06 40 00 Architectural Woodwork

DIVISION 07 – THERMAL AND MOISTURE PROTECTION
07 21 19.19 Foam-In-Place Sealant
07 84 00 Firestopping and Smokeseals
07 92 00 Joint Sealants

DIVISION 08 – DOORS AND OPENINGS
08 03 14 Wood Door and Frame Restoration
08 11 13 Metal Doors and Frames
08 31 00 Access Doors and Panels
08 44 13 Glazed Aluminum Framing Systems
08 80 50 Glazing
08 87 53 Glazing Films

DIVISION 09 – FINISHES
09 05 13 Mechanical Preparation of Flooring Substrates
09 05 23 Common Work Results for Flooring Preparation
09 21 16 Gypsum Board Assemblies
09 30 13 Tiling
09 51 13 Acoustical Panel Ceilings
09 54 00 Wood Plank Ceilings
09 60 00 Finish Schedule
09 65 13 Resilient Base
09 65 66 Resilient Sports Flooring
09 66 13.10 Terrazzo Restoration
09 84 53 Sound Barrier Mullion Trim Cap
09 91 00 Painting

DIVISION 10 – SPECIALTIES
10 21 13.17 Phenolic Core Change Room Compartments
10 25 00 PVC Panels
10 28 10 Toilet and Bath Accessories
10 51 13 Metal Lockers

DIVISION 20 – MECHANICAL
20 05 05 Mechanical Work General Instructions
20 05 10 Basic Mechanical Materials and Methods
20 05 25 Mechanical Insulation
20 05 55 Testing, Adjusting, and Balancing

DIVISION 21 – FIRE SUPPRESSION
21 12 00 Fire Protection Systems

DIVISION 22 – PLUMBING
22 11 16 Domestic Water Piping and Valves
22 13 16 Drainage Waste and Vent Piping and Valves
22 13 18 Drainage and Vent Piping Specialties

DIVISION 23 – HEATING, VENTILATION AND AIR CONDITIONING (HVAC)
23 21 13 Hydronic Piping and Valves
23 31 05 Standard Ductwork
23 33 00 Duct System Dampers and Accessories
23 36 00 Air Terminal Units
23 37 13 Grilles and Diffusers
23 82 00 Radiation Units

DIVISION 26 – ELECTRICAL
26 05 00 Common Work Results for Electrical
26 05 02 Firestopping and Smoke Seal Systems
26 05 05 Demolition and Revision Work
26 05 19 Wire and Cable
26 05 33 Raceway and Boxes for Electrical
26 05 53 Identification for Electrical Systems
26 09 23 Lighting Controls
26 27 00 Low-Voltage Distribution Equipment
26 27 26 Wiring Devices
26 28 13 Fuses
26 28 16 Disconnect Switches
26 28 23 Contactors
26 29 00 Motor Starters

26 50 00 Lighting
26 52 13 Emergency and Exit Lighting
26 60 00 Miscellaneous Equipment and Appliances

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY
28 31 00 Fire Detection and Alarm (Alterations)

00 01 00 Consultant/Professional Seals

1.1 The following professional seals and signatures are provided as required by Paragraph 1.21.1 (4) Division C of the Ontario Building Code and apply to the areas of expertise for which each consultant was commissioned.

1.1.1 Architect



1.1.2 Structural



1.1.3 Mechanical



1.1.4 Electrical



END OF SECTION

DIVISION 00 – BIDDING AND CONTRACT DOCUMENTS

00 21 13 - Instructions to Bidders

1.1 Designated Representative

To contact the Waterloo Region District School Board ("WRDSB" or the "Board") or ask questions in relation to this Procurement, bidders must initiate communication electronically through the Bidding System. The WRDSB will not accept any communications by any other means, except as specifically stated in the Procurement. Bidders must not communicate in any manner with anyone other than the Designated Representative.

The WRDSB Designated Representative for this procurement process is:

Procurement Lead: Ardith Inapan, Buyer
Email: ardith_inapan@wrdsb.ca

1.2 Consultant

The WRDSB has hired the following consultant to assist in the preparation of this Procurement: WF Group Inc.

The Consultant and any subconsultants are not to respond to any questions or communicate with bidders and/or any interested parties from the bid issue date to the bid award notification.

The Consultant/WRDSBwill be responsible for the contract administration of the project after the purchase order has been issued or the contract has been signed by the WRDSB.

1.3 Contract Administration

The Consultant/WRDSB will be responsible for the contract administration of the project after the purchase order has been issued or the contract has been signed by the WRDSB.

1.4 Blackout Period

A blackout period shall exist between the deadline for questions and the date of award. During this period, there shall be no communication between the Bidders, the WRDSB, or any WRDSB consultants or employees, unless initiated by the Board's Designated Representative, noted above.

1.5 Doing Business with the Waterloo Region District School Board

Waterloo region District School Board (WRDSB) serves approximately 65,000 students in 123 schools, as well as alternative and continuing education sites. WRDSB is committed to creating learning environments that support the achievement and well-being of all students through partnering with staff, parents, families, caregivers, and communities to promote success in learning and life.

Bid opportunities above $10,001 CAD will be solicited through an electronic bidding system (bids&tenders) or the WRDSB may also utilize Supplier roster lists awarded through a competitive process, participate in cooperative procurements with various

public entities, or buying groups. These may include, but are not limited to, Ontario Education Collaborative Marketspace, Supply Ontario, and other Cooperative Group(s).

WRDSB competitive opportunities are posted on the Electronic Bidding System, bids&tenders/wrdsb.

The WRDSB only accept electronic Bid Submissions submitted through the Electronic Bidding System, bids&tenders/wrdsb

Bid opportunities may be posted as Public or by Invitation and are based on dollar thresholds outlined in Administration Procedure 4570 PROCUREMENT. Click here to access the WRDSB's Administrative Procedures, Section 4000 – Business Services.

1.6 Certificate of Recognition (COR) Certification (General Contractors)

i. All bidders must possess and maintain a valid Certificate of Recognition (COR) issued by a recognized certifying partner at the time of bid submission.
ii. Bidders shall provide proof of current COR Certification with their tender submission. Failure to provide acceptable documentation may render the bid non-compliant and subject to rejection.
iii. The WRDSB reserves the right to verify the validity and status of COR Certification at any time during the procurement process and throughout the term of the contract.
iv. If a bidder's COR Certification expires, is suspended, or is revoked during the contract period, the Board may, at its sole discretion, require immediate corrective action or terminate the contract without penalty

1.7 Communication and Question Protocol

Bidders and their representatives are NOT permitted to contact WRDSB Project Managers/Leads, agents of the WRDSB; any member of the WRDSB's governing body (such as Board of Trustees, or advisors); any employee, consultant, or agent of the WRDSB's Clients, other than the Designated Representative listed above. Any attempt by a Bidder to bypass or influence the procurement process may result in disqualification of the Bidder and the rejection of the Bidder's submission.

The WRDSB will not be responsible for any verbal statements, instructions, or representations. In case of difference between any verbal information and written document, the written document shall govern. Information obtained from any source, other than the Designated Representative, noted above in writing, shall not be relied upon.

The WRDSB shall not be bound by any verbal instruction or information provided by any WRDSB employee or consultant of the WRDSB. Only responses provided in an Addendum shall form part of this Procurement Document.

All requests for information, instructions, or clarifications shall be through the Bidding System by clicking on the "Submit a Question" button found within the bid detail of the specified Procurement. Addenda will be issued accordingly.

It is the responsibility of the Bidder to seek clarification of any matter that they consider unclear before submitting their application. The Board is not responsible for any misunderstanding of the Procurement documents on the part of the Bidder.

1.8 Anticipated Project Schedule

The following table represents the anticipated project timelines. This timeline is an estimate only and may be subject to change by the WRDSB at any time.

DESCRIPTION	DATE
Issue Date of Tender	Friday, April 10, 2026
Non-Mandatory Pre-Bid Site Examination	Date: Tuesday, April 14, 2026 Time: 14:45 pm local time School/Site: Kitchener Waterloo Collegiate and Vocational School (KCI) Address: 787 King St W, Kitchener, ON N2G 2G5 Meeting Area: Front Entrance
Deadline for Questions	Thursday, April 23, 2026
Closing Date and Time	**Thursday, April 30, 2026** **2:00:00 pm local time**
Anticipated Contract Start / Work begins	Monday, June 1, 2026
Substantial Completion Date	Thursday, August 27, 2026
Ready for Takeover	Tuesday, September 8, 2026
Deemed Complete Date	Friday, December 18, 2026

1.9 Site Pre-Bid Examination

Bidders are strongly encouraged to attend the non-mandatory pre-bid site meet and sign the attendance sheet. Date, time and location are provided above in the Anticipated Project Schedule. The WRDSB may not provide another opportunity to visit the site.

i. Bidders shall attend site meetings at their own risk and hold the WRDSB harmless for any issues or damage arising out of their attendance at the site meeting.
ii. The WRDSB will not consider any claims for additional payments during the execution of the Work for extra work or difficulties encountered resulting from conditions which were either visible or could be reasonably inferred from an examination of the Place of the Work and the available project information prior to the submission of Bids
iii. Absence from a non-mandatory site meeting will not disqualify any Bidder.
iv. Bidders are solely responsible for making their own assessment of the site.
v. Bidders are encouraged to bring their own measuring tape, camera, or other portable tools as required to the site meeting. Bidders are solely responsible for making their own assessment of the site.

1.10 Secondary Site Examinations

Bidders may request a secondary site examination visit through the Bidding System by clicking on the "Submit a Question" button found within the bid details page of that Procurement. Include the contact's name, phone number and email address of the person who will visit the site.

Bidders shall attend the secondary site examination visit at their own risk and hold the Board harmless for any issues or damage arising out of their attendance of the site meeting.

In the event the WRDSB holds a Mandatory Pre-Bid Site Examination meeting, Bidders not in attendance will not be provided an opportunity to a secondary stie examination visit.

Bidders must adhere to all communication protocols, as described above in 1.5. Communication Protocol.

The Owner will not consider any claims for additional payments during the execution of the Work for extra work or difficulties encountered resulting from conditions which were either visible or could be reasonably inferred from an examination of the Place of the Work and the available project information prior to the submission of Bids.

Bidders are encouraged to bring their own measuring tape, camera, or other portable tools as required to the site meeting. Bidders are solely responsible for making their own assessment of the site.

1.11 Examination of Bid Documents and Work and Submitting Questions

Bidders are required to fully acquaint themselves with the Procurement documents; fully inform themselves of all conditions, limitations and requirements involved in the Procurement; and obtain all information that may be necessary to complete those requirements before submitting a Bid.

Submission of a Bid shall be considered conclusive evidence that the Bidder has satisfied itself as to the requirements of this Procurement.

In the event a Bidder discovers any errors, discrepancies, inconsistencies, or omissions or requires clarification within this Procurement, they are to submit their observations and/or questions through bids&tenders by clicking on the "Submit a Question" button found within the bid detail of the specified Procurement by the Deadline for Questions specified in this paragraph.

Bidders are strongly encouraged to ask clear and concise questions(s) or statements citing the relevant section of the Procurement Document. The Board cannot guarantee a response to questions received by the Board after the Deadline for Questions.

The WRDSB has endeavored to provide complete, correct information and estimates to enable Bidders to accurately assess and determine the scope and complexity of the Work prior to submitting a Bid.

Bidders are solely responsible for determining if they require additional information or if anything appears incorrect or incomplete. The onus is on the Bidder to contact the Designated Representative prior to the Deadline for Responses indicated in this document, if they have any questions or queries whatsoever or find omissions from or discrepancies in this Procurement document, unnecessary restrictions in the terms of reference, or should they be in doubt as to the meaning of any part of this document.

Written responses or clarifications to issues of substance will be shared with all Bidders in the form of an Addendum.

1.12 Electronic Bid Submission Only / Electronic Bidding System

The Bidder must complete and submit their bid through the Bidding System only. All components of the submission and supporting documents must be in English only. Any other form of submittal will not be considered. It is the Bidder's responsibility to read the Procurement documents thoroughly including all attachments and addenda, if any, as these contain information that is highly pertinent to this Procurement and to clarify any details with the Designated Representative prior to their submission. To be considered, Bidders must respond to this Procurement.

To submit a bid, bidders must be registered with bids&tenders. The sole onus is on the bidder to have the most current correct information set-up in bids&tenders e.g. plan taker contact information, categories, and agency etc.

All Bids shall be submitted through bids&tenders only. The onus is on the Bidder to ensure all requirements of this Procurement are submitted.

If a bidder encounters technical issues, the onus is on the bidder to have this resolved prior to the closing date and time by contacting support@bidsandtenders.ca

Bidder shall have a "Vendor account" in the Bidding System and shall ensure the account is created with the Bidders full legal company name and be registered as a "plan taker" for this Procurement. Only the plan takers will have access to download bid documents, receive addenda email notifications, download addenda, and submit their bid electronically through the Bidding System.

The onus is on the Bidder to ensure that the Bid is received in the Bidding System on or before Closing Time. The Closing Time shall be determined by the Bidding System's web clock. The timing of the Bid submission shall be based on when the Bidding System receives the Bid, not when a Bidder submits a Bid.

Bidders shall allow sufficient time to upload their Bid submission including all requirements as stated in this Procurement and to resolve any issues that may arise as Bid transmission can be delayed in an "internet traffic jam" due to file transfer size, transmission speed, and other electronic considerations

All prices including provisional pricing, if requested, shall be submitted in the Schedule of Prices forms available through the Bidding System.

The Owner reserves the right to accept or reject any or all provisional bid prices submitted. Failure to submit provisional prices where required may result in the Bid being declared non-compliant.

Bids submitted by fax or paper copy, or any other format will not be accepted.

The Bidding System will not accept Bids after the Closing Time as determined by the Bidding System's web clock.

The WRDSB hereby consents to the use of an Electronic Signature for the signing of all documents requested hereunder. Acceptable forms of signatures include, but are not limited to, the typing of the Bidder's authorized signing officer's name or the inclusion of an image of the Bidder's authorized signing officer's signature, so long as the electronic signature is sufficient to identify the Bidder's authorized signing officer. The Bidder's authorized signing officer agrees that whatever form of electronic signature is provided constitutes a signature for the purpose of executing all documents requested hereunder.

Upon submitting a Bid, the Bidding System will send a confirmation email to the Bidder advising that the Bid was submitted successfully. If a Bidder does not receive a confirmation email despite submitting a Bid, the Bidder should contact technical support of the service provider hosting the Bidding System via email: support@bidsandtenders.ca

There will be no public opening for this Bid.

If a Bid is a joint submission of two (2) or more firms, a single Bid is to be coordinated and submitted by the lead Bidder with the required information. If two or more parties submitted a joint response to this Procurement, they shall decide between them who is to be the Bidder, without any involvement of the WRDSB.

Your online Bid submission shall be taken as your statement that you understand the requirements and agree to comply with the requirements as well as terms and conditions stated in this Procurement document, including WRDSB's Standard Terms and Conditions. Your Bid submission through the Bidding System confirms that you have checked and confirmed your pricing and by submitting the Bid online, you agree that you have not omitted any items from your Bid.

For construction projects with Bids above $200,000 the Successful Bidder will be required to execute a "Canadian Standard Form of Construction Contract to a Stipulated Sum" (CCDC 2 - 2020 including amendments thereto as set out in this Procurement.

1.13 Bid Prices

The amounts stipulated on the Schedule of Prices are intended to cover the cost of the complete Work as described in this Procurement Document.

All prices shall be in Canadian Funds, Free On Board (FOB) Destination, Freight Prepaid (WRDSB sites/locations).

Exclusive of the HST, or other similar taxes.

Unit pricing shall be exclusive of Harmonized Sales Tax (HST) but shall include all applicable costs including but not limited to overhead, material, labour, travel, fuel, fuel surcharge, equipment, disbursements, expenses, customs, charges, freight, shipping and handling costs, and all other charges of every kind attributable to the services, equipment or goods provided.

The person submitting the Bid on behalf of the Bidder must have authority to bind the Bidder.

Quantities may be estimated and subject to change, and therefore the WRDSB, at its discretion, may purchase more or less of the commodity based on the unit price bid.

All information required on the forms shall be completed in full including references and subcontractors that it proposes to use for Work described. Changes made to the list of subcontractors after the closing of the Bid must have prior written approval of the WRDSB's Project Representative.

All price(s) submitted shall be a reasonable price for each item as determined by the WRDSB and under no condition will an unbalanced Bid be considered. Submissions containing prices which appear to be so unbalanced as to likely affect the interests of the WRDSB adversely will be clarified and may be rejected.

Unit prices and/or optional pricing, if any will set the foundation for any approved increases or decreases in Work. The unit prices must remain fixed and firm for the term of the Contract, unless otherwise specified in this Procurement document.

Provisional or Optional Pricing may or may not be required for completion of the Work called for under the Contract. The WRDSB will decide necessity of these items and quantities thereon based on the unit prices(s) included in their Bid. If Provisional or Optional items are not purchased, or quantities are less than estimated, no adjustment or compensation will be awarded to the Bidder by the WRDSB. Optional pricing is not used for comparison of Bids for award purposes.

1.12.1 Bonding: for awards over $200,000.00 unless otherwise instructed is required – Refer to Standard Terms and Conditions, Clause #4 Bonding Requirements.

1.14 References

1.14.1 Through bids&tenders, Bidders must complete the Reference form in its entirety by providing three (3) references.

1.14.2 References must be for Work completed within the last five (5) years.

1.14.3 One (1) reference must be from the WRDSB, if you have done previous work, otherwise at least one (1) reference must be of a government entity of comparable size, scope, and complexity.

1.14.4 References for residential, domestic work or unrelated work are not defined as similar scope, size nor complexity and are not acceptable.

1.14.5 Bidders cannot use references that pertain to another Supplier or Contractors' work.

1.14.6 The WRDSB reserves the right to contact customers using any of the following but not limited to references form, reference letters, customers other than those provided by any Bidder, and CCDC-11 Contractor's Qualification Statement to verify information provided and assess overall client experience.

1.14.7 Bidders should ensure that their references are prepared to provide a response if contacted by the WRDSB. If the WRDSB is unable to obtain satisfactory references, or if the reference(s) do not respond after WRDSB's best efforts, or if the reference(s) choose not to comment, the reference(s) will be deemed unsatisfactory, and the WRDSB may ask the Bidder for additional references.

1.14.8 Unsatisfactory references may result in the Bidder's submission being rejected.

1.14.9 The WRDSB, in its sole discretion, may confirm the Bidder's experience and/or ability to provide the Services required after checking references, and the provision of the references by the Supplier is deemed to be consent to such confirmation/contact with the references.

1.15 Addenda

All Addenda issued through the Bidding System shall form part of the Procurement Document.

The WRDSB shall not be bound by any verbal instruction or information provided by any WRDSB employee or consultant of the WRDSB. Only responses provided in an Addendum shall form part of this Procurement Document.

Prior to bid closing any discrepancies, omissions, questions, or clarifications regarding the procurement documents must be sent immediately through the Bidding System by clicking on the "Submit a Question" button found within the bid details page of that opportunity.no later than the deadline noted in the Anticipated Project Schedule. Those that are deemed pertinent to the Procurement Document will be addressed in the form

of an Addendum.

It is understood and acknowledged that while the Procurement document includes specific requirements, a complete review and recommendation is required. Minor items or details not herein specified but obviously required for the Work shall be provided as if specified in conformance with modern practices. Any omissions or errors or misrepresentation of these requirements and specifications within the Procurement document shall not relieve the Bidder of the responsibility of providing the services or products as aforesaid.

Bidders shall acknowledge the receipt of all Addenda in the Bidding System prior to the submission of a Bid. Where Addenda has been issued, the system will not allow the Bidder to submit a Bid prior to acknowledging said Addenda.

Where an Addendum is issued after a Bid has been submitted, the Bidding System will automatically withdraw the submitted Bid. The Bid status will change to incomplete and will not be accepted by the WRDSB as a submitted Bid. It is the responsibility of the Bidder to make any required adjustments to their submission, acknowledge all Addenda and ensure the Bid has been received by the Bidding System. Bidders should check the Bidding System for Addenda up until the Bid Closing Date and Time.

Addenda cannot be acknowledged after the Closing Date and Time.

1.16 Edit and Withdrawal of Bid Submission

A Bidder who has submitted a bid may edit or withdraw its bid at any point up to the Closing Date and Time.

Any edits to a bid submission will cause the submission to automatically be withdrawn. The bid submission must be re-submitted to be accepted.

The Bidder is solely responsible for ensuring that its re-submission is received prior to Closing Date and Time. The closing time shall be determined by the web clock within the Bidding System. After such time, requests to withdraw Bid will not be considered.

1.17 Irrevocable Period

Bids will be irrevocable by the Bidder, and open for acceptance by the WRDSB, for **60 (sixty) days** following the Closing Date.

1.18 Tie Bids

Where two (2) or more Bids have been received reflecting the same, lowest Bid price, the time stamp for date and time submission in the Bidding System will dictate the award (earliest submission shall prevail).

1.19 Bid Irregularities

Bids with one or more of the following may be declared informal and/or disqualified and/or non-compliant:

i. Bids that do not comply strictly with all terms and conditions of the Procurement Document.

ii. Bids that are incomplete, conditional, qualified, or obscure.

iii. Bids that are based upon an unreasonable period for completion of the Work.

iv. Bids received from Bidders involved in Claims with either of the WRDSB or banned or on probation with the WRDSB.

v. Bids received from any Bidder deemed to be unskilled or inexperienced in the work contemplated, or those who have defaulted on, or failed to satisfactorily complete other similar work in the past.

vi. Bids submitted by Bidders that are not prequalified, where applicable.

1.20 Bid Review

i. All Bids received on or before the Closing Time will be reviewed for compliance based on this Procurement document. Non-compliant Bids will be rejected. Bids not meeting any of the mandatory requirements included in this Procurement document will be disqualified. Bidders may be contacted to clarify their submissions.

ii. Should there be any error in extensions, additions or computations, the WRDSB shall be entitled to correct such errors based upon the unit prices supplied, and the corrected total shall be considered as representing the intention of the Bidder and shall be used as the basis for comparison of Bids.

iii. It is the Bidder's responsibility to satisfy the WRDSB that they can comply with the requirements contained within this Procurement document and that they possess the necessary inventory, equipment, facilities, resources, and staff to perform the work specified in this Procurement document. Bidders may be required to submit evidence of above in a form acceptable to the WRDSB. Substitution of materials, equipment, or methods different from those outlined in the terms of reference will not be accepted unless provided for within this Procurement document or with the written approval of the WRDSB.

iv. The WRDSB also reserves the right to examine Bidder's facilities, equipment and visit the subcontractors or subconsultants proposed and/or Bidder's existing and past clients. The award decision may be revised based on the above.

v. The WRDSB will not be responsible for travel costs if travel is required. No additional charges will be accepted by the WRDSB for any cost incurred by the Bidder or any other party in participating in the Bid evaluations.

vi. The WRDSB may, in its sole discretion, check references, conduct credit checks, review the litigation history and history of professional liability or other insurance claims, and obtain any other type of information that might aid the WRDSB in its selection. The WRDSB reserves the right to consider all, or any information received from all available sources, whether internally or externally obtained. The WRDSB

may disqualify any Bid from further consideration based on results of reference or credit checks or review of litigation or claim history. The foregoing may include the WRDSB's own experiences with the respective Bidder(s) or any of the subcontractors and subconsultants proposed in their Bid.

1.21 Intent to Award

Bidders are advised not to make any business decisions, assignments, or any sub-contract for the execution of the Work, before receiving a Purchase Order from the WRDSB.

There shall be no obligation on the WRDSB because of seeking Bids or conducting the procurement process and the WRDSB reserves the right to pursue other Bidders, cancel the Procurement, issue a revised request, or to pursue any other course of action which would aid in meeting their needs.

If instructed, within **twenty-four (24) hours**, excluding hours occurring during a Saturday, Sunday, or a legal holiday, from the issuance date an intent to award from the WRDSB, the Bidder (the "Recommended Bidder") shall provide a list of all subcontractors/subconsultants that it proposes to use for all Work described in this Procurement including the Company Name, Subtrade Category and if applicable, related Divisions.

1.21.1 Within **seven (7) calendar days**, from the issuance date of an intent to award notice or requested by the WRDSB, the Bidder (the "Recommended Bidder") shall provide the following mandatory requirements:

i. Insurance certificate with coverage specified in the Procurement Document.
ii. WSIB clearance certificate valid on the date of award or an exemption letter (if applicable and requested).
iii. Non-Disclosure Agreement (NDA) duly signed by the authorized signatory (to be renewed annually). The WRDSB will provide this form.
iv. Bonding Requirements, if applicable, as specified in the Procurement Document.
v. An executed WRDSB issued Form of Agreement, if applicable, and duly signed by the authorized signatory.
vi. Any other submittal specified in the Procurement Document or in the intent to award, as a requirement of award.
vii. For construction projects above $200,000 the Successful Bidder will be required to execute a "Canadian Standard Form of Construction Contract to a Stipulated Sum" (CCDC 2 – 2020) including amendments thereto as set out in this Procurement.

1.21.2 The documents listed below will be incorporated as deemed necessary by the WRDSB, into the Contract with the Bidder. If there is a discrepancy between the wording of one document and the wording of any other document that appears

on the list, the wording of the document that first appears on the list shall take precedence:

i. WRDSB approved change order(s) or Contract / Agreement / CCDC 2 - 2020 amendment(s)
ii. Purchase Order(s), Contract(s) Agreement(s) / CCDC 2 -2020 executed with the Bidder including exhibits
iii. Procurement document issued by the WRDSB, including addenda, if applicable
iv. Bid submitted by the Bidder

1.22 Post- Closing/Pre-Award Meeting

The WRDSB may request a meeting with Bidders after the bid closing dates.

1.23 Award

Unless otherwise stated, the contract will be awarded to the lowest compliant bidder on the base bid, who meets the requirements, the scope of work outlined in this Procurement, and satisfactory references and experience. The WRDSB reserves the right to decrease quantities and/or the Scope of Work or not award this Project, due to insufficient budget.

1.24 Post-Award Meeting (Kick off Meeting)

A post-award meeting may be held consisting of the successful Contractor, and their key personnel assigned to the contract, the WRDSB's Project Manager/Lead and if applicable the Consultant, to discuss the program and exchange information before the contract commences. This meeting will be at the sole expense of the Bidder and shall be considered part of the contract. If applicable, the meeting date will be scheduled after the Award.

1.25 Post Award

In addition to all the WRDSB's other remedies, if a recommended Bidder fails to satisfy the requirements and/or execute the Form of Agreement or any other applicable conditions within seven (7) calendar days of notice of selection, the WRDSB may, in their sole and absolute discretion and without incurring any liability, rescind the selection of that Bidder.

The Bidder may protest within the five (5) day Notice of Intent to Award, after that, the protest will not be reviewed or accepted.

1.26 Award Posting Notification

For procurements valued at $121,200 or more, and in accordance with the Broader Public Sector Procurement Directive, once the WRDSB is satisfied that all requirements are met, the project award notification will be posted in the same manner as the procurement documents were posted. The notification will be posted after the purchase order and/or

agreement between the successful bidder and the WRDSB has been issued/executed. The award notification will list the name of the successful bidder, agreement start and end dates, and any extension options.

END OF SECTION

00 21 14– General Contractors, Subcontractors, Prequalified Rosters

1.1 General Contractors

1.1.1 Only invited prequalified General Contractors, by award through a competitive prequalification process, 7430-RFPQ, may submit a bid for this opportunity.

1.1.2 Invitations are based on awarded Project Size Categories. Only approved GCs (on the Roster) may bid on the project size categories based on their award.

1.1.3 A Site Supervisor and Project Manager, assigned to manage and supervise the Work, must be named in the Bidder's Contact Information Specification section through the electronic Bidding System only and include resumes. Personnel will be subject to approval by the WRDSB and cannot be changed without prior written approval from the WRDSB.

1.1.4 Refer to COR Certification Requirements, Clause 1.5.

1.2 Subcontractors/Subconsultants

1.2.1 Refer to specifications for products and suppliers that will be required.

1.2.2 The subcontractor/subconsultant list is not required at time of bid submission.

1.2.3 The subcontractor/subconsultant list is mandatory after the bid closing date from the Recommended Bidder within twenty-four (24) hours of receiving a request or intent to award from the WRDSB.

1.2.4 In the event the WRDSB has a Prequalified Roster List for a Trade Category required for this project, the General Contractors will select from the list below in *3.0 WRDSB Prequalified Roster Lists*. General Contractor's subcontracting other than the companies listed below or identified by Addendum will have their Bid ruled informal.

1.2.5 The Bidder (the "Recommended Bidder") shall provide a list of subcontractor/subconsultant that it proposes to use for all Work described in this Procurement including the specification sections, as per the following:

i. Bidders shall select experienced and qualified subcontractor/subconsultant or Suppliers in their field to perform or supply an item of Work indicated in this Procurement.

ii. The Bidder shall be fully aware of the capability of each subcontractor/subconsultant and/or Supplier included in its bid, including but not limited to technical ability, financial stability, and ability to maintain the proposed construction schedule.

iii. The WRDSB reserves the right to reject any proposed subcontractor/subconsultant or supplier, based on the following but not limited to unsatisfactory past performance, suspended/removed from doing business with the WRDSB and/or outstanding/unresolved corrective action notice issued by the Owner to the subcontractor/subconsultant within the last three (3) years.

iv. The WRDSB reserves the right to obtain information from the Bidder and from third parties respecting the qualifications and experience of the Bidder's nominated list of subcontractor/subconsultant for such item of the Work.

v. The WRDSB reserves the right to examine Bidder's facilities, equipment and visit the subcontractor/subconsultant's proposed.

vi. The substitution of any subcontractor/subconsultant and/or suppliers after the list is submitted will not be accepted unless a valid reason is given in writing to and approved by the Owner, whose approval may be arbitrarily withheld.

vii. Where a bidder lists "own forces" in place of a subcontractor/subconsultant, the bidder shall conduct such item of the Work with its own forces.

viii. Where "own forces" have been listed by a bidder, the WRDSB reserves the right to obtain information from the bidder and from third parties respecting the qualifications and experience of the bidder's "own forces" for such item of the Work.

1.3 WRDSB Prequalified Roster Lists – Not Applicable

END OF SECTION

00 21 15 – Scope of Work – Not applicable

END OF SECTION

00 31 34 – Subsurface Investigation Report – Not Applicable

END OF SECTION

Appendix 00 31 34A – Soil Report – Not Applicable

Appendix 00 41 13A – Asset and Warranty Card

WRDSB PROJECT ASSET & WARRANTY CARD

Instructions:

a. The WRDSB Project Asset & Warranty Card shall be filled out and completed for any project or work that calls for the replacement or new installation of any asset that has a warranty and requires ongoing preventative maintenance, as well any asset that is being removed.

b. The information for the WRDSB Project Asset & Warranty Card shall be collected and coordinated by the General Contractor responsible for the overall project. The WRDSB Project Asset & Warranty Card shall be filled out and submitted to the Board electronically to FAC_maintenance@wrdsb.ca and carbon copy the project coordinator at the point in time where the project is deemed "Substantially Complete" or at the start of the Warranty Period for said asset. For any project without a General Contractor, the Contractor or Trade responsible for the installation and/or removal of the asset shall complete the WRDSB Project Asset & Warranty Card and submit it to the Board in the same manner as mentioned above.

c. All items shall include the asset identifier, asset description, location, manufacturer, model, serial number, and warranty end date (refer to example at bottom of page).

d. NO Warranty Period shall start without the written permission of the Board prior to the point of Substantial Completion of the project.

e. The Contractor that is responsible for the coordination and completion of the WRDSB Project Asset & Warranty Card shall ensure that the contractor or trade responsible for the installation of the item understands that the contractor or trade is responsible for the preventative and general maintenance of that item for the minimum 2 year warranty period as noted on the WRDSB Project Asset & Warranty Card.

f. All items installed under this contract that require ongoing preventative maintenance (PM) shall be included on the WRDSB Project Asset & Warranty Card. The following list contains examples to be included but not limited to;

Air Compressor	Chiller	Grease Trap
Air Handler- ERV, Heat Pump, RTU	Cooling Tower	Gym Equipment
AC Split -Indoor/Outdoor Unit	Elevator/Lift	Hoods- Kitchen/Fume
Automatic Doors	Eyewash Station-location only	Operable Partitions
Backflow Preventer	Fire Panel	Sprinkler System -area covered
Boiler		Tech Equipment

g. All maintenance during the warranty period shall be the responsibility of the contractor. This shall include, but not be limited to; air handling unit filter changes (3x min.per year), or as per manufacturers recommendations; servicing testable backflow preventors, including fees; and any and all required maintenance.

Sample:

To be filled out by Consultant				*To be filled out by Contractor*				
IDENTIFIER	ASSET	LOCATION (incl. Rm. No.)	REMOVED (R), OR *NEW (N)*	CONTRACTOR	MANUFACTURER	MODEL	SERIAL NUMBER	WARRANTY END DATE
Boiler 2	*Condensing Boiler*	*Boiler Rm. B005*	*R*	*Bob's Mechanical*	*Viessman*	*Vitocrossal 300 CA3B*	*1234x5678y90*	*Jan. 1, 2025*
HVAC 7	*New RTU*	*Roof D*	*N*	*Bob's Mechanical*	*Daiken*	*DPS020A*	*ABCD1EFGH2IJ*	*Jan. 1, 2025*
n/a	*Gym Partition*	*Gyms 122/123*	*R*	*Extreme Partitions*	*Hufcor*	*933EC*	*n/a*	*Jun. 30, 2028*

WRDSB Project Asset & Warranty Card

Project Name: _____

School / Location: _____

Date: _____

To be filled out by Consultant				*To be filled out by Contractor*				
IDENTIFIER	ASSET	LOCATION (include Room No.)	ASSET REMOVED (R) OR NEW (N)	CONTRACTOR	MANUFACTURER	MODEL	SERIAL NUMBER	WARRANTY END DATE

00 56 13 – Definitions Stipulated Price

1.1. Definitions Declaration

.1 CCDC 2-2020 Edition, Stipulated Price Contract as may be amended, forms the basis of Definitions between the Owner and Contractor.

.2 These Definitions are bound to the CCDC 2 Definitions and CCDC 2 General Conditions.

1.2. Supplementary Words and Terms to CCDC 2-2020

.1 The following words and terms are additional to the CCDC 2 Definitions.

.2 Addendum: A document that amends the Bid Documents during the Bidding Period and becomes part of the Contract Documents when a Contract is executed. (Plural: Addenda).

.3 Agreement: The signed and sealed legal instrument binding parties in a Contract, describing in strict terms their mutual arrangement, roles and responsibilities, commencement, and completion responsibilities.

.4 Alternative Price: The amount stipulated by a Bidder for an Alternative and stated as an addition, a deduction, or no change to the Bid Price.

.5 Authorities: Those having jurisdiction under law over Work or Parts thereof.

.6 Bid: To offer as a Bid stating for what price a Contractor will assume a Contract.

.7 Bid Documents: A set of documents consisting of the Instructions to Bidders, Bid Form, Contract Documents, and other information issued for the benefit of Bidders to prepare and submit a Bid.

.8 Bid Form: The specific and detailed form used to collect information about a Bid.

.9 Bidding: The process of preparing and submitting a Bid.

.10 Construction Documents: The Drawings and Project Manual. When combined with a Contract and Contract conditions, these documents form the Contract Documents.

.11 Contingency Allowance: An additional monetary amount added to a Project cost estimate and designated to cover unpredictable or unforeseen items of Work. The amount is usually based on some percentage of the estimated cost and expended and adjusted by Change Order. It is not intended to cover additions to the scope of Work.

.12 General Conditions: That part of the Contract Documents which sets forth many of the rights, responsibilities and relationships of the parties involved in a Contract.

.13 Exposed: Visible at completion of Work, in usable areas as well as interior of closets, cabinets, drawers, storage and service rooms, stairwells and exterior surfaces.

.14 Instructions To Bidders: Instructions contained in the Bid Documents to convey an Owner's expectations and criteria associated with submitting a Bid.

.15 Ready for Takeover: *Ready-for-Takeover* shall have been attained when the conditions set out in GC12.1, SC 55.1, 12.1.1

.16 Section: A portion of a Project Specification covering one or more segments of the total Work or requirements. Sections are included in a Project manual as required to meet Project requirements.

.17 Standard: A document describing a grade or a level of quality, which has been established by a recognized agency or organization, utilizing an internal voting process.

.18 Separate Price: A separate price for work to be added to the base price if selected by the Owner. This price type is not a part of the base bid price.

.19 Stipulated Price: An amount set forth in a Stipulated Price Contract as the total payment for the performance of the Work. Sometimes referred to as a stipulated sum or a lump sum stipulated price.

.20 Tender: Refer to definition of Bid.

.21 Unit Price: The amount payable for a single unit of Work as stated in a Schedule of Prices.

.22 Install: To remove from site storage, move or transport to intended location, install in position, connect to utilities, repair site caused damage, and make ready for use.

.23 Supply: To acquire or purchase, ship or transport to the site, unload, remove packaging to permit inspection for damage, re-package, replace damaged items, and safely store on-site.

.24 Provide: To Supply and Install

.25 Wherever words 'approved', 'selected', 'satisfactory', 'directed', 'permitted', 'inspected', 'instructed', 'required', 'submit', 'ordered', 'reviewed', 'reported to', or similar words or phrases are used in Contract Documents, it shall be understood, unless context provides otherwise, that words 'by Consultant' or 'to Consultants' follow.

.26 Words 'by others' when used in Specifications or on Drawings shall not mean by someone other than Contractor. Only means by which something shown or specified shall be indicated as not being in Contract is by initials 'NIC' or words 'not in Contract', 'by Owner', or 'by Other Contractor'.

END OF SECTION

00 72 13 – WRDSB Standard Terms and Condition

1. Applicable Terms and Conditions

None of the standard or other terms, conditions, or policies of the Bidder, whether published or otherwise shall be of any effect unless accepted by the WRDSB in writing. This includes, without limitations, terms in publications, website, sales invoice, delivery document as well as those commonly applied by the Bidder. WRDSB's acceptance of goods, equipment or service, acknowledgement thereon or paying invoices shall not imply acceptance of such terms, conditions, or provisions.

2. Bankruptcy

If, during the term of the Contract, the Supplier makes an assignment for the benefit of creditors, or becomes bankrupt or insolvent, or makes a proposal to its creditors, the Contract with the Supplier shall immediately be terminated, and the WRDSB shall be entitled to enter into an agreement with another party without the consent of the Supplier.

3. Basis of Award (Price factor)

Bidders shall be deemed to have included all costs related to the Work in the Total Price as provided in their Bid, except for items clearly identified as provisional in the Procurement document. In no case shall the invoicing for the entire Work performed exceed the Total Price unless additional Work is ordered by the WRDSB in writing. The unit prices as well as provisional pricing shall be used to invoice the additional or provisional work, as required by the WRDSB. For the purpose of award, the Total Price will be considered as representing the intention of the Bidders and will be used as the basis for comparison of Bids for the price factor.

4. Bonding Requirements

Bonding is only required if the project is equal to or greater than $200,000.00.

Note: The Bidding System has flagged these fields as mandatory. If your bid is less than $200,000.00, you may upload a pdf document stating: Not Applicable.

i. Bid Amount

Bonding requirements are based on the total base bid amount INCLUSIVE of ALL applicable taxes.

ii. Bid Deposit Bond & Agreement to Bond

Bid submissions must be accompanied by a bid deposit in the form of a digital Bid Bond in an electronically verifiable and enforceable (e-Bond) format in the amount of 10% of the total base bid (inclusive of HST) made payable to the Waterloo Region District School Board as surety that, if the Bid is accepted, a Contract will be entered into for the proper performance of the work. For more information, contact your surety company or visit the Surety Association of Canada website.

Bid Submissions must be accompanied by an Agreement to Bond in the form of a digital Bond in an electronically verifiable and enforceable (e-Bond), completed and executed by the Bidder's Surety, assuring the successful Supplier shall provide for a Performance Bond for 50% of the total Contract Price, and a Labour and Material Payment Bond for 50% of the total Contract Price.

Bidders shall upload their digital Bid Deposit Bond and Agreement to Bond separately to the Bidding System, in the bid submission files labeled "Bid Deposit Bond" & "Agreement to Bond". If both Bonds are within one (1) document, upload it in both files. All instructions and details for accessing authentication shall be included with the digital Bonds uploaded in the Bidding System. Do not include and/or upload Performance Bond and Labour and Materials Bond in this section.

Bids that do not contain the bid deposit(s) in the required amount will be declared non-compliant and will be rejected. A scanned PDF copy of bonds or original certified cheque, bank draft, money order, etc. are not acceptable as Bid deposit and will result in your Bid being rejected.

The bid deposit of the Bidder whose submission is accepted shall be forfeited by the Bidder should the Bidder fail to execute a Contract or provide the necessary documents as required within this Procurement document (including but not necessarily limited to: signed agreement, satisfactory security, insurance certificate, appropriate Workplace Safety and Insurance Board letter of clearance certificate) within the time stipulated as a written notice from the WRDSB.

For bid amounts where Bonding is not requested, the Awarded Bidder agrees to pay to the WRDSB the difference in costs between the bid submitted and the final contract should the Awarded Bidder fail to either execute or deliver the contract documents in accordance with the Procurement within seven (7) calendar days of written notification of the award of the contract.

iii. Performance and Labour & Materials Bonds

For bid amounts where bonding is required, inclusive of all taxes, the Supplier shall provide a digital Bid Performance and Labour and Materials Bond in an electronically verifiable and enforceable (e-Bond) format in the amount(s) of not less than 50% Performance Bond and a 50% Labour and Materials Bond of the total Contract Price made payable to the Waterloo Region District School Board as surety that, if the Bid is accepted, a Contract will be entered into for the proper performance of the work and extends protection to Subcontractors, Suppliers, and any other persons supplying labour or materials to the Project. For more information, contact your surety company or visit the Surety Association of Canada website.

If the Supplier fails to provide a performance bond and/or labour and materials bond when requested, the WRDSB may declare the bid deposit forfeited, and the Bidder will be held responsible for any increased costs or damages incurred by the WRDSB. Any Bidder who fails to provide all required documents within the timelines provided or otherwise fails to enter into an agreement with the WRDSB upon notice of being the Supplier may be subject to future bidding constraints by the WRDSB.

Performance bond shall guarantee all conditions as set out in the contract, including proper execution of the work and for all matters for which the Supplier is responsible for throughout the two (2) year period of maintenance and warranty.

Any costs associated with performance bond are the responsibility and cost of the Bidder.

Bonds must be submitted through the Bidding System within seven (7) calendar days of receiving the Intent to Award.

5. Business Code of Conduct for Board Employees

The WRDSB will not knowingly purchase goods and/or services from Suppliers who operate in contravention of local and international laws. If a product and/or service supplied to the WRDSB is discovered to be in contravention, the WRDSB reserves the right to rectify the issue with the Supplier, including the cancellation of the contract.

The WRDSB expects that all employees and Suppliers act within the parameters of the in Administration Procedure 4360 PRINCIPLES OF BUSINESS CONDUCT FOR BOARD EMPLOYEES. Click here to access the WRDSB's Administrative Procedures, Section 4000 – Business Services.

6. Code of Conduct for Suppliers

These Guidelines cover any contractor, supplier, consultant, business, firm, company or individual doing work, providing a service or delivering goods on any Waterloo Region District School Board property, as well as the Supplier's employees, subcontractors, agents, consultants, and others on site in connection with the Supplier's work or at the Supplier's express or implied invitation.

i. Courtesy and Respect: all Suppliers and their employees must conduct themselves in a manner that is lawful, courteous, respectful, businesslike, and free of bias to the WRDSB, its officer, employees, students, guests, or visitors.
ii. Language and Behavior: Suppliers and their employees cannot engage in behavior that is rude, threatening, or offensive. Use of profane or insulting language is prohibited. Harassment of any type, including sexual harassment is strictly

prohibited. Abusive, derogatory, obscene or improper language, gestures, remarks, whistling, cat calls or other disrespectful behavior cannot be tolerated. Rough housing, fighting, fisticuffs, physical threats, destruction of property, vandalism, littering, or physical abuse of anyone on WRDSB property are not permitted under any circumstance.

iii. No Weapons, Alcohol, or Drugs: The use, possession, distribution, or sale of any weapon, alcohol, illegal drug, or controlled dangerous substance by any Supplier or Supplier's employee is prohibited. Offenders will be removed from WRDSB property and/or reported to the local Police Department.

iv. Smoking: Suppliers and their employees are not permitted to smoke on WRDSB property, in or near any buildings.

v. Fraternization: Suppliers and their employees may not fraternize or socialize with WRDSB students or employees.

vi. Appearance: Suppliers and their employees, where applicable, are required to wear appropriate Personal Protective Equipment (PPE), work wear, hard hats and safety footwear high-visibility clothing, while on WRDSB property. Articles of clothing must be neat and tidy in appearance, and cannot display offensive or inappropriate language, symbols, or graphics. WRDSB has the right to decide if such clothing is inappropriate.

vii. Identification: contracted suppliers and their employees are required to wear branded attire of the company they work for when on WRDSB property.

viii. Vehicles and Driving on WRDSB Property: Vehicles must clearly indicate the Supplier's company name, identifier number and telephone number. It must be readable from 8 meters (25 feet) away. Vehicles including movable Equipment/Machinery must not enter, leave or drive on WRDSB premises during nutritional breaks, before and after school hours, or anytime there are students or staff outside of the building.

ix. Reporting: The Supplier is required to report any matter involving a violation of these rules of conduct, any matter involving health or safety, including any altercations, to WRDSB Facilities staff.

The Supplier is responsible for its employees, agents, consultants and guests. If prohibited conduct does occur, the Supplier will take all necessary steps to stop and prevent any future occurrence. Any breach of these conditions will result in the removal of the person responsible from the school premises and prohibited actions could result in the termination of any contract or agreement with WRDSB.

7. Compliance with Laws, Acts and Regulations

Suppliers shall abide by all applicable municipal, provincial and federal laws, as well as WRDSB Policies. Some of the applicable laws are highlighted below for information purposes only. In case of any discrepancy between this Procurement Document and the

provision of applicable laws, the latter shall prevail. This list is not intended to be a comprehensive summary of relevant laws or be a complete list of applicable regulations or interpretation of the provisions of any laws

i. Accessibility for Ontarians with Disabilities Act (AODA)
ii. Architect Act
iii. Bill S-211 Fighting Against Forced Labour and Child Labour in Supply Chains Act
iv. Broader Public Sector Accountability Act, 2010
v. Building Ontario Businesses Initiative (BOBI) Act, 2022
vi. Canada Revenue Agency (CRA) regulations
vii. Confidentiality Acts (MFIPPA, PIPEDA etc.)
viii. Construction Act
ix. Education Act
x. Occupational Health and Safety Act
    a. Ontario Regulation 157/25, Section 27.1.
       This regulation requires Constructors to have a defibrillator (AED) on construction projects with 20 or more regularly employed workers (effective January 1, 2026), and ensure a worker trained in CPR/AED operation is present at all times.
xi. Supply Ontario: Supply Chain Management Act (Government, Broader Public Sector and Health Sector Entities), 2019, S.O. 2019, c. 15, Sched. 37
xii. Trade Agreements (CETA/CFTA etc.)
xiii. Workplace Safety and Insurance Act (WSIB)
xiv. WRDBS Procurement Services Policies website
xv. WRDSB Policies and Procedures

Non-compliance with provincial and/or federal laws, or WRDSB Policies may result in rejection of the Bidder's Bid submission and/or termination of Contract.

Bidders should make themselves aware of provisions in all applicable provincial and federal laws as well as WRDSB policies and ensure full compliance. Non-compliance may result in rejection of Bid and/or termination of Contract.

The Supplier(s) will be required to comply with all applicable federal, provincial laws as well as WRDSB policies in performing its obligations under the Contract including, without limitation, the Occupational Health and Safety Act, as amended, and the Workplace Safety and Insurance Act, 1997, as amended, and Accessibility for Ontarians With Disabilities Act, 2005, S.O. 2005, c.11, Accessibility Standards for Customer Services O. Reg. 429/07 requirements, under the Accessibility for Ontarians With Disabilities Act, 2005, as amended, or any successor legislation applicable, and to provide to the WRDSB, upon request, periodic reports and evidences confirming such compliance.
By supplying the goods or equipment and/or providing services, the Supplier warrants that the goods or equipment supplied, and services provided to the WRDSB conforms in all respects to the standards and codes set forth by federal and provincial agencies. Failure to comply with this condition will be considered a breach of this Contract.

The obligations of the parties and resolutions of any disputes shall be governed by and construed in accordance with the laws of the Province of Ontario and the federal laws of Canada, including the Construction Act, as to interpretation and performance, and shall be treated, in all respects, as an Ontario contract. The parties shall attorn to the exclusive jurisdiction of the courts of the Province of Ontario.

8. Confidential Information, MFIPPA, and PIPEDA

All information and documentation provided by the WRDSB or to the WRDSB in connection with this Procurement, before or after the issuance of this Procurement is the sole property of the WRDSB and shall be treated as confidential, subject to the provisions of the Municipal Freedom of Information and Protection of Privacy Act (MFIPPA).

Bidders shall identify any confidential information in their Bid Submission. The WRDSB will make reasonable efforts to safeguard confidential information, subject to its disclosure requirements under MFIPPA or any other disclosure requirements imposed by law or by order of a court or competent tribunal. Bidders are advised that their Bid submissions may be disclosed, on a confidential basis, to advisers retained by the WRDSB to advise or assist with the Bid process, including the evaluation of Bid submissions.

Bidders should be aware that when submitting a Bid, the name, title, and contact information will be made public upon request. Under MFIPPA, and as a record of the WRDSB, the Bid prices submitted and agreed to under contract with the WRDSB can also be made available through a Freedom of Information request. Bidders will be notified regarding requests for any other information submitted in a Bid; information may be disclosed to a requester in whole or part unless otherwise considered exempt from disclosure under MFIPPA.

The Supplier represents and warrants that if it is or becomes subject to any private sector privacy legislation during the Term it will be solely responsible for compliance with such legislation. Without limitation, the Supplier represents and warrants that if it is subject to the *Personal Information Protection and Electronic Documents Act*, S.C. 2000, c.5, including any further amendments thereto (PIPEDA):

i. it and all the Supplier's Subcontractors shall ensure the PIPEDA compliance of all PIPEDA Protected Information it collects directly from individuals or indirectly from the WRDSB, uses or discloses while performing their obligations under this Agreement; and,
ii. without limitation, it shall ensure the PIPEDA compliance of all PIPEDA Protected Information it transfers or discloses to the WRDSB.

9. Confirmation to Proceed

No work shall commence until the WRDSB has issued a purchase order and/or contract, if applicable to the Supplier. Goods/Service or Work as described shall not commence

until all the required documents have been submitted to Procurement Services and the Form of Agreement and/or the CCDC 2 - 2020, if applicable, are executed by the Supplier and the WRDSB. For payment purposes, a Purchase Order shall be generated and issued to the Supplier. The Purchase Order number must appear on all invoices to ensure prompt payment.

10. Conflict of Interest

By submitting a Bid, the Bidder confirms that they have no conflict of interest with respect to other work and/or other clients. The Bidder shall ensure that all subcontractors, subconsultants and suppliers also have no conflict with respect to other work and/or other clients.

The Supplier, subcontractors and sub-suppliers and any of their respective advisors, partners, directors, officers, employees, agents, and volunteers shall not engage in any activity or provide any services where such activity or the provision of such services creates a conflict of interest (actually or potentially, in the sole opinion of the Owner) with the provision of the Work pursuant to the Contract. The Supplier acknowledges and agrees that a conflict of interest, as described in this section includes, but is not limited to, the use of Confidential Information where the Owner has not specifically authorized such use.

The Supplier shall disclose to the Owner, in writing, without delay, any actual or potential situation that may be reasonably interpreted as either a conflict of interest or a potential conflict of interest, including the retention of any Subcontractor or Supplier that is directly or indirectly affiliated with or related to the Supplier.

The Supplier covenants and agrees that it will not hire or retain the services of any employee or previous employee of the Owner where to do so constitutes a breach by such employee or previous employee of the Owner’s conflict of interest policy, as it may be amended from time to time, until after completion of the Work/Services under the Contract.

It is of the essence of the Contract that the Owner shall not have direct or indirect liability to any Subcontractor or Supplier, and that the Owner relies on the maintenance of an arm's-length relationship between the Supplier and its Subcontractors and Sub-suppliers. Consistent with this fundamental term of the Contract, the Supplier will not enter into any agreement or understanding with any Subcontractor or Supplier, whether as part of any contract or any written or oral collateral agreement, pursuant to which the parties thereto agree to cooperate in the presentation of a claim for payment against the Owner, directly or through the Supplier, where such claim is, in whole or in part, in respect of a disputed claim by the Subcontractor or Supplier against the Supplier, where the payment to the Subcontractor or Supplier by the Supplier is agreed to be conditional or contingent on the ability to recover those amounts or a portion thereof from the Owner, failing which the Supplier shall be saved harmless from all or a portion of those claims. The Supplier

acknowledges that any such agreement would undermine the required arm's-length relationship and constitute a conflict of interest. For greater certainty, the Supplier shall only be entitled to advance claims against the Owner for amounts pertaining to Subcontractor or Supplier claims where the Supplier has actually paid or unconditionally acknowledged liability for those claims or where those claims are the subject of litigation or binding arbitration between the Subcontractor or Supplier and the Supplier has been found liable for those claims.

A breach by the Supplier, any of the Subcontractors, Sub-suppliers or any of their respective advisors, partners, directors, officers, employees, agents, and volunteers shall entitle the Owner to terminate the Contract, in addition to any other rights and remedies that the Owner has in the Contract, in law, or in equity."

11. Construction Act Guidelines

For Work that is governed by the provisions of the Construction Act, the Construction Act shall apply where applicable including in respect to release of 10% holdback, 2% deficiency holdback, adjudication, and the provision of security.

12. Criminal Background Checks and Collection of Personal Information

1. Compliance with Legislation

The Service Provider acknowledges that the Waterloo Region District School Board ("WRDSB") is required to comply with Ontario Regulation 521/01, *Collection of Personal Information under the Education Act*, with respect to criminal background checks and offence declarations. The Service Provider agrees to comply with all related obligations set out in this Regulation.

2. Right of Inspection

Upon forty-eight (48) hours' prior written notice, WRDSB shall be entitled to attend at the Service Provider's head office for the purpose of reviewing criminal background checks for any individuals providing services under this Agreement. Such checks must include offences under the *Criminal Code of Canada*, the *Controlled Drugs and Substances Act*, and any other offences disclosed through the automated Criminal Records Retrieval System.

3. Required Police Record Checks

(a) Individuals in Positions of Trust or Authority

A position of trust or authority refers to a relationship where an adult has power, influence, or control over a child or vulnerable person, creating a duty of care or dependency. Any employee, contractor, or other individual engaged by the Service Provider who is in a position of trust or authority with respect to WRDSB students must provide a valid **Vulnerable Sector Check (VSC)** that:

- was completed within the previous five (5) years; or

- is updated immediately if the individual is charged with or convicted of any offence under the *Criminal Code of Canada*.

(b) Individuals Not in Positions of Trust or Authority

Individuals who are not in a position of trust or authority with respect to students must provide a valid **Criminal Record and Judicial Matters Check (CRJMC)** that:

- was completed within the previous five (5) years; **or**
- is updated immediately if the individual is charged with or convicted of any offence under the *Criminal Code of Canada*.

4. Annual Offence Declarations

The Service Provider shall ensure that every individual working on its behalf who may come into direct contact with WRDSB staff or students on a regular basis completes an **annual Offence Declaration**, except in any calendar year in which a new police record check has been provided.

5. Failure to Comply

Failure by the Service Provider to comply with any requirement in this section shall constitute a **material breach** of this Agreement and may result in immediate suspension of services and/or termination of the contract by WRDSB, at its sole discretion. Termination of contracts may result from non-compliance with this requirement.

13. Damage Responsibility of Supplier

The Supplier, their agents and all workers and persons employed by them or under their control, shall use due care that no person or property is injured and that no rights are infringed in the prosecution of the work, and the Supplier shall be solely responsible for all damages by whomsoever claimable in respect of any injury to persons or to lands, buildings, structures, utilities, survey markers, fences, livestock, trees, crops, roads, ways, ditches, drains and in watercourses, whether natural or artificial, or property or whatever description and in respect of any infringement of any right, privilege or easement whatever occasioned in the carrying on of the work or any part thereof, or by any neglect, misfeasance or nonfeasance on the Supplier's part or on the part of any of his agents, workers and persons employed by them or under their control shall bear the full cost thereof and shall at his own expense make such temporary provisions as may be necessary to ensure the avoidance of any such damage, injury or infringement.

The Supplier shall indemnify and save harmless the WRDSB from and against all claims, demands, loss, costs, damages, actions suits or other proceedings by whomsoever made, brought, or prosecuted in any manner based upon, occasioned by, or attributed to any such damage, injury, or infringement.

Notwithstanding the indemnity provisions contained in this section, where in the opinion of the WRDSB Representative the Supplier has failed to rectify any damage, injury or

infringement or has failed to adequately compensate any person for any damage, injury or infringement for which the Supplier is responsible under the Contract, the WRDSB, following notice in writing to the Supplier of his intention so to do, may withhold payment of any monies due to the Supplier under this or any other Contract until the Supplier has rectified such damage, injury or infringement or has paid adequate compensation for such damage, injury or infringement.

14. Damage Reporting

If a utility structure or device, utility cable/conduit, or utility related infrastructure is damaged, the Supplier shall notify the WRDSB representative the same working day of any service disruption or damage and the Supplier will immediately notify the utility company to initiate repair. The Supplier will additionally make every reasonable effort to advise impacted resident(s) of a service disruption.

It is understood that all damage caused by workers engaged in the work under these specifications will be repaired by the Supplier and at the Supplier's sole expense. Damaged turf areas will be levelled and seeded, all horticultural planting damaged beyond repair will be replaced and any damage to structures, utilities, signs, light fixtures, landscape furniture, irrigation systems etc. will be repaired or replaced. Repair work will be carried out by skilled workers acceptable to the WRDSB representative. All repairs and replacements will be approved by a WRDSB representative prior to final payment.

15. Debriefing Requests

For procurements valued at $121,200 or more, and in accordance with the Broader Public Sector Procurement Directive, unsuccessful Bidders are entitled to a debriefing to receive feedback with respect to their Bid submission. To obtain a debriefing, Bidders shall contact the Single Point of Contact listed in this Procurement Document in writing with their request within sixty (60) calendar days of the award notification.

16. Default

If the Supplier fails to properly, promptly, and fully carry out the Work required by these documents, the WRDSB reserves the right to notify the Supplier to discontinue all Work under this Contract, to advertise for new Bids or carry out the Work in any way as the WRDSB may, in their sole discretion, deem best.

The Supplier further agrees to indemnify and save harmless the Indemnified Parties from all loss, damage, liability, cost, charge, or expense whatsoever which it, they or any of them may suffer, incur or be put to by reason of such default or failure.

17. Delay Claims

The Supplier shall be responsible for all deliverables including lead times. The bidder shall include in their bid price any costs associated with an extended schedule beyond the stated substantial completion date due to delayed deliveries of items. Cost is to be inclusive of any afterhours work required due to the school being occupied by staff and students during the school year until completion.

The WRDSB will not accept or consider any "delay claim" requests for delayed deliverables outlined in the tender documents.

18. Delivery and Transportation Charges

Unless otherwise specified under the Special Provisions and/or Scope of Work and Deliverables sections of this document, prices documented shall be net prices including transportation and delivery charges fully paid by the Supplier and Free On Board (FOB) Destination, Freight Prepaid (any/all WRDSB locations).

19. Designated Substances

The Occupational Health and Safety Act of Ontario (OHSA) allow for certain toxic substances to be especially designated. The OHSA defines a designated substance as “a biological, chemical, or physical agent or combination thereof prescribed as a designated substance to which the exposure of a worker is prohibited, regulated, restricted, limited, or controlled”. Ontario Regulation 490/09 - Designated Substances (O.Reg. 490/09), made under the Occupational Health and Safety Act outlines required steps to control exposure of workers to designated substances. Under O. Reg. 490/09 there are eleven (11) designated substances: acrylonitrile, arsenic, asbestos, benzene, coke oven emissions, ethylene oxide, isocyanates, lead, mercury, silica and vinyl chloride. This regulation applies to every employer and worker at a workplace where the designated substances are present, produced, processed, used, handled or stored and at which a worker is likely to be exposed to the designated substance.

i. Asbestos

Asbestos-containing material (ACMs) were identified during the completion of the Asbestos Audit Update Report (AAU), prepared by WRDSB retained consultants. Each facility was surveyed, and if applicable, an AAU Report is available, refer to attached**,** Appendix 01 35 34A. If these materials, including those deemed or suspected, will be disturbed, or will likely be disturbed, during building maintenance, renovations, construction, or demolition activities, they must be handled and disposed of in accordance with the procedures prescribed by O. Reg. 278/05.

Should the Supplier encounter asbestos, not noted in the above AAU Report, which would be disturbed during the course of the Work they should stop the work in that immediate area and report the same to the WRDSB Contact.

All asbestos work must be conducted by Suppliers approved by the WRDSB, who are trained in the type of asbestos operations required and should be overseen by a qualified third-party Health, Safety and Environmental professional. To conduct Type 3 asbestos operations, Suppliers must be certified as Asbestos Abatement Workers AAW (Trade code 253W) and Asbestos Abatement Supervisors AAS (Trade code 253S) by The Ministry of Training, Colleges and Universities as prescribed by Section 20 of O. Reg. 278/05.

Unless otherwise specifically covered by Cash Allowance or Contingency Allowance for known asbestos materials, include in this contract for the removal under abatement, in compliance with O. Reg. 278/05, of all known asbestos containing materials, as identified in the audit, within 0.6 meter (2'-0") of all new services, materials, and equipment, and/or as required to complete the work. No claims for extra cost will be accepted for areas known to contain asbestos containing materials.

ii. Lead

Lead was historically used in mortar pigments, ceramic glazing; plumbing solder, electrical equipment and electronics solder, in pipe gaskets as packing in cast iron bell and spigot joints of sanitary drains, flexible plumbing connections, flashing panels, acoustical dampeners, phone cable casing and some architectural applications. The assessment of lead for this assignment was limited to paint on interior and exterior surfaces which may be disturbed during the Work.

Preliminary paint, coatings or materials were collected within the work area to determine if lead-containing paints, including lead-based paints, are present. The analytical results, if applicable, including the location marked on the floor plans are available, refer to attached, Appendix 01 35 34B.

Should the Supplier encounter paint and coatings, not sampled, that would be disturbed during the course of the Work, they should stop the work in that immediate area and report the same to the WRDSB Contact.

Unless otherwise specifically covered by Cash Allowance or Contingency Allowance for known lead-containing paint and coatings, include in this contract for the removal or disturbance of lead-containing materials, must be completed in compliance with "Lead on Construction Projects" guideline (April 2011). No claims for extra cost will be accepted for lead-containing paint or coatings in identified areas.

The classification of typical lead-containing construction tasks is based on presumed airborne concentrations obtained from the U.S. Occupational Safety and Health Administration (OSHA), the Ontario Ministry of Labour, and published research studies. The classification of Type 1, Type 2, or Type 3 operations are grouped based on the following concentrations of airborne lead

Supplier shall inform all workers of the presence of paint finishes that are lead containing. Disturbance of lead-containing materials, paints or surface coatings shall be conducted in accordance with the procedures outlined in the Environmental Abatement Council of Canada (EACC) "Lead Guideline" (October 2014) and/or the Ministry of Labour (MOL) "Lead on Construction Projects" guideline (April 2011). The extent of procedures required depends on the type of work to be conducted. Waste to be handled and disposed of in accordance with O.Reg. 347.

iii. Mercury

Mercury is typically used in building service applications such as thermometers, barometers, thermostats, gauges, electrical switches, and lighting products including fluorescent light bulbs and a variety of High Intensity Discharge (HID) lamps as mercury vapour, metal halide and high pressure sodium lamps. Lamps and other devices that require demolition are to be handled with care and kept intact to avoid potential exposure. Any mercury-containing lamps or other equipment that are demolished are to be recycled. Waste to be handled and disposed of in accordance with O.Reg. 347.

iv. Silica

Silica is present in rock, stone, soil, and sand. Masonry products such as concrete block, brick, and mortar, as well as concrete and associated products contain silica. Due to its ubiquitous nature, silica was historically used in a wide variety of building materials and is still used today in new construction.

All work involving the demolition silica-containing materials shall follow the procedures outlined in the MOL “Silica on Construction Projects” guideline. Type 1 operations may be necessary based on the type of work conducted and the Supplier shall implement dust suppression methods and protect workers.

v. Other Designated Substance

In addition to asbestos and/or lead, silica, and mercury are present in all WRDSB facilities. New construction, renovation, or alterations require compliance by the Supplier with the applicable legislation. Other designated substances (i.e., acrylonitrile, arsenic, benzene, coke oven emissions, isocyanates, ethyl oxide, and vinyl chloride) are not encountered in WRDSB facilities as significant constituents or in a form that would represent an exposure concern.

20. Dispute Resolution

All disputes arising out of or in connection with this Contract, or in respect of any legal relationship associated with or derived from this Contract, other than with respect to the WRDSB's right to terminate this Contract, shall first be mediated pursuant to the National Mediation Rules of the ADR Institute of Canada, Inc. Despite this agreement to mediate, the Supplier or the WRDSB may apply to a court of competent jurisdiction or other competent authority for interim measures of protection at any time. All disputes remaining unsettled after mediation shall be arbitrated and finally resolved before a single arbitrator pursuant to the National Arbitration Rules of the ADR Institute of Canada, Inc. The place of mediation and arbitration shall be Toronto, Ontario, Canada. The language of the mediation shall be English.

21. Duty to Disclose Change of Control

If the Supplier undergoes a change in control, the Supplier shall immediately disclose such change in control to the Designated Representative and shall comply with any terms and conditions subsequently prescribed by the WRDSB resulting from the disclosure.

22. Electrical Safety Requirements

All electrical equipment and components must be C.S.A., or Electrical Safety Association (E.S.A.) certified. A certification sticker must be affixed to the equipment in a visible location.

23. Emergency and Maintenance

The care of the Works until completed, delivered to and accepted by the WRDSB, rests solely with the Supplier who shall assume all risk of damage to the work.

For emergency and maintenance measures, the name, address, and telephone number of a responsible official of the contracting firm shall be given to the WRDSB's contact person in charge of the project, if requested. This official shall always be available and have the necessary authority to mobilize workers and machinery and to take any action as directed by the WRDSB in the event emergency or maintenance measures are required, although the emergency or requirement of maintenance may have been caused by the Supplier's negligence, Act of God, or any cause whatsoever.

Should the Supplier be unable to carry out the required immediate remedial measures, the WRDSB may carry out the necessary repairs and the costs for this work shall be deducted from payments due to the Supplier.

24. Equivalents and Alternatives

24.1 Equivalents or Brands Names

24.1.1 Any reference to a brand name or a particular manufacturer shall be understood to have been made solely for the purpose of establishing and describing required performance and quality levels of the product to be supplied, unless specified otherwise.

24.1.2 No reference to the brand name of a particular manufacturer shall be construed to restrict Bidders to that manufacturer. Bidders are invited to Bid equivalent and comparable equipment or items of any manufacturer, pending approval from the WRDSB in the form of an Addendum. It is the Bidder's responsibility to demonstrate that the item meets the specifications.

24.1.3 Bidders shall request through the Bidding System by clicking on the “Submit a Question” button found within the bid details page of that Procurement that a proposed product be considered an approved equivalent prior to the Deadline for Questions in the Anticipated Project Schedule. Upon receipt of a request, the WRDSB will respond by providing further instructions where you may submit documentation.

24.1.4 The response must include enough detail to determine equivalency by comparing the WRDSB’s specifications to the equivalent product. It will not be the WRDSB’s responsibility to make this comparison.

24.1.5 The WRDSB/ Consultant may, depending on the nature of the product request site visits within a reasonable distance (preferable within 100 km of the WRDSB) showing product and installation based on a certain age, minimum 18 months in use, room use, room size, etc. based on same or similar purpose as described in this Procurement.

24.1.6 The WRDSB/Consultant will endeavor to complete a review and decide prior to the Closing Date, and, if required, the WRDSB reserves the right to extend the Closing Date to complete its review. However, in the event additional time is required beyond a suitable extension to the Closing Date, the request will be pending until the product is thoroughly vetted, therefore, it may not be approved for this Procurement.

24.1.7 If the WRDSB is willing to consider the product with its differences, it will be communicated in the form of an Addendum prior to the Closing Date.

24.1.8 The cost of any testing requirements to establish acceptable equivalent or comparable products will be borne by the Bidder, unless otherwise stated by the WRDSB.

24.2 Alternatives and Substitutions

24.2.1 After Contract Award, the Contractor may submit an alternate material or piece of equipment to the Consultant and Owner for review. An Alternate will only be evaluated and considered acceptable if it meets the intent of the original design and specifications, and where there is a credit or no additional cost to the Owner. The Specification Sections contain pertinent performance criteria, quality, function and requirements for materials and methods to achieve work described.

24.2.2 Material or equipment of equal or better performance and quality may be offered in substitution for those specified. Requests for review of substitute items of material and equipment will not be accepted by the Consultant from anyone other than the Contractor. All requests for substitution must be accompanied by a detailed listing of the expected cost savings to the Owner.

24.2.3 Substitutions will not be considered when they are indicated or implied on Shop Drawings or product data submittals without a separate written request.

24.2.4 Requests for substitution shall include any request for changes from the Contractor that require significant design changes, redesign, or significant design reviews.

A request for substitution constitutes a representation that the Contractor:

i. Has investigated the proposed product and determined that it meets or exceeds the quality level of the specified product.
ii. Will provide the same warranty for the substitution as for the specified product.
iii. Will coordinate the installation and amend other Work which may be required for the Work to be complete at the Contractor's expense and at no additional cost to the Owner.
iv. Waives claims for additional costs or time extension which may subsequently become apparent.
v. Will reimburse the Owner for review or redesign services.

24.2.5 Request for substitution to be made by written application to the Consultant and is to include sufficient data to enable the Consultant to assess the acceptability of requirements, including the following:

i. All submittal information required for the specified equipment, including all deviations from the specified requirements and/or necessitated by the requested substitution.
ii. Materials of construction, including material specifications and references.
iii. Dimensional drawings, showing required access and clearances, including any changes to the work required to accommodate the proposed substitution.
iv. Drawings and details showing changes if the offered substitution necessitates changes to or coordination with other portions of the Work. Perform these changes as part of the substitution of material or equipment at no additional cost.
v. Certification that the proposed substitute will adequately perform the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified with the same or better warranty.
vi. Information and performance characteristics for all system components and ancillary devices to be furnished as part of the proposed substitution.
vii. Certification that acceptance of the proposed substitute will not prejudice achievement of Substantial Performance.
viii. Itemization of all costs including any licenses fee or royalty that will result directly or indirectly from the acceptance of the proposed substitution.

Include redesign and cost of claims of any other contract affected by the resulting change.

ix. Guaranteed credit or cost reduction offered if the proposed substitution is accepted and a waiver of claims for additional expenses which may subsequently become apparent.

x. Recommended maintenance requirements and availability of spare parts and service.

xi. Written confirmation from subcontractors and suppliers on cost, schedule, and technical requirements if requested by the Consultant.

24.2.6 Consultant will evaluate each proposed substitution. Consultant will be the sole judge of acceptability, and no substitute will be ordered, installed, or utilized without the Consultant's prior written acceptance by either a Change Order or a reviewed shop drawing. The burden of proof is on the Contractor.

24.2.7 Pay the Consultant's cost for evaluating the requested substitution even though the request may be denied, or for additional redesign work required because of any substitution. Costs will be charged on a time and expense basis and will be deducted from progress payments due to the Contractor.

25. Evidence of Quality

It is the Bidder's responsibility to prove their product/service quality meets the WRDSB's requirements and Bidders may be required to submit evidence in a form acceptable to the WRDSB. Substitution of materials, equipment or methods different from those outlined in the specifications / terms of reference will not be accepted unless provided for within the Procurement document or without the written approval of the WRDSB.

26. Force Majeure

If either party is delayed in the performance of their obligations under this Contract by Force Majeure, then the Contract Time shall be extended for such reasonable time as the Owner, and the Supplier shall agree. The extension of time shall not be less than the time lost because of the event causing the delay, unless the parties agree to a shorter extension. Neither party shall be entitled to payment for costs incurred by such delays. Upon reaching agreement on the extension of the Contract Time attributable to the Force Majeure event, the Owner and the Supplier shall execute a Change Order indicating the length of the extension to the Contract Time and confirming that there are no costs payable by the either party for the extension of Contract Time. However, if at the time an event of Force Majeure arises a party is in default of its obligations under the Contract and has received a notice of default shall not excuse a party from its obligation to cure the default(s). For greater certainty, the defaulting party, to the extent possible, must continue to address and cure the default notwithstanding an event of Force Majeure."

Any cause, unknown at the effective date of the Contract and beyond either party's control, other than financial difficulties, bankruptcy or insolvency, which prevents the performance by a party, or both, of any of their respective obligations under the Contract and the event of Force Majeure did not arise from a party's default and could not be

avoided or mitigated by the exercise of reasonable effort or foresight. Force Majeure includes Labour Disputes; fire; unusual delay by common carriers or unavoidable casualties; delays in obtaining third-party licenses, permits, agreements, or approvals (excluding approvals of any Subcontractors or Suppliers of any tier); civil disturbance; emergency acts, orders, legislation, regulations or directives or revoking of funding from any government or other public authority; acts of a public enemy; war; riot; sabotage; blockage; embargo; lightning; earthquake; adverse weather conditions but only if substantially beyond the weather norms of the Place of the Work; acts of God; or declared epidemic or pandemic outbreak or other public health emergency (e.g. SARS, COVID-19)

If in the reasonable opinion of either party to this Contract that performance of the Contract is made impossible by force majeure, then either party shall notify the other in writing and the WRDSB shall either terminate the Contract forthwith without any future payments being made or authorize the Bidder to continue performance of the Contract with such adjustments as may be required by the existence of the force majeure and agreed upon by both parties.

27. Hold Back or Set Off

The WRDSB may hold back payment or set off against payment if, in the opinion of the WRDSB, the Supplier has failed to comply with any requirements of the Contract.

28. Hot Work Procedure

Take all precautions to Work safely and to provide the necessary protection to persons and property from Hot Work. This includes, but is not limited to Brazing, Cutting, Grinding, Soldering, Thawing Pipe, Torch Applied Roofing and Welding. With all such activity these steps are to be followed:

i. Whenever possible, complete Hot Work in a welding shop or out of doors at the school.
ii. Flammable liquids, dust lint and oily deposits to be removed from within 50-ft (15m) of Work. Remove other combustibles where possible. Otherwise protect with fire-resistive tarpaulins or metal shields.
iii. Explosive atmosphere in area eliminated. Floors swept clean. Combustible floors wet down, covered with damp sand or fire-resistive tarpaulins.
iv. All wall and floor openings covered. Fire-resistive tarpaulins suspended beneath Work.
v. For on-site Work (indoor and out of doors), advise the Head Custodian, Principal, Consultant (if assigned) and Project Coordinator/Lead prior to Work being performed, and of related dangers.
vi. Where the Fire Alarm system is required to be set to stand-by to discourage false alarms from smoke detectors provide a firewatch throughout the building or structure being worked on. NEVER put the fire alarm system in stand-by mode when the building is occupied by staff or students.

vii. In the event of a fire because of the Hot Work, notify the fire department immediately. Report incident to the head custodian, the Consultant, if assigned, and Project Coordinator immediately, whether extinguished or not. Provide a fire incident report to the WRDSB.

viii. Barriers must be set up to protect staff and students (i.e. pylons, shields, and caution tape) from exposure to arc flash and smoke migration.

ix. Have all necessary doors, windows and/or drapes closed. Confer with the Head Custodian to shut down all fan systems in the area to reduce or eliminate smoke distribution.

x. Provide and keep fire extinguishers handy and in good Working condition. Temporarily cover all smoke detectors in the area during time of Work.

xi. Provide a fire watch/spot check for several hours after Work is completed. Uncover smoke detectors.

xii. On new construction, the requirements of the Hot Wok permit may be waived, until such time as either Substantial Completion or Occupancy is granted, whichever comes first.

xiii. On additions to existing buildings, the requirements for Hot Work permits shall remain in place.

28.2 Hot Work Permit

i. Each permit is valid for seven (7) days only and must be renewed prior to its expiration date

ii. The contractor must obtain Hot Work Permits from the WRDSB's representative prior to the start of work.

iii. The contractor must complete the form as required and must keep the form on site.

iv. Return each completed form to the WRDSB's representative on the date of expiration.

v. The most current version of the Permit and its requirements shall be used for the purposes of the Work.

29. Incurred Costs

The WRDSB will not be liable, nor reimburse any Bidder for costs incurred in the preparation of the Bid, or any other services that may be requested as part of the procurement process.

30. Indemnification

The Bidder will indemnify and save harmless and defend the WRDSB, and their respective elected officials, officers, employees, agents and their respective successors and assigns, from and against all actions claims and demands whatsoever which may be brought against or made upon any of the Indemnified Parties and against all losses, liability,

judgments, claims, costs, demands or expenses which the Indemnified Parties may sustain, suffer, or be put to resulting from or arising out of the Bidder's failure to exercise reasonable care, skill or diligence in the performance or rendering of any Work or service required hereunder to be performed or rendered by the Bidder, its agents, servants, employees or Subcontractors, or any of them as well as for the infringement of or use of any intellectual property rights including any copyright or patent arising out of the reproduction or use in any manner of any plans, designs, drawings, specifications, information, negatives, data, material, sketches, notes, documents, memoranda, or computer software furnished by the Bidder in the performance of this Contract.

31. Inspection of Supplier's Work and Equipment.

ii. The WRDSB reserves the right to inspect and/or have demonstration of the products/equipment/services offered prior to award of this Procurement.

iii. The WRDSB reserves the right to have all work, including maintenance and repair work reviewed by a third-party Contractor, Agency, or Consultant to confirm that work within this Contract is being completed satisfactorily.

32. Insurance Requirements

If selected, it is the responsibility of the Supplier and its Insurance Broker to review all potential operations and exposures to determine if the coverage and limits noted below are sufficient to address all insurance related exposures presented by the specification of the Project, Work, or Supply. The Supplier shall ensure its undertaking, business, and equipment under the following coverage to protect and indemnify and save harmless the WRDSB.

Throughout the term of this Contract (including any renewal thereof), the Supplier shall obtain, upload through bids&tenders and maintain at its own expense, including the cost of any applicable deductible or self-insured retention, the following policies of insurance:

i. **Commercial General Liability Insurance** shall be in the name of the Supplier*,* and shall name the **Waterloo Region District School Board** and any other person or party identified in the contract documents, as an **additional insured**, with limits of not less than $5 Million inclusive per occurrence for bodily injury, death, and damage to property, including loss of use thereof, for itself and each of its employees, *Subcontractors* and/or agents. To achieve the desired limit, umbrella, or excess liability insurance may be used. The policy shall be endorsed to provide the *Owner* with not less than 30 days' notice, in writing, in advance of any cancellation and of change or amendment restricting coverage.

ii. **Automobile Liability Insurance** in respect of licensed vehicles with limits of not less than $2 Million inclusive per occurrence for bodily injury, death and damage to property, covering all licensed vehicles owned or leased by the Supplier, and endorsed to provide the Owner with not less than 30 days' notice, in writing, in advance of any cancellation, change or amendment restricting coverage. Where the

policy has been issued pursuant to a government-operated automobile insurance system, the Supplier shall provide the Owner with confirmation of automobile insurance coverage for all automobiles registered in the name of the Contractor.

iii. **Contractor's Equipment Insurance:** If applicable/requested, Broad Form Contractor's Equipment Insurance: The General Contractor shall provide and maintain during the term of the Agreement coverage for construction machinery and equipment used by the Contractor for the performance of the work. Such insurance shall be in a form acceptable to the WRDSB and shall not allow subrogation claims by the Insurer against the WRDSB.

iv. **All Risk Installation Floater:** If applicable/requested, the General Contractor shall provide and maintain during the term of the Agreement an All Risk Installation Floater Insurance policy covering the installation of any machinery and equipment associated with the construction project. Coverage shall be in an amount equal to the value of the machinery and/or equipment and shall include coverage while it is in transit too, while stored at a temporary location, and awaiting installation at the work site.

v. **Professional Liability Insurance (Errors and Omissions):** If applicable/requested, Contractors and/or Consultants shall ensure its professional consultants, architects, landscape architects, planners, engineers, including IT providing a professional service in connection with the contract, maintain until three (3) years after the Agreement, Professional Liability Insurance to a limit not less than $1 Million per claim providing coverage for acts, errors and omissions arising from their professional services performed under this Agreement including but not limited to . design errors, project management mistakes, failure to perform etc. The policy SIR/deductible shall not exceed $100,000 per claim and if the policy has an aggregate limit, the amount of the aggregate shall be double the required per claim limit. Certificates evidencing such coverage shall be supplied to the WRDSB prior to the completion of the project and in accordance with the provisions stated above.

vi. **Pollution Liability:** If applicable, (i.e., for projects with environmental liability concerns) the General Contractor shall take out and keep in force Contractor's Pollution Liability (CPL) coverage to ensure that its work does not exacerbate any pre-existing environmental conditions during construction. Coverage shall be in an amount of not less than $5 Million per claim or per occurrence, or such greater amount as the WRDSB may from time to time require, naming the WRDSB as an additional insured, whose coverage shall be maintained in force for 1 year following the termination of the Contract. The policy SIR/deductible shall not exceed $100,000 per claim and if the policy has an aggregate limit, the amount of the aggregate shall be double the required per occurrence limit.

vii. **Cyber Insurance**: If applicable/requested: In addition to the insurance required under the Agreement, the Contractor shall procure and maintain cyber and network

privacy insurance at its sole cost and expense with an aggregate limit of not less than $1 million per occurrence.

The insurance policy shall include coverage for any and all liabilities, damages, claims, losses, costs, and expenses of any kind that may be incurred by or asserted resulting from or related to: (1) any act, error, omission, or negligence related to the Proponent's technology and/or professional services; (2) intellectual property infringement arising out of software and/or content; (3) breaches of security and/or data; (4) violation or infringement of any right to privacy, or any breach of federal, provincial or local security and/or privacy laws or regulations; and (5) theft, damage, destruction, or corruption of any WRDSB data or any employee, or student of WRDSB, including without limitation, unauthorized access, unauthorized use, identity theft, theft of personally identifiable information or confidential corporate information, the transmission of a computer virus or other type of malicious code.

Evidence of coverage must be provided to the WRDSB within 7 days of the Intent to Award. The policy must be kept in force by the Proponent during the term of this Agreement and for three (3) years (either as a policy in force or Extended Reporting Endorsement) after this Agreement is terminated or after completion of the Project provided for herein, whichever is later. Proof of insurance may be requested during the agreement term and for three (3) years after. If the policy is to be cancelled or non-renewed for any reason, a 90-day notice of said cancellation or non-renewal must be provided to the WRDSB. The WRDSB has the right to request that the Proponent purchase an Extended Reporting Endorsement at the Proponent's sole expense.

viii. **Provisions**: Prior to the commencement of work, the Supplier shall forward a Certificate of Insurance evidencing this insurance with the executed Agreement. The Certificate shall state that coverage will not be suspended, voided, canceled, reduced in coverage or in limits except after thirty (30) days (ten (10) days if cancellation is due to non-payment of premium) prior written notice by certified mail to the WRDSB.

It is also understood and agreed that in the event of a claim any deductible or self-insured retention under these policies of insurance shall be the sole responsibility of the General Contractor and that this coverage shall preclude subrogation claims against the WRDSB and any other person insured under the policy and be primary insurance in response to claims. Any insurance or self-insurance maintained by the WRDSB and any other person insured under the policy shall be considered excess of the Contractor's insurance and shall not contribute with it. The minimum amount of insurance required herein shall not modify, waive, or otherwise alter the Contractor's obligation to fully indemnify the WRDSB under this Agreement.

The WRDSB reserves the right to modify the insurance requirements as deemed suitable.

ix. Third Party Claims Process:

a. The WRDSB's claims process for Third Party claims is to refer the claimant directly to the Supplier and to leave the resolution of the claim with the Supplier. This applies regardless of whether it is an insured loss.

b. As WRDSB has a responsibility to the taxpayers, we must ensure that claimants are dealt with in a fair and efficient manner. Claims reported to the Supplier, either directly by a third party or through the WRDSB shall be promptly investigated by the Supplier. The Supplier shall contact the third party claimant within 48 hours of receipt of notice of a claim. The Supplier shall initiate an investigation of the claim immediately upon notice, and advise the third party claimant in writing, with a copy to the WRDSB, of its position regarding the claim within 21 calendar days of the notice. The Supplier shall include in its response the reasons for its position.

c. Should this position not resolve the claim and be accepted by the third party claimant, the Supplier shall immediately report the claim to its Insurer for further review. (Insurer for this purpose is defined as either the Claims Department of the Supplier's Insurance Company or the Claims Administrator at the Supplier's Insurance Broker.) The Supplier's Insurer upon receipt of this claim shall advise the third party claimant by letter, with a copy to the WRDSB, that it is now investigating the claim. When a final position on the claim has been determined, the Supplier's Insurer shall advise the third party claimant by letter, with a copy to the WRDSB. Failure to follow this procedure shall permit the WRDSB to investigate and resolve any such claims.

d. Nothing herein shall limit the right of the WRDSB to investigate and resolve any such claims notwithstanding the response of the Supplier and/or its Insurer and to seek indemnification from the Supplier or to exercise any other rights under the Contract.

e. The WRDSB may, without breaching this contract, retain from the funds owing to the Supplier an amount that, as between the WRDSB and the Supplier, is equal to the balance in the WRDSB's favour of all outstanding debts, claims or damages, whether related to this contract.

33. Invoicing and Payment Terms

33.1 Submit all invoices to finance-ap@wrdsb.ca for payment at the completion of the Work or after receipt of goods, unless otherwise stated. Not Applicable for Credit Card orders.

33.2 Fiscal Year End: All work scheduled within a single school year (Sept 1-Aug 31) must be completed and invoiced received by the WRDSB no later than August 31 of that same school year, unless budgets dictate that work must extend into the following school year and/or mutually agreed upon both parties.

33.3 New Account, in advance of invoicing, upon request, Suppliers will provide:

i. necessary company information to set up a WRDSB account and
ii. banking information to receive payment by Electronic Funds Transfer (EFT).

33.4 Requests to change company information must be submitted in writing accompanied by a legal document/letter signed by a lawyer on the law firm's letterhead.

33.5 Invoices must contain the following information, where applicable, to be deemed complete:

i. Purchase Order Number
ii. Invoice Date
iii. Unique Invoice Number
iv. Supplier name and address
v. Quantity, Unit Price, Unit of Measure and Extended Price
vi. Description for each line item
vii. Date of Service Call, if applicable
viii. HST
ix. Payment Terms
x. Work Order Number, if applicable
xi. Name of WRDSB Project Lead, if known, and

33.6 Payment terms shall be net thirty days (30) days after receipt of invoice, unless otherwise agreed by the WRDSB in writing. An early payment discount, if offered, may be considered on a mutual agreement basis. Payment may be delayed if the invoice is incorrect or the goods, equipment and/or services are not acceptable to the WRDSB. The WRDSB will not pay any interest, penalty, or late fee for delayed payments. The WRDSB preferred payment method is Credit Card or EFT, however alternate payment methods may be approved. Suppliers are required to invoice promptly, without delay. For Work that falls under the Construction Act, refer to 34 Construction Act – Proper Invoice.

34. Construction Act – Proper Invoice

The WRDSB will pay such invoice within twenty-eight (28) calendar days of the WRDSB's receipt of such proper invoice if the work has been performed to the satisfaction of the WRDSB For Work that is governed by the provisions of the Construction Act and the Regulations thereto, the Supplier shall submit its invoices in the form of a Proper Invoice. For the purposes of this section, a "Proper Invoice" shall include the following:

i. the Supplier's name, address, telephone number, and mailing address.
ii. the date of the Proper Invoice and the period during which the services or materials for which payment is being made were supplied.
iii. information identifying the authority, whether in the contract or otherwise, under which the services or materials were supplied.
iv. a description, including quantity where appropriate, of the services or materials

that were supplied during the payment period.

v. the amount payable for the services or materials that were supplied during the payment period, with a clear identification of the portions of the amount that are holdbacks, and HST.

vi. the name, title, telephone number, and mailing address of the person to whom payment is to be sent.

vii. the payment terms as specified by the WRDSB in the Contract.

viii. the invoice number and if applicable, the revision number.

ix. the Supplier's HST number.

x. invoices and time sheets from all subtrades whose work is included in the Proper Invoice, if required in the Contract.

xi. backup documentation to support any cash allowances and extra work claimed in the Proper Invoice.

xii. a schedule of values indicating:

a. for lump sum contracts, the percentage of work completed per division with each division further subdivided to show the percentage of work completed for each subtrade,

b. for unit price contracts, the tender quantity, unit of measure, previous quantity, current quantity, to-date quantity,

c. an updated list of change orders, showing the percentage of work completed under each change order, and

d. an updated cash allowance list, showing the percentage of work completed in respect of each cash allowance, if required by the Contract.

xiii. a Statutory Declaration where required by the Contract attesting to the truth of the statements made therein.

35. Interpretive Value of Headings

The headings in this Procurement document or subsequent Agreements are for convenience of reference only and in no manner modify, interpret, or construe the Procurement document or subsequent Agreements.

36. Licenses and Permits

The Supplier will be responsible for applications and fees associated with all licenses and permits required by all governing bodies. The Supplier will attach a copy of all permits, and any other required documentation to the applicable assigned work order for WRDSB records.

37. Locates

All required utility locates must be obtained before any on-site work commences, be available for Supplier operator/employee review, and are the sole responsibility of the Supplier. Any damage to any utility installation arising from work performed by the Supplier or their employees shall be the Supplier's responsibility.

The Supplier will obtain all utility locates in advance of work and all cost(s) associated with obtaining the utility locates will be the Supplier's responsibility.

The Supplier shall possess the ability to supply and or share with the WRDSB Representative utility locates for the sole purpose of Quality Control inspections. This is to be done at no additional cost to the WRDSB.

38. Log Reports

If requested, the Supplier must submit a completed Log Report with invoices. The WRDSB may request more frequent log submissions if it is necessary.

39. Materials - Specifications

Only new materials in perfect condition will be accepted. Demonstrators, seconds, or defective materials are unacceptable. Any materials found not to be in a new condition or as specified will be returned to the Supplier at the Supplier's expense.

40. Material Safety Data Sheets (M.S.D.S.)

Where applicable, a materials safety data sheet (M.S.D.S.), must accompany all purchased goods, that fall under the requirements of the Occupational Health and Safety Act. The WRDSB will not accept any additional charges or surcharges related to the supply of M.S.D.S.

41. Mathematical Errors (Unit Prices Prevail)

Should there be any error in extensions, additions or computations, the WRDSB shall be entitled to correct such errors based upon the unit prices supplied, and the corrected total shall be considered as representing the intention of the Bidder and shall be used as the basis for comparison of bid submissions.

42. No Branding

The Supplier shall not place any sign at the site, public meetings, any public or private property or along curbside prior, during or after the Work without prior written permission of the WRDSB.

43. No Collusion

Bidders/Proponents including any of their agents are prohibited from engaging in any comparison of figures or arrangement with any other individual, corporation or person submitting a Bid/Proposal for the same Work and shall be fair in all respects and shall be without collusion or fraud.

44. No Lobbying

Any attempt by the Bidder or its agents to contact any of the following people, directly or indirectly, with respect to this procurement may lead to disqualification:

i. any elected or appointed officer.
ii. any staff of the WRDSB except the Designated Representative as identified in the Procurement Document; or
iii. any other person connected in any way with the procurement.

45. No Smoking and Scent-Free Environment

The Province of Ontario has legislated under the Smoke Free Ontario Act that smoking is not permitted on any WRDSB owned properties. Furthermore, most WRDSB properties are “scent free”. Smoking will not be permitted on-site. Offenders will be asked to leave the site, and infractions could result in corrective action and or fine.

46. Non-Assignment

No assignment by the Supplier shall relieve the Supplier of any responsibility for the full performance of all its’ obligations under this contract.

The Supplier shall not change its corporate name without the prior written approval of the WRDSB.

47. Non-Disclosure Agreement (NDA)

The WRDSB requires all service providers to sign off on a non-disclosure agreement and for the service provider to complete the Software Privacy and Security Standards Document (if necessary) in accordance with WRDSB procedure AP4790. Prior to any sharing of WRDSB personal, sensitive, or confidential information, the Supplier will be subject to further privacy and security reviews as required. This agreement will be renewed on an annual basis.

48. Ownership of Work

For the purposes of this paragraph:

“Deliverables” means all material prepared by the Bidder forming the Work under this Contract including, without limitation, all electronic media, reports, documents, and instruments of service.

“Intellectual Property Rights” means any and all rights provided under: (a) patent law; (b) copyright law; (c) trade-mark law; (d) industrial design law; (e) any other statutory provision or common law principle applicable to this Contract, including trade secret law; and (f) any and all registrations and licenses in relation to the foregoing; and

“Personnel” means employees, representatives, agents, and Subcontractors.

The Bidder and the WRDSB acknowledge and agree that the development of the Deliverables and the provision of the Work may result in the creation or development of new intellectual property and may contain or utilize the existing intellectual property of the Bidder or of third parties. Accordingly, the Bidder and the WRDSB agree as follows.

i. Except as set out in paragraph (b) below, the Bidder hereby assigns and agrees to assign to the WRDSB all right, title and interest, including all Intellectual Property Rights, in and to each Deliverable from the moment of creation, and will cause its Personnel to assign the same. The Bidder will cause its Personnel to waive all moral rights they may have in each Deliverable.
ii. To the extent that a Deliverable contains or utilizes the intellectual property of the Bidder or a third party (“Retained Materials”), and the Bidder expressly identifies such Retained Materials, the Bidder and the applicable third party will, subject to

the following sentence, retain all their respective right, title and interest, including all Intellectual Property Rights, which each may have in such Retained Materials. To the extent that a Deliverable contains or utilizes Retained Materials, the Bidder hereby grants to each of the WRDSB a royalty-free, irrevocable, perpetual, world-wide, non-exclusive license to make, use, sell, modify, prepare derivative works, disclose, publish, sublicense, copy and communicate by electronic means such Retained Materials.

iii. The Supplier agrees to always cooperate fully and will cause its Personnel to always cooperate fully, with respect to signing such documents and doing such acts and other things reasonably requested by the WRDSB to confirm the transfer of ownership rights in the Deliverables.

49. Patent, Copyright and Other Proprietary Rights

The Bidder (by responding) agrees that the Bid on acceptance by the Designated Representative, becomes the property of the WRDSB. The copyright for respective purchased concepts and/or materials will become the property of the WRDSB unless otherwise mutually agreed upon by the Bidder and the WRDSB.

All reports submitted by the successful bidder, including the "Asbestos Audit Update Report" dated [Month/Day/Year], and any related documentation, shall become the exclusive property of the Board upon submission, including all associated intellectual property rights, except for any pre-existing intellectual property of the contractor unless otherwise agreed in writing.

The consultant shall ensure the accuracy and legal compliance of all submitted materials, which may be verified or audited by the Board.

The Board and its authorized agents may use, reproduce, and disclose the report as necessary to fulfill obligations under applicable legislation, including the Occupational Health and Safety Act, Ontario Regulation 278/05, and relevant privacy laws such as but not limited to Freedom of Information and Protection of Privacy Act (FIPPA), the Municipal Freedom of Information and Protection of Privacy Act (MFIPPA).

All information shall be treated as confidential and shall not be disclosed by the consultant to third parties without prior written consent from the Board representative, unless required by law.

All Bids, other documents as well as correspondence are subject to the provisions of the Municipal Freedom of Information and Protection of Privacy Act (MFIPPA).

50. Performance

i. Where the Supplier is in default in conducting any of its obligations under the contract, the WRDSB may issue a verbal warning outlining the deficiency in supply or other aspects of performance and requiring the Supplier to correct those deficiencies within such period as stated.

ii. If the deficiency is not corrected within the time specified, or there is a further instance of deficient performance, the WRDSB may issue a written notice to the Supplier, identifying the deficiency in performance and setting a final date or period for its correction.

iii. If corrective steps are not taken by the final date or within that time, the WRDSB may terminate the Contract and take corrective action.

iv. Termination of any Contract can be immediate depending on the severity of the default.

v. The Supplier shall have no right to perform the services contemplated under this agreement beyond the time when such services become unsatisfactory to the WRDSB; and in the event that Supplier shall be discharged before all the services contemplated hereunder have been completed, or the services are for any reason terminated, stopped or discontinued because of the inability of the Supplier to serve under this agreement they shall be paid only for that portion of the Work which shall have been satisfactorily completed at the time of termination.

vi. Where deemed appropriate, a performance evaluation shall be completed by the WRDSB. The evaluation report shall be reviewed with Procurement Services, and a copy of the completed evaluation forwarded to the Supplier for their records. Dependent on the evaluation scoring, the WRDSB may request a corrective action plan and/or project size/value may be affected on future bid opportunities for your company.

51. Permits and Licenses

Unless stated otherwise, the Supplier shall apply for all required permits and licenses, supply all necessary notices required for the Work and pay all required fees. These costs shall be included in the Total Price. A copy of all permits, and any other required documentation shall be provided to the WRDSB upon request.

52. Proceedings Against the WRDSB

The Bidder represents and warrants that the Bidder is not a party to any legal suits, actions, litigation proceedings, arbitrations, alternative dispute resolutions, investigations, or claims (Hereinafter collectively referred to as “Claims”) by or against or otherwise involving the WRDSB and the Bidder. The WRDSB may reject any Bid in the event of potential, current, pending, or threatened litigation, arbitration, alternative dispute resolution, or disputes involving the WRDSB and the Bidder.

53. Protection of WRDSB Assets

The Supplier (the Supplier / Subcontractor) shall be informed of and protect all WRDSB assets including existing structures and vehicles, to the satisfaction of the WRDSB. Any damage shall be reported to the WRDSB and subsequently repaired and/or replaced by the Supplier, at their expense, to the satisfaction of the WRDSB. The Supplier shall not

cause any inconvenience to WRDSB operations, staff, public or users of the WRDSB facilities, within reason. Communication between the successful Supplier and the school (or WRDSB representative if school contact is not available) must be timely and effective to ensure all stakeholders are considered / aware of work to be completed.

54. Records, Inspection, Audits

The WRDSB will have the right, upon reasonable notice, to full access to the accounts and records of the Supplier in respect of the goods, services and equipment provided by it under the Contract, for the purposes of inspection and/or audit. The Supplier shall make and retain such records during the term of the Contract and for a minimum of seven (7) years following its termination, cancellation, or expiry.

55. Reserved Rights of the WRDSB

The WRDSB reserve the right, in their respective sole and unfettered discretion, to:

i. Reject any Bid received from a Bidder which is party to any potential, current, past or existing suits, actions, and litigation proceedings, arbitrations, alternative dispute resolutions, investigations, Bidder performance evaluations that are below expectations, significant or persistent deficiencies in performance of any substantive requirement or obligation under a prior agreement or agreements or claims by or against or otherwise involving either of the WRDSB and the Bidder.
ii. waive formalities and accept Bids which substantially comply with the requirements of this tender.
iii. accept any Bid in whole or in part.
iv. accept, reject, or cancel any or all Optional or Provisional pricing.
v. discuss with any Bidders different or additional terms to those contemplated in this Procurement Document or in any Bid submission.
vi. make public the names of any or all Bidders.
vii. accept or reject equivalent or alternative brand names.
viii. check references other than those provided by any Bidder.
ix. Verify with any Bidder or with a third party any information set out in a Bid.
x. reject any, or any part of, any or all Bids, or cancel the bidding process at any stage and/or issue a new Bid call for the same or similar deliverables.
xi. disqualify any Bidder:
    a. whose Bid contains misrepresentations or any other, inaccurate, or misleading information, or any qualifications within its Bid,
    b. who has engaged in conduct prohibited by the Procurement Document,
    c. with inadequate credentials or due to unsatisfactory past performance,
xii. reject Bid(s) from Bidder who has engaged in lobbying or has contravened any of the terms of the Procurement Document.
xiii. reject a Bid based on:
    a. information provided by references or credit check or other due diligence efforts,
    b. the information provided by a Bidder pursuant to the WRDSB exercising its clarification rights under the procurement process, or

c. other relevant information that arises during the procurement process.

xiv. choose to reject a Bid if only a single Bid is received and cancel the bidding process or enter direct negotiations with the sole Bidder.

xv. accept a Bid other than the lowest or highest scoring and/or to not accept any Bid for any reason whatsoever.

xvi. award the contract as split-order, lump sum or individual-item basis, or such combination as shall best serve the interests of the WRDSB.

xvii. negotiate in circumstances permitted for in the Bid document or by relevant policies, or directives, and include additional terms and conditions during the process of negotiations.

xviii. no longer consider a Bidder if a satisfactory outcome is not reached as part of negotiation, as determined by the WRDSB in their sole discretion and move to the next highest ranked Bid in such event.

xix. select a Bidder other than the Bidder whose Bid reflects the lowest cost to the WRDSB and/or award the Contract to any Bidder.

xx. award any business/Work described in this Procurement to more than one (1) Bidder.

xxi. not award the Contract if the costs of completing the Work exceed budget funding; or do not respond to all requirements or do not represent fair market value or where necessary internal approvals are not obtained, and

xxii. if the WRDSB receives a bid from a Supplier with Rates that are abnormally lower than the Rates in other Bids, the WRDSB may verify with the Bidder that the Bidder satisfies the conditions for participation and can fulfill the Agreement.

These reserved rights are in addition to any other expressed rights or any other rights which may be implied in the circumstances. The WRDSB shall not be liable for any expenses, costs or losses suffered by any Bidder or any third party resulting from the WRDSB exercising any of its express or implied rights under this bidding process.

56. Responsibilities of the Supplier

Acceptance of a purchase order issued by the WRDSB and/or a signed agreement shall constitute a contract (the "Contract") between the WRDSB and the Supplier, which shall bind the Supplier on their part to furnish and deliver the goods, equipment and services at the prices given and in accordance with the conditions of the Procurement document.

The Supplier shall:

i. perform the Contract in accordance with the specifications, terms and conditions under which it is awarded.

ii. act in a professional manner always when dealing with WRDSB staff, with the public, and while working on site.

iii. not, except with the consent of the WRDSB in writing, release information relating to any subsequent order for advertising, promotional or technical purposes or otherwise give it publicly in any fashion, nor shall the name of either of the WRDSB

be used for, or in connection with, any advertising or promotional purpose of the Supplier.

iv. treat information gained while working with the WRDSB confidentially and not use it for any other project and return it to the WRDSB if requested.

v. submit to Finance – Accounts Payable, an invoice for payment at the completion of the Work, unless otherwise stated. All applicable taxes, including HST, are to be itemized separately on invoices. Include the purchase order number on each invoice; and

vi. provide necessary information if they wish to receive payment by Electronic Funds Transfer (EFT).

57. Site and Work Examination

i. Bidders will accept the site conditions, and the requirements of the Work, as is. No modifications to the Bid will be accepted after the Closing Time.

ii. No claim for extras will be allowed for Work or difficulties encountered due to conditions of the site which were visible, knowable, or reasonably inferable, prior to the time of submission of Bid. Bidders shall accept sole responsibility for any error or neglect on their part in this regard.

iii. Before submitting a Bid, each Bidder shall:
   a. carefully examine this entire Procurement Document to determine the extent of the Work, and various provisions including the maps, drawings, reports and specifications.
   b. immediately report all discrepancies between the various documents and site conditions.
   c. provide the names of Subcontractors, subconsultants, and suppliers to whom the Bidder intends to sublet a portion or portions of the Work with complete information as to the requirements of the Work. This is to include maps, drawings, reports, specifications, and all requirements of the Procurement Document including any addenda.

iv. In the event of discrepancies between the maps, drawings, reports, and the specifications regarding quantity or quantities of materials or items, and in the absence of Addenda in clarification of said discrepancies, the Bidder is to include for the larger quantity or quantities.

v. No additional payments will be made for any costs incurred through failure of the Bidder to abide by provisions stipulated in all the articles and sub-articles of this item.

vi. Any soils investigation, environmental, geotechnical, or other reports prepared or obtained with respect to the Place of the Work (collectively the “Reports”) are available from the Consultant. Where the Work involves existing buildings, structures, facilities, plant or equipment, any reports, data, or as-built drawings

concerning such buildings, structures, facilities, plant or equipment (collectively the "Data") are available from the Consultant. The Reports should not be considered a representation of the site conditions of the entire Place of the Work, and the Reports and Data are provided for general information and guidance purposes only. Neither the Owner nor the Consultant guarantees the accuracy or completeness of the Reports or the Data, nor does either assume any responsibility for any interpretations or conclusions that bidders may make or draw from the Reports or the Data.

vii. Each Bidder is solely responsible, at its own cost and expense, to conduct its own independent research and due diligence, or to perform any other investigations considered necessary by the Bidder to satisfy itself as to all existing conditions. The Bidders' obligations set out in this paragraph apply irrespective of any Reports, Data or any information contained in the Bid Documents.

viii. No allowances will be made for additional costs, and no claims will be entertained in connection with conditions which could reasonably have been ascertained by investigation or other due diligence undertaken prior to the Submission Deadline, and/or in connection with Work which is required and which is reasonably inferable from the Bid Documents, the Reports and/or Data as being necessary.

58. Site Existing Services, if applicable

The position of utility pole lines, underground conduits, and services, watermains, sewers and other underground and over ground utilities and structures are not necessarily known, and the accuracy of the position of such utilities and structures on any reference documents is not guaranteed. The WRDSB will not be responsible for damages or extra work caused or occasioned by the Supplier relying on this or any other information or records.

Before starting work, the Supplier shall familiarize themselves of the exact location of all such utilities and structures and shall assume all liability for damage to them. Where extra measures are required to support utility poles during construction either by the utility involved or the Supplier themself, the costs involved shall be borne by the Supplier. The Supplier will be responsible for any fees that may be associated with these services.

59. Site Inspection and Control

A representative of the WRDSB (appointed by the WRDSB) reserves the right to enter the site at any time for the review & inspection. The presence of a said representative does not indicate satisfaction or compliance unless these comments are made by the representative and submitted to the Supplier in written form.

60. Site Investigation

Bidders shall not rely solely upon information furnished by the WRDSB but shall do their own investigation of the locations and quantity of the work to be completed under this contract.

The Bidder assumes all risk of conditions, existing or arising, in the course of the work,

which might or could make the work or any items therefore more expensive in character, or more onerous to fulfill, than was contemplated or known when the Bid was made, or the Contract signed.

61. Site Safety and Clean Up

For safety of students, staff, and community members alike, it is expected that cleanup operations will progress with the job.

Repair work will be conducted by skilled workers acceptable to the WRDSB Representative, under the liability of the Supplier.

The WRDSB Authorized Representative must approve all repairs and replacements prior to final payment.

62. Suspension of Bidders

At the sole discretion of the Manager of Procurement Services, any Bidder may be suspended from consideration for default of delivery, unsatisfactory performance, safety concerns, lobbying or contravention of the Procurement Document.

63. Sustainable Purchasing

The procurement needs of the WRDSB represent a significant level of responsibility to demonstrate leadership and support for greener business practices. Integrating environmental performance and impact into supply chain decisions is a commitment to improvement of the environment and the quality of life.

Green procurement shall be viewed in the context of achieving value for money for the total life-cycle costs. It requires the inclusion of environmental impact considerations into the procurement process, including planning, acquisition, use and disposal. Value for money should include the consideration of environmentally tangible and intangible factors when determining the total life-cycle costs and environmental impact.

64. Termination

If the Supplier fails to comply with any provision of this agreement or otherwise fails to fulfil its obligations hereunder in a competent manner satisfactory to the WRDSB, the WRDSB may give the Supplier notice in writing of such failure. If the Supplier has not remedied its failure within ten (10) working days of the said notice, the WRDSB shall be entitled to exercise any one or more of the following remedies:

i. The WRDSB may terminate the contract without further notice and exercise its rights to the Contract security provided by the Supplier.
ii. The WRDSB may withhold any payment due to the Supplier hereunder until the Supplier has remedied its failure.
iii. The WRDSB may engage the services of another Bidder to remedy the Supplier's failure and obtain reimbursement therefore from the Supplier. The said reimbursement may be obtained either through deduction from any amounts

owing to the Supplier hereunder, or through any other legal means available to the WRDSB; or

iv. The WRDSB may assert any other remedy available to it in law or equity.

Unless the WRDSB expressly agrees to the contrary, any failure of the WRDSB to exercise any of the foregoing remedies, or the granting of any extension or indulgences, shall not be prejudicial to any right of the WRDSB to subsequently obtain such remedies.

65. Termination for Convenience

The WRDSB may terminate the Contract, in whole or in part, whenever the WRDSB determine that such termination is in the best interests of the WRDSB without showing cause, upon providing written notice to the Supplier. The WRDSB shall pay all reasonable costs incurred by the Supplier/Contract up to the date of termination considering the Work performed and/or services were provided in accordance with the Contract and to the complete satisfaction of the WRDSB. Payment shall be in accordance with prices as per Contract. However, in no event shall the Supplier be paid an amount, which exceeds the Total Bid Price. The Supplier will not be reimbursed for any profits which may have been anticipated but which have not been earned up to the date of termination.

66. Termination for Lack of Funding

Should the WRDSB fail to appropriate funds to enable payments including multi-year agreements, the WRDSB may cancel the contract without termination charges, provided the Supplier receives thirty (30) days written notice of such termination from the WRDSB.

67. Tools and Equipment

All equipment and methods used to fulfill this contract shall be in accordance with best practices, guidelines, regulations, and standards with respect to safety and quality.

No equipment, tools or materials are to be stored or left overnight within WRDSB property.

At the time of bid, if requested, the bidders will indicate the type of equipment that will be used to fulfill the terms and conditions of this contract. Prior to the WRDSB entering into an agreement with the Supplier, or at any time during the contract, the WRDSB may, at its discretion, request an inspection of the equipment proposed for use.

It is the responsibility of the Supplier, in the event of a major mechanical equipment breakdown, to have available substitute equipment of similar capability. It shall be supplied and put into service to fulfill the requirements of this procurement. Failure to provide alternative equipment within expectations specified within this procurement may result in termination of the contract. It is the responsibility of the Supplier to ensure work continues and deadlines are met, despite any unforeseen interruption because of equipment failure.

It is the Supplier’s responsibility to ensure that the equipment and the operator, are licensed in accordance with the Ministry of Transportation. The WRDSB may, at their

discretion, require the Supplier to provide proof that the equipment has passed a recent (within the last 12 months) government safety inspection and that the operators are suitably licensed prior to commencement of the contract. All vehicles, tools, equipment, and voltage rated gloves requiring dielectric testing shall have current certification and all applicable documentation.

The equipment must be in good working order, and the Supplier is responsible for all general and preventative maintenance, fuel, and repair and those costs shall be included in the bid. All preventative maintenance and repairs are to be conducted off peak hours. No other charges to the WRDSB shall apply.

68. Traffic/Pedestrian Safety

Vehicles, including Couriers and movable Equipment/Machinery must take all precautions to avoid entering or driving on WRDSB premises during nutritional breaks, before and after school hours, or anytime there are students or staff outside of the building.

69. Traffic Control and Site use

Supplier's activities shall be limited to areas for work and storage as directed by the WRDSB. Except where expressly permitted by the WRDSB, materials and/or equipment must not be stored within four metres of the travelled portion of any roadway. Notwithstanding the foregoing, the Supplier shall, at their own expense, remove any equipment or material, which, in the WRDSB's opinion, constitutes a traffic hazard.

The Supplier shall plan and schedule the routes of vehicles transporting all materials to, from or within the job, so that vehicular movements are accomplished with minimum interference and interruption to traffic. This will necessitate vehicles to "slip off" or "slip on" in the direction of traffic lanes.

The Supplier shall maintain the adjacent side streets in a condition free from debris resulting from their operations, such as materials spilling from trucks. It is expected that the Supplier shall regularly inspect the surface condition of these streets and promptly dispose of all the debris.

Should the Supplier be unable to conduct the required remedial measures, the WRDSB may conduct the necessary maintenance and the costs for the work shall be deducted from payments due to the Supplier.

The Supplier shall, at his own expense and to the satisfaction of the WRDSB, provide all vehicular traffic control equipment, signs, material, and labor required to perform the work in a safe manner in accordance with the "Occupational Health and Safety Act" and the "Ontario Traffic Manual" (Book 7). The Supplier shall assure that all required forms are completed and on-site for inspection. In the event a traffic control company is contracted for the purpose of signage, information regarding the Supplier must be included in the quotation and included with the bid price.

The Supplier shall be responsible for the supply of traffic flag person(s) where required under the "Ontario Traffic Manual" (Book 7), with all costs included in the base unit price.

70. Usage Reports

The WRDSB, at no additional cost, may request detailed usage reports or activity log reports in Excel (unprotected) to be provided annually or upon request. Reports may include but are not limited to descriptions, codes, quantities, extended quantity, price.

71. Variation of Bid Prices

No variation in the Total Price, unit prices and/or optional pricing will be permitted after Closing Time, except in the instance of variation solely due to an increase or decrease in the rate of eligible taxes, beyond the control of the Bidder, occurring after the time of submission of their Bid. An increase or a decrease in the rate of eligible taxes, under these circumstances, shall alter the price of the Bid, but only to the extent of the tax increase or decrease.

72. Volume and Exclusivity

Quantities and/or WRDSB sites may be added, deleted, or adjusted at the discretion of the WRDSB due to but not limited to unintentional omissions, inventory adjustments, new schools/school closures, and/or budget restraints.

The WRDSB makes no guarantee of value or volume of work to be assigned to the Supplier. Any agreement executed with the Supplier may not be an exclusive contract for the provision of the described goods/services. The WRDSB reserves the right to contract with other Supplier for good(s) and/or service(s) of the same as or like the deliverables or may obtain such good(s) and service(s) internally.

73. Waiver

No term or provision of the Procurement Document shall be deemed waived, and no breach consented to, unless such waiver or consent is in writing and signed by an authorized representative of the party claimed to have waived or consented to the breach. No consent by a party to, or waiver of, a breach under the procurement process shall constitute consent to, waiver of, or excuse for any other, different, or subsequent breach.

The WRDSB does not accept responsibility for any information or any errors or omissions which may be contained in the Procurement Document, or the data, materials or documents disclosed or as provided to the Bidders pursuant to the procurement. The WRDSB make no representation or warranty, either expressed or implied, in fact or in law with respect to the accuracy or completeness of the Procurement Document or such data, materials or documents and the WRDSB shall not be responsible for any actions, costs, losses or liability whatsoever arising from any Bidder's reliance or use of the Procurement Document or any other technical or historical data, materials or documents provided by the WRDSB. The Bidder is responsible for obtaining its own independent financial, legal, accounting, and technical advice with respect to any information included in the Procurement Document or in any data, materials, or documents provided or required by the WRDSB.

74. Warranty and Maintenance

The Supplier, at the time of substantial completion, shall furnish a written warranty covering material, maintenance, and work performed under the contract for a minimum period of two (2) years from the date of completion, unless otherwise stated. Individual sections may extend warranties beyond the two (2) year time frame. The Supplier is responsible for all required maintenance complete with materials and labour during the warranty period.

75. Work Continuity

The Supplier shall take adequate care to protect the Work, the WRDSB's property, adjacent properties and shall be fully responsible for any damage or injury due to their act or neglect or is attributable to the acts or omissions of the Supplier, its Subcontractors, sub-suppliers, agents, employees, officers, directors, and all other persons and other entities for whose acts the Supplier may be liable or for whom it is responsible in law and their respective officers, directors, agents and employees.

The Supplier shall ensure minimal to no disturbance to the user(s) of the surrounding facilities. Replacement and repairs due to any damage caused to any existing structure, WRDSB equipment, public assets or private property during the Work shall be the responsibility of the Supplier.

76. Work Requirements

The Supplier shall perform entire work with minimal to no disturbance to the routine operations of the respective facility. Further, the Supplier shall ensure safety of WRDSB assets, students, staff as well as public always.

77. Workplace Safety Insurance Board (WSIB) Certificate

The WRDSB requires all Suppliers and service providers be in full compliance with all requirements imposed upon them by the Workplace Safety Insurance Board. All certificates of training and Safety Policies and Manuals must be available for presentation upon request.

Prior to a formal award and commencing the services covered by this Procurement, the recommended Bidder(s) make available to the WRDSB a copy of certificates of good standing with the Workplace Safety and Insurance Board ("WSIB Certificates") listing appropriate NAICS Code and Code Description stating that the Supplier/consultant and all of its subcontractors/consultants have complied with the requirements of the Workplace Safety and Insurance Act and in particular, that all requisite premiums under such Act have been paid. Where the Bidder is exempt from registration with the WSIB, the Bidder must provide evidence of such by way of written confirmation from WSIB.

WSIB Certificate evidencing renewal or replacement of Certificates listing appropriate NAICS Code and Code Description shall be uploaded through the Bidding System within 72 hours of the expiration or replacement of the current certificate, without demand by the WRDSB.

END OF SECTION

00 73 00 “The Supplementary Conditions”

SUPPLEMENTARY CONDITIONS & AMENDMENTS TO STANDARD CONSTRUCTION DOCUMENT CCDC2 -2020 STIPULATED PRICE SUBCONTRACT

(the “Supplementary Conditions”)

AGREEMENT, DEFINITIONS, AND

GENERAL CONDITIONS

The Standard Construction Document CCDC 2 2020 for a Stipulated Price Contract, English version, consisting of the Agreement Between *Owner* and Contractor, Definitions and General Conditions of the Stipulated Price Contract, Parts 1 to 13 inclusive, governing same, together with the changes with the new *Construction Act* is hereby made part of these *Contract Documents*, with the following amendments, additions and modifications:

AGREEMENT BETWEEN OWNER AND CONTRACTOR

ARTICLE A-1 – THE WORK

SC17.1	A-1.3	Amend Article A-1.3 by deleting all of the words after *"Contract Documents"* and replace them with the following" "attain .1 *Substantial Performance of the Work* by the 27 day of August in the year 2026. .2 (if applicable) *Occupancy* by the 8 day of September in the year 2026, and .3 *Ready-for-Takeover* by the 8 day of September in the year 2026."
SC1.1		

ARTICLE A-3 – CONTRACT DOCUMENTS

SC2.1	A-3.1	Add the following documents to the list of *Contract Documents* in Article A-3.1: • Waterloo Region District School Board's Supplementary Conditions & Amendments to Standard Construction Document CCDC 2-2020 Stipulated Price Subcontract, May 2022 Version, including any Special Supplementary Conditions listed in Appendix 2 thereto • *Drawings* • *Specifications* • Performance Bond (Form 32 -Performance Bond under Section 85.1 of the *Act*) if applicable • Labour and Material Payment Bond (Form 31 – Labour and Material Payment Bond under Section 85.1 of the *Act*), if applicable

ARTICLE A-4 – CONTRACT PRICE

SC3.1	A-4.4	Delete Article A-4.4 and replace it with the following: "4.4 The *Contract Price* shall remain fixed for the duration of the *Contract Time*, subject only to adjustments as provided for in the *Contract Documents*. For certainty, and without limiting the general application of the preceding sentence, the *Contractor* assumes all risks in connection with cost increases for overhead, *Products, Labour*, and *Construction Equipment* prescribed by the *Contract Documents* for the performance of the *Work*, and the *Contractor* assumes all responsibility for liabilities and additional costs that may arise as a result of the *Contractor's* inclusion of any *Product, Construction Equipment, Supplier*, or *Subcontractor* in its calculation of the *Contract Price*."

ARTICLE A-5 – PAYMENT

SC4.1	A-5.1	Delete Article A- 5.1 in its entirety including all subparagraphs and replace it with the following: "5.1 Subject to the provisions of the *Contract Documents* and the *Construction Act*, the *Owner* shall:

		.1 make progress payments to the *Contractor* on account of the *Contract Price* when due together with such *Value Added Taxes* as may be applicable to such payments, .2 upon *Substantial Performance of the Work* as certified by the *Consultant*, and on the 61st day after the publication of the certificate of *Substantial Performance of the Work*, in accordance with the *Construction Act*, there being no claims for lien registered against the title to the *Place of the Work* and no written notices of lien delivered to the *Owner*, pay the *Contractor* the unpaid balance of the 10% holdback, together with such *Value Added Taxes* as may be applicable to such payment, less any amount stated in the *Owner's Notice of Non-Payment*. .3 after *Ready-for-Takeover* has been achieved in accordance with the *Contract Documents* and the *Work* is complete, there being no claims for lien registered against the title to the *Place of the Work* and no written notices of lien delivered to the *Owner*, pay the *Contractor* any unpaid balance of the *Contract Price* in accordance with GC 5.5 – FINAL PAYMENT, excluding *Deficiency Holdback*, together with such *Value Added Taxes* as may be applicable to such payment."
SC 4.2	A-5.2.1	Delete subparagraph 5.2.1 in its entirety and replace it with the following: ".1 Should either party fail to make payments as they become due under the terms of the *Contract* or in an award by arbitration or court, interest shall also become due and payable on such unpaid amounts at the prejudgment interest rate prescribed by the *Courts of Justice Act* (Ontario), as it may change from time to time."

***NEW* ARTICLE A-9 – CONFLICT OF INTEREST**

SC3.1	A-9	Add new ARTICLE A-9 CONFLICT OF INTEREST as follows: "**ARTICLE A-9 CONFLICT OF INTEREST** 9.1 The *Contractor*, *Subcontractors* and *Suppliers* and any of their respective advisors, partners, directors, officers, employees, agents, and volunteers shall not engage in any activity or provide any services where such activity or the provision of such services creates a conflict of interest (actually or potentially, in the sole opinion of the *Owner*) with the provision of the *Work* pursuant to the *Contract*. The *Contractor* acknowledges and agrees that a conflict of interest, as described in this Article A-9, includes, but is not limited to, the use of *Confidential Information* where the *Owner* has not specifically authorized such use. 9.2 The *Contractor* shall disclose to the *Owner*, in writing, without delay, any actual or potential situation that may be reasonably interpreted as either a conflict of interest or a potential conflict of interest, including the retention of any *Subcontractor* or *Supplier* that is directly or indirectly affiliated with or related to the *Contractor*. 9.3 The *Contractor* covenants and agrees that it will not hire or retain the services of any employee or previous employee of the *Owner* where to do so constitutes a breach by such employee or previous employee of the *Owner's* conflict of interest policy, as it may be amended from time to time, until after completion of the *Work* under the *Contract*. 9.4 It is of the essence of the *Contract* that the *Owner* shall not have direct or indirect liability to any *Subcontractor or Supplier*, and that the *Owner* relies on the maintenance of an arm's-length relationship between the *Contractor* and its *Subcontractors and Suppliers*. Consistent with this fundamental term of the *Contract*, the *Contractor* will not enter into any agreement or understanding with any *Subcontractor or Supplier*, whether as part of any contract or any written or oral collateral agreement, pursuant to which the parties thereto agree to

		cooperate in the presentation of a claim for payment against the *Owner*, directly or through the *Contractor*, where such claim is, in whole or in part, in respect of a disputed claim by the *Subcontractor or Supplier* against the *Contractor*, where the payment to the *Subcontractor or Supplier* by the *Contractor* is agreed to be conditional or contingent on the ability to recover those amounts or a portion thereof from the *Owner*, failing which the *Contractor* shall be saved harmless from all or a portion of those claims. The *Contractor* acknowledges that any such agreement would undermine the required arm's-length relationship and constitute a conflict of interest. For greater certainty, the *Contractor* shall only be entitled to advance claims against the *Owner* for amounts pertaining to *Subcontractor or Supplier* claims where the *Contractor* has actually paid or unconditionally acknowledged liability for those claims or where those claims are the subject of litigation or binding arbitration between the *Subcontractor or Supplier* and the *Contractor* has been found liable for those claims. 9.5 Notwithstanding paragraph 7.1.2 of GC 7.1 - OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, OR TERMINATE THE CONTRACT, a breach of this Article A-9 by the *Contractor*, any of the *Subcontractors*, or any of their respective advisors, partners, directors, officers, employees, agents, and volunteers shall entitle the *Owner* to terminate the *Contract*, in addition to any other rights and remedies that the *Owner* has in the *Contract*, in law, or in equity."

***NEW* ARTICLE A-10 TIME OF THE ESSENCE**

SC6.1	Article A-10	Add the following new Article A-10 as follows: **"ARTICLE A-10 TIME OF THE ESSENCE** 10.1 It is agreed that one of the reasons the *Contractor* was selected by the *Owner* for this *Contract* is the *Contractor's* representation and covenant that it will attain *Substantial Performance, Occupancy (*if applicable), and *Ready-for-Takeover* within the *Contract Time* stated in Article A-1 of this *Contract*. 10.2 The *Contractor* acknowledges and agrees that it is responsible to marshal its resources and those of its *Subcontractors and Suppliers* in a manner which will permit timely attainment of *Substantial Performance, Occupancy (*if applicable), and *Ready-for-Takeover*. The *Contractor* agrees that time is of the essence of this *Contract*."
SC6.2		

DEFINITIONS

Revisions to Existing Definitions		
SC5.1	Consultant	Amend the definition of "Consultant" by adding the following to the end of the definition: "For the purposes of the *Contract*, the terms "*Consultant"*, "*Architect*" and "*Engineer*" shall be considered synonymous."
SC5.2	Payment Legislation/Construction Act	Delete the Definition of *Payment Legislation* and replace it with "Construction Act" as follows: "**Construction Act** *Construction Act* means the *Construction Act*, R.S.O. 1990, c. C.30, as amended, including all regulations passed under it that are enforceable as of the date of execution of this *Contract*. For certainty, the first procurement process for the *Project* (*i.e*., the "improvement" as that term is defined in the *Construction Act*) commenced on or after October 1, 2019."
SC5.3	Ready-for-Takeover	Amend the Definition of *Ready-for-Takeover* by deleting all the words after "as verified" and replacing them with "and approved by the *Owner*."
New Definitions		
	Adjudication	Add the following definition: "**Adjudication** *Adjudication* means construction dispute interim adjudication as defined under the *Construction Act*."
	Close-Out Documentation	Add the following new definition: "**Close-Out Documentation** *Close-Out Documentation* has the meaning given to it under GC 5.4.2."
	Confidential Information	Add the following definition: "**Confidential Information** *Confidential Information* means all the information or material of the *Owner* that is of a proprietary or confidential nature, whether it is identified as proprietary or confidential or not, including but not limited to information and material of every kind and description (such as drawings and move-lists) which is communicated to or comes into the possession or control of the *Contractor* at any time, but *Confidential Information* shall not include information that: .1 is or becomes generally available to the public without fault or breach on the part of the *Contractor*, including without limitation breach of any duty of confidentiality owed by the *Contractor* to the *Owner* or to any third party, but only after that information becomes generally available to the public; .2 the *Contractor* can demonstrate to have been rightfully obtained by the *Contractor* from a third party who had the right to transfer or disclose it to the *Contractor* free of any obligation of confidence;

		.3 the *Contractor* can demonstrate to have been rightfully known to or in the possession of the *Contractor* at the time of disclosure, free of any obligation of confidence; or .4 is independently developed by the *Contractor* without use of any *Confidential Information*."
	Construction Schedule	Add the following definition: "**Construction Schedule** *Construction Schedule* means the schedule for the performance of the *Work* provided by the *Contractor*, and approved by the *Owner*, pursuant to GC 3.4.1, including any amendments to the *Construction Schedule* made pursuant to the *Contract Documents*."
	Construction Schedule Update	Add the following definition: "**Construction Schedule Update** *Construction Schedule Update* means an update to the *Construction Schedule* by the *Contractor* using Microsoft Project (or other approved scheduling software) that accurately depicts the progress of the *Work* relative to the critical path established in the *Construction Schedule* approved in GC 3.5.1 (or any approved successor *Construction Schedule*), aligns with the currently approved date for *Substantial Performance of the Work*, shows up-to-date projected major activity sequences and durations, and shows any changes or delays in anticipated completion dates of major activities in the *Work* relative to the last *Construction Schedule Update,* and includes the following minimum deliverables: (a) a record version of the updated *Construction Schedule* in .pdf format; (b) an editable copy of the updated original digital file of the *Construction Schedule* (*e.g.*, .mpp format files for Microsoft Project)."
	Deficiency Holdback	Add the following definition: **Deficiency Holdback** - a value applied to the total contract value to cover the cost of completing deficiencies in, or correcting defects in The Work.
	Direct Costs	Add the following definition: "**Direct Costs** *Direct Costs* are the reasonable costs of performing the contract or subcontract including costs related to the additional supply of services or materials (including equipment rentals), insurance and surety bond premiums, and costs resulting from seasonal conditions, that would not have been incurred, but do not include indirect damages suffered, such as loss of profit, productivity or opportunity, or any head office overhead costs."
	EFT	Add the following definition: "**EFT** *EFT* has the definition given to it under GC 5.3.2."

	Excess Soil	Add the following definition: "**Excess Soil** *Excess Soil* means "excess soil" as that term is defined under section 3 of the *Excess Soil Regulation*."
	Excess Soil Regulation	Add the following Definition: "**Excess Soil Regulation** *Excess Soil Regulation* means O. Reg. 406/19: On-Site and Excess Soil Management to the *Environmental Protection Act,* R.S.O. 1990, c. E.19."
	Final Pre-Invoice Submission Meeting	Add the following ne definition: "**Final Pre-Invoice Submission Meeting** *Final Pre-Invoice Submission Meeting* has the meaning given to it in GC 5.5.1."
	Force Majeure	Add the following definition: "**Force Majeure** *Force Majeure* means any cause, unknown at the effective date of the *Contract* and beyond either party's control, other than financial difficulties, bankruptcy or insolvency, which prevents the performance by a party, or both, of any of their respective obligations under the *Contract* and the event of *Force Majeure* did not arise from a party's default and could not be avoided or mitigated by the exercise of reasonable effort or foresight. *Force Majeure* includes *Labour Disputes*; fire; unusual delay by common carriers or unavoidable casualties; delays in obtaining third-party licences, permits, agreements, or approvals (excluding approvals of any *Subcontractors* or *Suppliers* of any tier); civil disturbance; emergency acts, orders, legislation, regulations or directives or revoking of funding from any government or other public authority; acts of a public enemy; war; riot; sabotage; blockage; embargo; lightning; earthquake; adverse weather conditions but only if substantially beyond the weather norms of the *Place of the* Work; acts of God; or declared epidemic or pandemic outbreak or other public health emergency (*e.g*. SARS, COVID-19)."
	Install	Add the following definition: "**Install** *Install* means install and connect. *Install* has this meaning whether or not the first letter is capitalized."
	Labour Dispute	Add the following definition: "**Labour Dispute** *Labour Dispute* means any lawful or unlawful labour problems, work stoppage, labour disruption, strike, job action, slow down, lock-outs, picketing, refusal to work or continue to work, refusal to supply materials, cessation or work or other labour controversy which does, or might, affect the *Work*."
	Notice of Non-Payment	Add the following definition:

		"**Notice of Non-Payment** *Notice of Non-Payment* means a notice of non-payment of holdback (Form 6) or a notice of non-payment (Form 1.1) under the *Act*, as applicable to the circumstances."
	OHSA	Add the following definition: "**OHSA** *OHSA* means the *Occupational Health and Safety Act*, R.S.O. 1990, c. O.1, as amended, including all regulations thereto."
	Overhead	Add the following definition: "**Overhead** *Overhead* means all site and head office operations and facilities, all site and head office administration and supervision; all duties and taxes for permits and licenses required by the authorities having jurisdiction at the *Place of the Work*; all requirements of Division 1, including but not limited to submittals, warranty, quality control, calculations, testing and inspections; meals and accommodations; and, tools, expendables and clean-up costs."
	Payment Period	Add the following definition: "**Payment Period** *Payment Period* has the definition given to it under GC 5.2.1."
	Pre-Invoice Submission Meeting	Add the following definition: "**Pre-Invoice Submission Meeting** *Pre-Invoice Submission Meeting* has the definition given to it under GC 5.2.1."
	Proper Invoice	Add the following definition: "**Proper Invoice** *Proper Invoice* means a "proper invoice" as that term is defined in Section 6.1 of the *Act*, including the minimum requirements set out in Appendix "1" of the Supplementary Conditions."
	Proper Invoice Submission Date	Add the following definition: "**Proper Invoice Submission Date** *Proper Invoice Submission Date* has the definition given to it under GC 5.2.2.1."
	Request for Information (RFI)	Add the following definition: "**Request for Information (RFI)** *Request for Information* or *RFI* means written documentation sent by the *Contractor* to the *Owner* or to the *Owner's* representative or the *Consultant* requesting written clarification(s) and/or interpretation(s) of the *Drawings* and/or *Specifications*, *Contract* requirements and/or other pertinent information required to complete the *Work* of the *Contract* without applying for a change or changes to the *Work*."

	Restricted Period	Add the following definition: "**Restricted Period** *Restricted Period* means the (inclusive) period of time between December 1 to January 8 and August 15 to September 15 of any given year throughout the duration of the *Contract*."

GENERAL CONDITIONS OF THE STIPULATED PRICE CONTRACT

Where a General Condition or paragraph of the General Conditions of the *Contract* is deleted by these amendments, the numbering of the remaining General Conditions or paragraphs shall remain unchanged, unless stated otherwise herein, and the numbering of the deleted item will be retained, unused.

PART 1 GENERAL PROVISIONS

GC 1.1 CONTRACT DOCUMENTS

SC5.1	1.1.3	Delete GC 1.1.3 in its entirety and replace it with the following: "1.1.3 The *Contractor* shall review the *Contract Documents* and shall report promptly to the *Consultant* any error, inconsistency, or omission the *Contractor* may discover. Such review by the *Contractor* shall be undertaken with the standard of care described in GC 3.13.1. Except for its obligation to make such a review and report the result, the *Contractor* does not assume any responsibility to the *Owner* or to the *Consultant* for the accuracy of the *Contract Documents*. Provided it has exercised the degree of care and skill described in this GC 1.1.3, the *Contractor* shall not be liable for damage or costs resulting from such errors, inconsistencies, or omissions in the *Contract Documents*, which the *Contractor* could not reasonably have discovered through the exercise of the required standard of care."
SC5.2	1.1.4	Delete GC 1.1.4 in its entirety and replace it with the following: "1.1.4 Except for the obligation to complete the review prescribed in GC 1.1.3, and report the results as set out in this GC 1.1.4, the *Contractor* is not responsible for errors, omissions or inconsistencies in the *Contract Documents*. If there are errors, omissions or inconsistencies discovered by or made known to the *Contractor* as part of its review under GC 1.1.3 or at any time during the performance of the *Work*, the *Contractor* shall immediately notify the *Consultant*, and request instructions, a *Supplemental Instruction*, *Change Order*, or *Change Directive*, as the case may require, and shall not proceed with the *Work* affected until the *Contractor* has received corrected or additional information from the *Consultant*. The *Contractor* shall not be liable for damage or costs resulting from such errors, inconsistencies, or omissions in the *Contract Documents*, which the *Contractor* could not reasonably have discovered through the exercise of care and skill described in GC 3.13."
	1.1.5.1	Delete GC 1.1.5.1 and replace with the following: ".1 the order of priority of documents, from highest to lowest, shall be: .1 Supplementary Conditions; .2 the Agreement between the Owner and the Contractor; .3 the Definitions; .4 the General Conditions; .5 Division 01 of the *Specifications*

		.6 technical *Specifications;* .7 material and finishing schedules; and .8 the *Drawings*.
	1.1.5.5	Delete GC 1.1.5.5 and replace with the following: ".5 Noted materials and annotations on the *Drawings* shall govern over the graphic representation of the *Drawings.*"
	1.1.5.6 to 1.1.5.8	Add the following new GC 1.1.5.6 to 1.1.5.8 as follows: ".6 Finishes in the room finish schedules shall govern over those shown on the *Drawings.* .7 Architectural drawings shall have precedence over structural, plumbing, mechanical, electrical and landscape drawings insofar as outlining, determining and interpreting conflicts over the required design intent of all architectural layouts and architectural elements of construction, it being understood that the integrity and installation of the systems designed by the *Consultant* or its sub-*Consultants* are to remain with each of the applicable drawing disciplines. .8 Should reference standards contained in the *Specifications* conflict with the *Specifications*, the *Specifications* shall govern. Should reference standards and *Specifications* conflict with each other or if certain requirements of the *Specifications* conflict with other requirements of the *Specifications*, the more stringent requirements shall govern."
	1.1.9	Add the following to the end of GC 1.1.9: "The *Specifications* are divided into divisions and sections for convenience but shall be read as a whole and neither such division nor anything else contained in the *Contract Documents* will be construed to place responsibility on the *Owner* or the *Consultant* to settle disputes among the *Subcontractors* and *Suppliers* with respect to such divisions. The *Drawings* are, in part, diagrammatic and are intended to convey the scope of the *Work* and indicate general and appropriate locations, arrangements and sizes of fixtures, equipment, outlets and other elements. The *Contractor* shall obtain more accurate information about the locations, arrangements and sizes from study and coordination of the *Drawings,* including *Shop Drawings* and shall become familiar with conditions and spaces affecting those matters before proceeding with the *Work.* Where site conditions require reasonable minor changes where the change requires only the additional labour two hours or less, the *Contractor* shall make such changes at no additional cost to the *Owner.* Similarly, where known conditions or existing conditions interfere with new installation and require relocation, the *Contractor* shall include such relocation in the *Work.* The *Contractor* shall arrange and install fixtures and equipment in such a way as to conserve as much headroom and space as possible. The schedules are those portions of the *Contract Documents*, wherever located and whenever issued, which compile information of similar content and may consist of drawings, tables and/or lists."
	1.1.13	Add new paragraphs 1.1.13 as follows: 1.1.13 The *Contractor* shall keep one copy of the current *Contract Documents*, *Supplemental Instructions*, contemplated *Change Orders*, *Change Orders*, *Change Directives*, cash allowance disbursement authorizations, reviewed *Shop Drawings*, submittals, reports and records of meeting at the *Place of the Work*, in good order and available to the *Owner* and *Consultant*."

GC 1.3 RIGHTS AND REMEDIES

SC6.1	1.3.2	In paragraph 1.3.2 delete the word "No" from the beginning of the paragraph and replace it with the words: "Except with respect to the requirements set out in paragraphs 6.4.1, 6.5.4, 6.6.1 and 8.3.2, no…"

***NEW* GC 1.5 EXAMINATION OF DOCUMENTS AND SITE**

SC8.1	1.5	Add new GC 1.5 – EXAMINATION OF DOCUMENTS AND SITE as follows: "**GC 1.5 EXAMINATION OF DOCUMENTS AND SITE** 1.5.1 The *Contractor* declares and represents that in tendering for the *Work*, and in entering into a Contract with the *Owner* for the performance of the *Work*, it has investigated for itself the character of the *Work t*o be done, based on information generally available from a visit to the *Place of the Work* and to the standard set out under GC 3.14.1 and further represents and warrants and acknowledges that it considered and took into account in the *Contract Price* all reasonably known impacts and restrictions arising from the COVID-19 pandemic, including without limitation corresponding legislative changes that may impact performance of the *Project*, various weather conditions that may affect the *Work*, the availability of supplies and labour or other conditions or risks that the *Contractor* knew about or reasonably ought to have known about prior to the date of the *Contract.* The *Contractor* has assumed and does hereby assume all risk of known conditions now existing or arising in the course of the *Work* which might or could make the Work, or any items thereof more expensive in character, more onerous to fulfill than was contemplated or known when the tender was made or the *Contract* signed. 1.5.2 The *Contractor* also declares that prior to commencement of the *Work*, where in tendering for the *Work* and in entering into this *Contract*, the *Contractor* relied upon information furnished by the *Owner* or any of its agents or servants respecting the nature or confirmation of the ground at the site of the Work, the Contractor shall review to the standard specified in GC 3.14.1, the accuracy of the information furnished by the *Owner*. If a condition is materially different than what is stated in the information furnished by the *Owner*, the *Contractor* shall, no later than five (5) *Working Days* after the first observation of such condition(s), deliver to the *Owner* and to the *Consultant* a *Notice in Writing* specifying the materially different condition and the *Contractor* shall not proceed with the affected part of the Work until receiving written direction from the *Owner* or the *Consultant*. Where the *Contractor* fails to provide prompt *Notice in Writing* in accordance with this GC 1.5.2, the *Contractor* expressly waives and releases the *Owner* from all claims with respect to the said information with respect to the *Work*.

PART 2 ADMINISTRATION OF THE CONTRACT

GC 2.2 ROLE OF THE CONSULTANT

SC11.1	2.2.5	Delete paragraph 2.2.4 and replace it with the following: "2.2.4 Upon receipt of an application for payment that satisfies the requirement of a *Proper Invoice*, based on the *Consultant's* observations and evaluation of the *Contractor's* application for payment, the *Consultant* will determine the amounts owing to the *Contractor* under the *Contract* and will issue certificates for payment as provided in Article A-5 - PAYMENT, GC 5.3 - PAYMENT, GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK, and GC 5.5 - FINAL PAYMENT. If the *Consultant* determines that the amount payable to the *Contractor* differs from the amount stated in a *Proper*

		Invoice, the *Consultant* shall notify the *Owner* as provided in GC 5.3.1.2 and prepare a draft of the applicable *Notice of Non-Payment* for the amount in dispute."
	2.2.6	In the first sentence of paragraph 2.2.6, delete the words "Except with respect to GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER".
	2.2.12	At paragraph 2.2.12, insert the following at end of that paragraph: "If, in the opinion of the *Contractor*, the *Supplemental Instruction* involves an adjustment in the *Contract Price* or in the *Contract Time*, it shall, within ten (10) *Working Days* of receipt of a *Supplemental Instruction*, provide the *Consultant* with a notice in writing to that effect. Failure to provide written notification within the time stipulated in this paragraph 2.2.12 shall be deemed an acceptance of the *Supplemental Instruction* by the *Contractor*, without any adjustment in the *Contract Price* or *Contract Time*."

GC 2.3 REVIEW AND INSPECTION OF THE WORK

SC10.1	2.3.2	Amend paragraph 2.3.2 by adding the words "and *Owner*" after the words "*Consultant*" in the second and third lines.
	2.3.3	Delete paragraph 2.3.3 in its entirety and replace it with the following: "2.3.3 The *Contractor* shall furnish promptly two copies to the *Consultant* and one copy to the *Owner* of all certificates and inspection reports relating to the *Work*."
	2.3.4	In paragraph 2.3.4 add the word "review" after the word "inspections" in the first and second lines of paragraph 2.3.4.
	2.3.5	In paragraph 2.3.5 in the first line after the word "*Consultant*", add "or the *Owner*".
	2.3.8	Add a new paragraph 2.3.8 as follows: "2.3.8 The *Consultant* will conduct periodic reviews of the *Work* in progress, to determine general conformance with the requirements of the *Contract Documents*. Such reviews, or lack thereof, shall not give rise to any claims by the *Contractor* in connection with construction means, methods, techniques, sequences and procedures, nor in connection with construction safety at the *Place of Work*, responsibility for which belongs exclusively to the *Contractor*."

GC 2.4 DEFECTIVE WORK

SC11.1	2.4.1	Amend GC 2.4.1 by inserting ", the *Owner* and/or its agent" in the first sentence following "rejected by the *Consultant*".
	2.4.1.1 to 2.4.1.2	Add new paragraphs 2.4.1.1 and 2.4.1.2 as follows: "2.4.1.1 The *Contractor* shall rectify, in a manner acceptable to the *Consultant* and to the *Owner through the Consultant* all defective work and deficiencies throughout the *Work*, whether or not they are specifically identified by the *Consultant*. 2.4.1.2 The *Contractor* shall prioritize the correction of any defective work, which, in the sole discretion of the *Owner through the Consultant*, adversely affects the day to day operations of the *Owner* or which, in the sole discretion of the *Consultant*, adversely affects the progress of the *Work*."

	2.4.2	Delete paragraph 2.4.2 in its entirety and replace it with the following: "2.4.2 The *Contractor* shall promptly pay the *Owner* for costs incurred by the *Owner*, the *Owner's* own forces or the *Owner's* other contractors, for work destroyed or damaged or any alterations necessitated by the *Contractor's* removal, replacement or re-execution of defective work."
	2.4.4	Add new paragraph 2.4.4 as follows: "2.4.4 Neither acceptance of the *Work* by the *Consultant* or the *Owner*, nor any failure by the *Consultant* or the *Owner* to identify, observe or warn of defective *Work* or any deficiency in the *Work* shall relieve the *Contractor* from the sole responsibility for rectifying such defect or deficiency at the *Contractor's* sole cost, even where such failure to identify, observe or warn is negligent."

PART 3 EXECUTION OF THE WORK

GC 3.1 CONTROL OF THE WORK

SC12.1	3.1.2	Amend paragraph 3.1.2 by inserting the words "Construction Schedule" after the word "sequences".
SC12.2	3.1.3 & 3.1.4	Add new paragraphs 3.1.3 and 3.1.4 as follows: "3.1.3 Prior to commencing individual procurement, fabrication and construction activities, the *Contractor* shall verify at the *Place of the Work*, all relevant measurements and levels necessary for proper and complete fabrication, assembly and installation of the *Work* and shall further carefully compare such field measurements and conditions with the requirements of the *Contract Documents*. Where dimensions are not included or exact locations are not apparent, the *Contractor* shall immediately notify the *Consultant* in writing and obtain written instructions from the *Consultant* before proceedings with any part of the affected *Work*. 3.1.4 Notwithstanding the provisions of paragraphs 3.1.1 and 3.1.2, the *Owner* shall have access to the site at all times to monitor all aspects of construction. Such access shall in no circumstances affect the obligations of the *Contractor* to fulfill its contractual obligations."

GC 3.2 CONSTRUCTION BY OWNER OR OTHER CONTRACTORS

SC13.1	3.2.2.1	Delete subparagraph 3.2.2.1 and replace it with "[Intentionally left blank]".
	3.2.3.2	Delete subparagraph 3.2.3.2 and replace it with the following: ".2 co-ordinate and schedule the activities and work of other contractors and the *Owner's* own forces, including where other contractors or the Owner's own forces are used after the *Owner* and the *Contractor* cannot reach agreement on the value of a change, with the *Work* of the *Contractor* and connect as specified or shown in the *Contract Documents*."
	3.2.3.4	Delete the period at the end of subparagraph 3.2.3.4 and replace it with a semicolon.
	3.2.3.5	Add new subparagraph 3.2.3.5 as follows: ".5 Subject to GC 9.4 CONSTRUCTION SAFETY, for the *Owner's* own forces and for other contractors, assume overall responsibility for compliance with all aspects of the applicable health and safety legislation in force at the *Place of the Work*, including all of the responsibilities of the "constructor", pursuant to the *OHSA*."

GC 3.3 TEMPORARY WORK

SC14.1	3.3.2	In paragraph 3.3.2, in the second line after the words "where required by law", insert "or by the *Consultant*".

GC 3.4 CONSTRUCTION SCHEDULE

SC17.1	3.4.1	Delete GC 3.4.1 in its entirety and replace it with the following: "3.4.1 The *Contractor* shall: 1 within five (5) calendar days of receiving written confirmation of the award of the *Contract*, prepare and submit to the *Owner* and the *Consultant* for their review and approval, a construction schedule in the format indicated below that indicates the timing of the activities of the *Work* and provides sufficient detail of the critical events and their inter-relationship to demonstrate the *Work* will be performed in conformity with the *Contract Time* and in accordance with the *Contract Documents.* Such schedule is to include a delivery schedule for *Products* whose delivery is critical to the schedule for the *Work* or are required by the *Contract* to be included in a *Products* delivery schedule. The *Contractor* shall employ construction scheduling software, being the latest version of "Microsoft Project"*,* that permits the progress of the *Work* to be monitored in relation to the critical path established in the schedule. The *Contractor* shall provide such schedule and any successor or revised schedules in both original digital file format (*e.g.,* .mpp format for Microsoft Project), portable data file (PDF) format, and hard copy. Once accepted by the *Owner* and the *Consultant*, the construction schedule submitted by the *Contractor* shall become the baseline "**Construction Schedule**"; .2 provide the expertise and resources, such resources including manpower equipment and tools, as are necessary on a best efforts basis to maintain progress under the accepted baseline *Construction Schedule* or revised construction schedule accepted by the *Owner* pursuant to GC 3.4 CONSTRUCTION SCHEDULE, which includes without limitation, the *Contractor*'s use of all possible and, if necessary, extraordinary measures, to bring the progress of the *Work* into compliance with the *Construction Schedule*, such as (i) increasing the presence of its own forces at the *Place of the Work*; (ii) directing any *Subcontractors* or *Suppliers* to increase their labour forces and equipment; (iii) working overtime and extra shifts; and (iv) providing any additional supervision and coordination of the *Project*, all at the *Contractor's* own cost and expense save and except where GC 6.5.1, 6.5.2, or 6.5.3 apply; and, .3 monitor the progress of the *Work* on a weekly basis relative to the baseline *Construction Schedule*, or any revised *Construction Schedule* accepted by the *Owner* pursuant to GC 3.4 CONSTRUCTION SCHEDULE, deliver a *Construction Schedule Update* to the *Consultant* and *Owner* with each application for payment, at a minimum, or as may be reasonably required by the *Consultant* and advise the *Consultant* and the *Owner* weekly in writing of any variation from the baseline or slippage in the schedule; and, .4 if after applying the expertise and resources required under paragraph 3.4.1.2, the *Contractor* forms the opinion that the slippage in schedule reported in paragraph 3.4.1.3

		cannot be recovered by the *Contractor*, it shall, in the same notice provided under paragraph 3.4.1.3, indicate to the *Consultant* if the *Contractor* intends to apply for an extension of *Contract Time* as provided in PART 6 —CHANGES IN THE WORK; and, .5 ensure that the *Contract Price* shall include all costs required to phase or stage the *Work*."
	3.4.2	Add new GC 3.4.2 and GC 3.4.3 as follows: "3.4.2 If, at any time, it should appear to the *Owner* or the *Consultant* that the actual progress of the *Work* is behind schedule or is likely to become behind schedule, or if the *Contractor* has given notice of such to the *Owner* or the *Consultant* pursuant to GC 3.4.1.3, the *Contractor* shall, either at the request of the *Owner* or the *Consultant*, or following giving notice pursuant to GC 3.4.1.3, take appropriate steps to cause the actual progress of the *Work* to conform to the schedule or minimize the resulting delay. Within 5 calendar days of the request by the *Owner* or the *Consultant* or the notice being given pursuant to GC 3.4.1.3, the *Contractor* shall produce and present to the *Owner* and the *Consultant* a plan demonstrating how the *Contractor* will recover the performance of the *Work* to align with the currently approved *Construction Schedule*. 3.4.3 The *Contractor* shall not amend the *Construction Schedule* without the prior written consent of the *Owner*.. Any revisions to the *Construction Schedule* approved by the *Owner* shall not be deemed to be an extension of the *Contract Time*. All requests by the Contractor for a revision to the Construction Schedule that include an extension to the *Contract Time* must be approved by the *Owner* through an executed *Change Order*."

GC 3.5 SUPERVISION

SC17.1	3.5.1	Delete GC 3.5.1 and replace it with the following: "3.5.1 The *Contractor* shall employ a competent full-time superintendent, acceptable to the *Owner* and *Consultant*, who shall be in full time attendance at the *Place of the Work* while the *Work* is being performed. The superintendent shall not be changed by the *Contractor* without valid reason which shall be provided in writing and shall not be changed without prior consultation with and agreement by the Owner and the *Consultant*. The *Contractor* shall replace the superintendent within 7 *Working Days* of the *Owner's* written notification, if the superintendent's performance is not acceptable to the *Owner*. The *Contractor* shall provide the *Owner* and the *Consultant* with the names, addresses and telephone numbers of the superintendent referred to in this GC 3.5.1 and other responsible persons who may be contacted for emergency and other reasons during non-working hours. ."
	3.5.2	Delete GC 3.5.2 and replace it with the following: "3.5.2 The superintendent, and any project manager appointed by the *Contractor*, shall represent the *Contractor* at the *Place of the Work* and shall have full authority to act on written instructions given by the *Consultant* and/or the *Owner*. Instructions given to the

		superintendent or the project manager shall be deemed to have been given to the *Contractor* and both the superintendent and any project manager shall have full authority to act on behalf of the *Contractor* and bind the *Contractor* in matters related to the *Contract*."
	3.5.3 to 3.5.6	Add new GC 3.5.3, 3.5.4, 3.5.5 and 3.5.6 as follows: "3.5.3 The *Owner* may, at any time during the course of the *Work*, request the replacement of the appointed representative(s). Immediately upon receipt of the request, the *Contractor* shall make arrangements to appoint an acceptable replacement, which is approved by the *Owner*. 3.5.4 The supervisory staff assigned to the *Project* shall also be fully competent to implement efficiently all requirements for scheduling, coordination, field engineering, reviews, inspections and submittals defined in the *Specifications,* and have a minimum 5 years documented "Superintendent/Project Management" experience. 3.5.5 The *Consultant and Owner* shall reserve the right to review the record of experience and credentials of supervisory staff assigned to the *Project* prior to commencement of the *Work*. 3.5.6 A superintendent assigned to the *Work* shall be "Gold Seal Certified" as per the Canadian Construction Association; or a superintendent that can demonstrate the requisite experience and success related to the *Project* to the sole satisfaction of the *Owner*."

GC 3.6 SUBCONTRACTORS AND SUPPLIERS

SC18.1	3.6.1.1	In paragraph 3.6.1.1 add to the end of the second line the words "including any warranties and service agreements which extend beyond the term of the *Contract*."
	3.6.1.2	In subparagraph 3.6.1.2 after the words "the *Contract Documents*" add the words "including any required surety bonding".
	3.6.2	Delete paragraph 3.6.2. in its entirety and replace it with the following: "3.6.2 The substitution of any *Subcontractor* and/or *Suppliers* after submission of the *Contractor's* bid will not be accepted unless a valid reason is given in writing to and approved by the *Owner*, whose approval may be arbitrarily withheld. The reason for substitution must be provided to the *Owner* and to the original *Subcontractor* and/or *Supplier* and the *Subcontractor* and/or *Supplier* shall be given the opportunity to reply to the *Contractor* and *Owner.* The *Contractor* shall be fully aware of the capability of each *Subcontractor* and/or *Supplier* included in its bid, including but not limited to technical ability, financial stability and ability to maintain the proposed construction schedule."
	3.6.7, 3.6.8, 3.6.9 & 3.6.10	Add new paragraphs 3.6.7, 3.6.8, 3.6.9, and 3.6.10 as follows: "3.6.7 The *Contractor* represents and warrants that it has confirmed the availability of its *Subcontractors* for the *Project* and, in particular, for the performance of their respective portions of the *Work* to ensure completion of the *Project* within the *Contract Price* and the *Contract Time*.

		3.6.8 The *Consultant* or the *Owner*, acting reasonably, may from time to time require the *Contractor* to remove from the *Project* any personnel of the *Contractor*, including project managers, superintendents or *Subcontractors*. Such persons shall be replaced by the *Contractor* in a timely fashion to the satisfaction of the *Consultant* or the *Owner*, as the case may be, at no cost to the *Owner*. 3.6.9 Where provided in the *Contract*, the *Owner* may assign to the *Contractor*, and the *Contractor* agrees to accept, any contract procured by the *Owner* for *Work* or services required on the *Project* that has been pre-tendered or pre-negotiated by the *Owner*, and upon such assignment, the *Owner* shall have no further liability to any party for such contract. 3.6.10 The *Contractor* covenants that each subcontract or supply contract which the *Contractor* enters into for the purpose of performing the *Work* shall expressly provide for the assignment thereof to the *Owner* (at the option of the *Owner*) and the assumption by the *Owner* of the obligations of the *Contractor* thereunder, upon the termination of the *Contract* and upon written notice by the *Owner* to the other parties to such subcontracts or supply contracts, without the imposition of further terms or conditions; provided, however, that until the *Owner* has given such notice, nothing herein contained shall be deemed to create any contractual or other liability upon the *Owner* for the performance of obligations under such subcontracts or supply contracts and the *Contractor* shall be fully responsible for all of its obligations and liabilities (if any) under such subcontracts and supply contracts."

GC 3.7 LABOUR AND PRODUCTS

SC19.1	3.7.1	Amend paragraph 3.7.1 by adding the words, "…, agents, *Subcontractors* and *Suppliers*…" after the word "employees" in the first line.
SC19.2	3.7.2	Delete paragraph 3.7.2 and substitute with the following: "3.7.2 *Products* provided shall be new and shall conform to all current applicable specifications of the Canadian Standards Association, Canadian Standards Board or General Standards Board, ASTM, National Building Code, provincial and municipal building codes, fire safety standards, and all governmental authorities and regulatory agencies having jurisdiction at the *Place of the Work*, unless otherwise specified. *Products* which are not specified shall be of a quality consistent with those specified and their use acceptable to the *Consultant*. *Products* brought on to the *Place of the Work* by the *Contractor* shall be deemed to be the property of the *Owner*, but the *Owner* shall be under no liability for loss thereof or damage thereto arising from any cause whatsoever. The said *Products* shall be at the sole risk of the *Contractor*. Workmanship shall be, in every respect, first class and the *Work* shall be performed in accordance with the best modern industry practice."
	3.7.4 to 3.7.8	Add new paragraphs 3.7.4, 3.7.5, 3.7.6, 3.7.7, and 3.7.8 as follows: "3.7.4 Upon receipt of a *Notice in Writing* from the *Owner,* the *Contractor* shall immediately remove from the *Place of the Work*, tradesmen and labourers or anyone whose conduct jeopardizes the safety of the *Owner's* operations or who are considered by the *Owner* or the *Consultant* to be unskilled or otherwise objectionable. Immediately upon receipt of the request, the *Contractor* shall make arrangements to appoint an acceptable replacement.

		3.7.5 The *Contractor* shall cooperate with the *Owner* and its representatives and shall take all reasonable and necessary actions to maintain stable and harmonious labour relations with respect to the *Work* at the *Place of the Work*, including cooperation to attempt to avoid *Work* stoppages, trade union jurisdictional disputes and other *Labour Disputes*. Any costs arising from labour disputes shall be at the sole expense of the *Contractor.* 3.7.6 The cost for overtime required beyond the normal *Working Day* to complete individual construction operations of a continuous nature, such as pouring or finishing of concrete or similar work, or *Work* that the *Contractor* elects to perform at overtime rates without the *Owner* requesting it, shall not be chargeable to the *Owner*. 3.7.7 All manufactured *Products* which are identified by their proprietary names or by part or catalogue number in the *Specifications* shall be used by the *Contractor.* No substitutes for such specified *Products* shall be used without the written approval of the *Owner* and the *Consultant*. Substitutes will only be considered by the *Consultant* when submitted in sufficient time to permit proper review and investigation. When requesting approval for the use of substitutes, the *Contractor* shall include in its submission any proposed change in the *Contract Price*. The *Contractor* shall use all proprietary *Products* in strict accordance with the manufacturer's directions. Where there is a choice of proprietary *Products* specified for one use, the *Contractor* may select any one of the *Products* so specified for this use. 3.7.8 Materials, appliances, equipment and other *Products* are sometimes specified by reference to brand names, proprietary names, trademarks or symbols. In such cases, the name of a manufacturer, distributor, *Supplier* or dealer is sometimes given to assist the *Contractor* to find a source *Supplier*. This shall not relieve the *Contractor* from its responsibility from finding its own source of supply even if the source names no longer supplies the *Product* specified. If the *Contractor* is unable to obtain the specified *Product*, the *Contractor* shall supply a substitute product equal to or better than the specified *Product,* as approved by the *Consultant* with no extra compensation. Should the *Contractor* be unable to obtain a substitute *Product* equal to or superior to the specified *Product* and the *Owner* accepts a different Product, the *Contract Price* shall be adjusted accordingly, as approved by the *Consultant*."

GC 3.8 SHOP DRAWINGS

SC21.1	3.8.1	Delete paragraph 3.8.1 in its entirety and replace with the following: "3.8.1 The *Contractor* shall provide shop drawings as described in the *Contract Documents* and as the *Consultant* may reasonably request."
	3.8.3	Delete paragraph 3.8.3 and replace it with the following: "3.8.3 The *Contractor* shall prepare a *Shop Drawings* schedule acceptable to the *Owner* and the *Consultant* prior to the first application for payment. A draft of the proposed *Shop Drawings* schedule shall be submitted by the *Contractor* to the *Consultant* and the *Owner* for approval. The draft *Shop Drawings* schedule shall clearly indicate the phasing of *Shop*

		Drawings submissions. The *Contractor* shall periodically re-submit the *Shop Drawings* schedule to correspond to changes in the *Construction Schedule*."
	3.8.5	Delete paragraph 3.8.5 in its entirety and substitute the following: "3.8.5 At the time of providing *Shop Drawings*, the *Contractor* shall advise the *Consultant* in writing of any deviations in *Shop Drawings* from the requirements of the *Contract Documents*. The *Consultant* shall indicate the acceptance of such deviation expressly in writing. Where manufacturers' literature is submitted in lieu of scaled drawings, it shall be clearly marked in ink, to indicate the specific items for which review is requested."
	3.8.8 to 3.8.12	Add new paragraphs 3.8.8, 3.8.9, 3.8.10, 3.8.11, and 3.8.12 as follows: "3.8.8 Reviewed *Shop Drawings* shall not authorize a change in the *Contract Price* and/or the *Contract Time*. 3.8.9 Except where the parties have agreed to a different *Shop Drawings* schedule pursuant to paragraph 3.10.3, the *Contractor* shall comply with the requirements for *Shop Drawings* submissions stated in the *Specifications*. 3.8.10 The *Contractor* shall not use the term "by others" on *Shop Drawings* or other submittals. The related trade, *Subcontractor* or *Supplier* shall be stated. 3.8.11 Certain *Specifications* sections require the *Shop Drawings* to bear the seal and signature of a professional engineer. Such professional engineer must be registered in the jurisdiction of the *Place of the Work* and shall have expertise in the area of practice reflected in the *Shop Drawings*. 3.8.12 The *Consultant* will review and return *Shop Drawings* and submittals in accordance with the schedule agreed upon in paragraph 3.10.3, The *Contractor* shall allow the *Consultant* a minimum of 10 *Working Days* to review *Shop Drawings* from the date of receipt. If resubmission of *Shop Drawings* is required, a further 10 *Working Day* period is required for the *Consultant's* review."

***NEW* GC 3.9 USE OF THE WORK**

SC22.1	GC 3.9	Add new GC 3.9 – USE OF THE WORK as follows: "**GC 3.9 USE OF THE WORK** 3.9.1 The *Contractor* shall confine *Construction Equipment*, *Temporary Work*, storage of *Products*, waste products and debris, and operations of employees and *Subcontractors* to limits indicated by laws, ordinances, permits, by the direction of the *Owner* or the *Consultant*, or the *Contract Documents* and shall not unreasonably encumber the *Place of the Work*. 3.9.2 The *Contractor* shall not load or permit to be loaded any part of the *Work* with a weight or force that will endanger the safety of the *Work*.

		3.9.3 The *Owner* shall have the right to enter or occupy the *Place of the Work* in whole or in part for the purpose of placing fittings and equipment, or for other use before *Substantial Performance of the Work*, if, in the opinion of the *Consultant*, such entry and occupation does not prevent or substantially interfere with the *Contractor* in the performance of the *Contract* within the *Contract Time.* Such entry or occupation shall neither be considered as acceptance of the *Work* or in any way relieves the *Contractor* from its responsibility to complete the *Contract*."

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***NEW* GC 3.10 CUTTING AND REMEDIAL WORK**

SC23.1	GC 3.10	Add new GC 3.10 – CUTTING AND REMEDIAL WORK as follows: "**GC 3.10 CUTTING AND REMEDIAL WORK** 3.10.1 The *Contractor* shall perform the cutting and remedial work required to make the affected parts of the *Work* come together properly. Such cutting and remedial work shall be performed by specialists familiar with the *Products* affected and shall be performed in a manner to neither damage nor endanger the *Work*. 3.10.2 The *Contractor* shall coordinate the *Work* to ensure all cutting and remedial work required is kept to a minimum. 3.10.3 Unless specifically stated otherwise in the *Specifications*, the *Contractor* shall do all cutting and making good necessary for the proper installation and performance of the *Work.* 3.10.4 To avoid unnecessary cutting, the *Contractor* shall lay out its work and advise the *Subcontractors,* when necessary, where to leave holes for installation of pipes and other work."

***NEW* GC 3.11 CLEAN UP**

SC24.1	3.11.1, 3.11.2, 3.11.3, 3.11.4, 3.11.5 & 3.11.6	Add new paragraphs 3.11.1, 3.11.2, 3.11.3, 3.11.4, 3.11.5, and 3.11.6 as follows: "3.11.1 The *Contractor* shall maintain the *Work* in a safe and tidy condition and free from the accumulation of waste products and debris, other than that caused by the *Owner*, other contractors or their employees. The *Contractor* shall remove accumulated waste and debris at least once a week as a minimum or as required by the nature of the *Work*. 3.11.2 Before applying for *Substantial Performance of the Work*, the *Contractor* shall remove waste products and debris, other than that resulting from the work of the *Owner*, other contractors or their employees, and shall leave the *Place of the Work* clean and suitable for use or occupancy by the *Owner*. The *Contractor* shall remove products, tools, materials, *Construction Equipment,* and *Temporary Work* not required for the performance of the remaining work.

		3.11.3 As a condition precedent to submitting its application for final payment, the *Contractor* shall remove any remaining products, tools, materials, *Construction Equipment*, *Temporary Work*, and waste products and debris, other than those resulting from the work of the *Owner*, other contractors or their employees. 3.11.4 The *Contractor* shall clean up garbage during and after construction and maintain the *Place of the Work* in a neat and orderly condition on a daily basis. Prior to leaving the *Place of the Work* and following completion of the *Work*, the *Contractor* shall make good all damage to the building and its components caused by the performance of the *Work* or by any *Subcontractor* or *Supplier*. The *Contractor* shall leave the *Place of the Work* in a clean and finished state; remove all *Construction Equipment* and materials; remove all paint, stains, labels, dirt, etc. from the *Place of the Work*; and touch up all damaged painted areas (if applicable). The *Contractor* shall be responsible for restoring those areas of the *Place of the Work*, impacted by the *Work*, to their original condition." 3.11.5 Without limitation to or waiver of the *Owner's* other rights and remedies, the *Owner* shall have the right to back charge to the *Contractor* the cost of damage to the site caused by transportation in and out of the *Place of the Work* by the *Contractor*, *Subcontractors* or *Suppliers,* if not repaired before final payment. 3.11.6 The *Contractor* shall dispose of debris at a location and in a manner acceptable to the *Owner* (and to the authorities having jurisdiction at the *Place of the Work* and at the disposal area) and the *Contractor* shall cover containers with tarpaulins."

***NEW* GC 3.12 EXCESS SOIL MANAGEMENT**

SC25.1	GC 3.12	Add new GC 3.12 – EXCESS SOIL MANAGEMENT as follows: "**GC 3.12 EXCESS SOIL MANAGEMENT** 3.12.1 The *Contractor* shall be solely responsible for the proper management of all *Excess Soil* at the *Place of the Work* and for performance of the *Work* in compliance with the rules, regulations and practices required by the *Excess Soil Regulation* until such time as *Ready-for-Takeover* is achieved. Without restricting the generality of the previous sentence, the *Contractor*'s responsibility under this GC 3.12 includes the designation, transportation, tracking, temporary and/or final placement, record keeping, and reporting of all *Excess Soil* in connection with the Work all in compliance with the *Excess Soil Regulation*. 3.12.3 The *Contractor* shall indemnify and save harmless the *Owner*, their agents, officers, directors, administrators, employees, consultants, successors and assigns from and against the consequences of any and all health and safety infractions committed directly by the *Contractor*, or those for whom it is responsible at law, under the *Excess Soil Regulation*, or any environmental protection legislation, including the payment of legal fees and disbursements on a substantial indemnity basis. Such indemnity shall apply to the extent to which the *Owner* is not covered by insurance."

***NEW* GC 3.13 CONTRACTOR STANDARD OF CARE**

SC25.1	3.13	Add a new GC 3.13 – CONTRACTOR STANDARD OF CARE as follows: "**GC 3.13 CONTRACTOR STANDARD OF CARE** "3.13.1 In performing its services and obligations under the *Contract*, the *Contractor* shall exercise the standard of care, skill and diligence that would normally be provided by an experienced and prudent contractor supplying similar services for similar projects. The *Contractor* acknowledges and agrees that throughout the *Contract,* the performance of the *Contractor's* obligations, duties and responsibilities shall be interpreted in accordance with this standard. The *Contractor* shall exercise the same standard of care, skill and diligence in respect of any *Products*, personnel or procedures which it may recommend to the *Owner* or employ on the *Project*. 3.13.2 The *Contractor* further represents, covenants and warrants to the *Owner* that: .1 the personnel it assigns to the *Project* are appropriately experienced; .2 it has a sufficient staff of qualified and competent personnel to replace any of its appointed representatives, subject to the *Owner's* approval, in the event of death, incapacity, removal or resignation; and .3 there are no pending, threatened or anticipated claims, liabilities or contingent liabilities that would have a material effect on the financial ability of the *Contractor* to perform its work under the *Contract*."

PART 4 ALLOWANCES

GC 4.1 CASH ALLOWANCES

SC27.1	4.1.3	In GC 4.1.3 delete the words "through the *Consultant*" and replace them with "in writing."
	4.1.4	Delete GC 4.1.4 in its entirety and replace it with the following: "4.1.4 Where the actual cost of the *Work* under any cash allowance exceeds the amount of the allowance, any unexpended amounts from other cash allowances shall be reallocated, by the *Consultant* at the *Owner*'s direction, to cover the shortfall, and, in that case, there shall be no additional amount added to the *Contract Price* for overhead and profit. Only where the actual cost of the *Work* under all cash allowances exceeds the total amount of all cash allowances shall the *Contractor* be compensated for the excess incurred and substantiated, plus an amount for overhead and profit on the excess only, as set out in the *Contract Documents.*"
	4.1.7	Delete GC 4.1.7 in its entirety and replace it with the following:

		"4.1.7 The net amount of any unexpended cash allowances, after providing for any reallocations as contemplated in paragraph 4.1.4, shall be deducted from the *Contract Price* by *Change Order* without any adjustment for the *Contractor's* overhead and profit on such amount."
	4.1.8 and 4.1.9	Add new GC 4.1.8 and 4.1.9 as follows: "4.1.8 The *Owner* reserves the right to call, or to have the *Contractor* call, for competitive bids for portions of the *Work* to be paid for from cash allowances. 4.1.9 Cash allowances cover the net cost to the *Contractor* of services, *Products*, *Construction Equipment*, freight, unloading, handling, storage, installation, provincial sales tax, and other authorized expenses incurred in performing any *Work* stipulated under the cash allowances but does not include any *Value Added Taxes* payable by the *Owner* and the *Contractor."*

PART 5 PAYMENT

GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

SC28.1	5.1	Delete GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER and all paragraphs thereunder, including any reference to GC 5.1 throughout the *Contract*.

GC 5.2 APPLICATIONS FOR PAYMENT

SC29.1	5.2.1	Delete GC 5.2.1 and replace it with the following: "5.2.1 Upon execution of the *Contract*, and in any event prior to the *Contractor* submitting its first application for payment, the *Owner* shall issue a purchase order to the *Contractor* for the performance of the *Contract*. The number indicated on such purchase order must be clearly identifiable on all applications for payment. Applications for payment shall be dated the last day of each month or an alternative day of each month agreed to in writing by the parties, with each month representing one payment period under the *Contract* (each a "**Payment Period**"). Within 3 calendar days of the end of each *Payment Period*, the *Contractor* will submit a draft application for payment to the *Owner* and the *Consultant*. Upon receipt of the draft application for payment, and within 7 calendar days, a representative of each of the *Contractor*, *Owner*, and the *Consultant* shall attend a meeting to discuss and review the work completed during the *Payment Period*, including quantities, if applicable (the "**Pre-Invoice Submission Meeting**"). In the event that the scheduled date for the *Pre-Invoice Submission Meeting* is not a *Working Day*, the *Pre-Invoice Submission Meeting* shall occur on the next *Working Day*. The *Contractor* shall bring with it to the *Pre-Invoice Submission Meeting* the following: .1 a copy of the draft application for payment; .2 any documents the *Contractor* is required to bring to the *Pre-Invoice Submission Meeting* as stipulated in the *Contract Documents* or as reasonably requested by the *Owner*; and

		.3 any other documents reasonably requested, in advance, by the *Owner* or the *Consultant*."
SC29.2	5.2.2	Delete GC 5.2.2 in its entirety and replace it with the following: "5.2.2 Applications for payment shall be given in accordance with the following requirements: .1 Within 5 calendar days following the *Pre-Invoice Submission Meeting*, the *Contractor* shall deliver its application for payment to the *Owner* and to the *Consultant* for *Work* performed during the *Payment Period* ("**Proper Invoice Submission Date**") subject to the following: .1 If the fifth calendar day following the *Pre-Invoice Submission Meeting*, to which an invoice relates falls on a day that is not a *Working Day*, the *Proper Invoice Submission Date* shall be deemed to fall on the next *Working Day*. .2 The application for payment must be delivered to the *Owner* and to the *Consultant* in the same manner as a *Notice in Writing* during the hours of 9:00 am to 4:00pm (EST) on the *Proper Invoice Submission Date*. Delivery to the *Owner* shall be to the following email address: **facilities_cap@wrdsb.ca** .3 If an application for payment is received after 4:00 p.m. (EST) on the applicable *Proper Invoice Submission Date*, the application for payment will not be considered or reviewed by the *Owner* and *Consultant* until the next *Proper Invoice Submission Date.* Notwithstanding the foregoing, the *Owner* in its sole and absolute discretion may elect to accept an application for payment submitted after 4:00 p.m. on the applicable *Proper Invoice Submission Date*; however, such acceptance shall not be construed as a waiver of any of its rights or waive or release the *Contractor*'s obligations to strictly comply with the requirements prescribed in this subparagraph 5.2.2.3. .4 No applications for payment shall be accepted by the *Owner* prior to the *Proper Invoice Submission Date*. .5 All applications for payment shall include all of the requirements for a *Proper Invoice* prescribed by the *Construction Act* and this *Contract* and be dated the last day of the applicable *Payment Period*;"
SC29.3	5.2.3	Delete GC 5.2.3 and replace it with the following: "5.2.3 The amount claimed shall be for the value, proportionate to the amount of the *Contract*, of *Work* performed and *Products* delivered and incorporated into the *Work* as of the last date of the applicable *Payment Period*. Materials may also be deemed to be supplied to an improvement, for payment purposes, when, in the *Owner's* opinion, they are placed and properly secured on the land on which the improvement is made, or placed upon land designated by the *Owner* or agent of the *Owner*, but placing the materials on the land so designated does not, of itself, make that land subject to a lien. No amount claimed shall include products delivered and incorporated into the work, unless the products are free

		and clear of all security interests, liens and other claims of third parties. No amount claimed shall include *Products* delivered to the *Place of the Work* unless the *Products* are free and clear of all security interests, liens, and other claims of third parties."
SC29.4	5.2.4	After the word "*Consultant*" in GC 5.2.4 add the words "and the *Owner*"
SC29.5	5.2.5	After the word "*Consultant*" in GC 5.2.5 add the words "or the *Owner*".
SC29.6	5.2.9	Add new 5.2.9 as follows: "5.2.9 The *Contractor* shall prepare and maintain current as-built drawings which shall consist of the *Drawings* and *Specifications* revised by the *Contractor* during the *Work*, showing changes to the *Drawings* and *Specifications*, which current as-built drawings shall be maintained by the *Contractor* and made available to the *Consultant* for review with each application for progress payment. The *Consultant* shall recommend to the *Owner* that the *Owner* retain a reasonable amount for the value of the as-built drawings not presented for review."

GC 5.3 PAYMENT

SC30.1	5.3.1	Delete GC 5.3.1 in its entirety, including all subparagraphs thereunder, and replace it with the following: "5.3.1 After receipt by the *Owner* and the *Consultant* of an application for payment submitted by the *Contractor* in accordance with GC 5.2 - APPLICATIONS FOR PAYMENT: .1 the *Consultant* will either: (a) issue to the *Owner* with a copy to the *Contractor*, a progress payment certificate in the amount applied for by the *Contractor* in the *Proper Invoice*, or (b) issue to the *Owner*, with a copy to the *Contractor*, a certificate for payment for an amount determined by the *Consultant* to be properly due to the *Contractor* after applying any credits, withheld amounts, or other set-offs which the *Consultant* has determined that the *Owner* is entitled to notwithstanding any notice of dispute or disagreement that the *Contractor* may have served, along with the *Consultant's* reasons why an amount other than what is claimed in the *Proper Invoice* is properly due to the *Contractor*, which finding the *Owner* may accept or amend prior to the *Owner* issuing a *Notice of Non-Payment*, if any, in accordance with GC 5.3.2; .2 the *Owner* shall make payment to the *Contractor* on account as provided in Article A-5 PAYMENT, (a) in the amount stated in the certificate for payment, or (b) in the amount stated in the certificate for payment less such amount stated in the *Owner's Notice of Non-Payment* issued pursuant to GC 5.3.3,

		on the 28th calendar day after receipt of a *Proper Invoice*, unless such 28th calendar day lands on a day that is other than a *Working Day*, in which case payment shall be made on the next *Working Day* after such 28th day." 5.3.2 All payments to the *Contractor* shall be processed using electronic funds transfer ("**EFT**") and deposited directly to the *Contractor's* bank account unless agreed to otherwise by the *Contractor* and the *Owner* in writing. Prior to the *Contractor* submitting its first application for payment, the *Owner* and the *Contractor* shall exchange such information as is necessary to facilitate *EFT* payments. 5.3.3 In the event that the application for payment delivered by the *Contractor* pursuant to GC 5.2 - APPLICATIONS FOR PAYMENT does not include the requirements for a *Proper Invoice* or where the *Owner* disputes the amount claimed as payable in the *Proper Invoice*, then the *Owner* shall within 14 calendar days of receipt of the application for payment, issue a *Notice of Non-Payment* (Form 1.1). 5.3.4 Where the *Owner* has delivered a *Notice of Non-Payment*, the *Owner* and the *Contractor* shall first engage in good faith negotiations to resolve the dispute. If within 5 calendar days following the issuance of a *Notice of Non-Payment*, despite good faith efforts by both parties and the assistance of the *Consultant*, the *Owner* and the *Contractor* cannot resolve the dispute, either party may commence an *Adjudication* in accordance with the procedures set out in the *Construction Act.* Any portion of the *Proper Invoice* which is not the subject of the *Notice of Non-Payment* shall be payable within the time period set out in GC 5.3.1.2. 5.3.5 Provided that the *Owner* complies with its obligations under the *Construction Act*, and subject to any interim determination of an adjudicator in accordance with any *Adjudication*, and where applicable, a final determination made in accordance with the dispute resolution processes prescribed by this *Contract*, the *Owner* shall be entitled to claim in a *Notice of Non-Payment* a right to deduct from or, set off against, any payment of the *Contract Price*: .1 any amount expended by the *Owner* in exercising the *Owner's* rights under this *Contract* to perform any of the *Contractor's* obligations that the *Contractor* has failed to perform; .2 any damages, costs or expenses (including, without limitation, reasonable legal fees and expenses) incurred by the *Owner* as a result of the failure of the *Contractor* to perform any of its obligations under the *Contract*; .3 any other amount owing from the *Contractor* to the *Owner* under this *Contract*. 5.3.6 The amounts disputed and described under the *Notice of Non-Payment* shall be held by the *Owner* until all disputed amounts of the *Proper Invoice* have been resolved pursuant to PART 8 – DISPUTE RESOLUTION.
	5.3.2 to 5.3.7	Add new paragraphs 5.3.2, 5.3.3, 5.3.4, 5.3.4, 5.3.5, 5.3.6, and 5.3.7 as follows:

		5.3.7 The *Contractor* represents, warrants, and covenants to the *Owner* that it is familiar with its prompt payment and trust obligations under the *Construction Act* and will take all required steps and measures to ensure that it complies with the applicable prompt payment and trust provisions under the *Construction Act* including, without limitation, section 8.1 of the *Construction Act*. Evidence of the *Contractor's* compliance under this GC 5.3.7, including evidence demonstrating that all *EFTs* by the *Owner* to the *Contractor* are kept in a bank account in the *Contractor's* name will be made available to the *Owner* within 5 *Working Days* following receipt by the *Contractor* of a *Notice in Writing* making such request."

GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK- AND PAYMENT OF HOLDBACK

SC32.1	GC 5.4	Delete GC 5.4 – SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK in its entirety and replace it with the following: "**GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK** 5.4.1 When the *Contractor* considers that *Substantial Performance of the Work* has been achieved, the *Contractor* shall prepare and submit to the *Consultant* and the *Owner* a comprehensive deficiency list of items to be completed or corrected, including any incomplete *Close-Out Documentation*, and apply for a review by the *Consultant* and the *Owner* to establish *Substantial Performance of the Work*. Failure to include an item on the list does not alter the responsibility of the *Contractor* to complete the *Contract*. 5.4.2 Prior to, or as part of its written application for *Substantial Performance of the Work* the *Contractor* shall submit to the *Consultant* submit to the *Consultant* all closeout documentation required by the *Contract Documents*, including but not limited to, warranties, manuals, guarantees, as-built drawings, warranty cards and all other relevant literature from suppliers and manufacturers including, but not limited to, where applicable (the "**Close-Out Documentation**"): .1 equipment, maintenance, and operations manuals; .2 equipment specifications, data sheets and brochures, parts lists and assembly drawings, performance curves and other related data; .3 line drawings, value charts and control sheets sequences with description of the sequence of operations; .4 warranty documents; .5 guarantees; .6 certificates; .7 service and maintenance reports; .8 *Specifications*; .9 *Shop Drawings*; .10 coordination drawings; .11 testing and balancing results and reports; .12 *Commissioning* and quality assurance documentation; .13 distribution system diagrams;

.14 spare parts;
.15 samples;
.16 existing reports and correspondence from authorities having jurisdiction in the *Place of the Work*;
.17 inspection certificates;
.18 red-lined record drawings from the construction trailer in two copies and
.19 other materials or documentation required to be submitted under the *Contract.*

5.4.3 The *Consultant* will review the *Work* to verify the validity of the application and shall promptly, and in any event, no later than 30 calendar days after receipt of the *Contractor's* complete deficiency list and application:

.1 prepare a final deficiency list incorporating all items to be completed or corrected, including any incomplete or unsubmitted *Close-Out Documentation*. Each item shall have an indicated value for correction or completion and the determination of the total value of such items shall be determined pursuant to GC 5.8 – DEFICIENCY HOLDBACK. The final deficiency list complete with values is to be included with the *Consultant's* draft verification and shall be reviewed with the *Owner* prior to the *Consultant* rendering a determination in accordance with GC 5.4.3.2

.2 having completed the requirements set out in GC 5.4.3.1,

(a) the *Consultant* shall advise the *Contractor* in writing that the *Work* or the designated portion of the *Work* is not substantially performed and give reasons why, or

(b) the *Consultant* shall state the date of *Substantial Performance of the Work* in a certificate and issue a copy of that certificate to each the *Owner* and the *Contractor.*

5.4.4 Following the issuance of the certificate of *Substantial Performance of the Work* referenced in subparagraph 5.4.3.2(b):

.1 The Contractor shall publish, in a construction trade newspaper in the area of the location of the Work, a copy of the certificate of S*ubstantial Performance of the Work* referred to in GC 5.4.2.2(b) within seven (7) calendar days of receiving a copy of the certificate signed by the *Consultant*, and the *Contractor* shall provide suitable evidence of the publication to the *Consultant* and the *Owner*. If the Contractor fails to publish such notice, the Owner shall be at liberty to publish said certificate and back-charge the Contractor its reasonable costs for doing so;

.2 The *Contractor* shall complete the *Work* within forty (40) calendar days of the date certified as the date of *Substantial Performance of the Work*;

.3 Notwithstanding any other provisions of the *Contract,* no payments will be processed between *Substantial Performance of the Work* and *Ready-for-Takeover*;

.4 The *Owner* reserves the right to contract out any or all unfinished *Work* if it has not been completed within forty (40) days of *Substantial Performance of the Work* using, without limitation, the funds retained in accordance with GC 5.8 - DEFICIENCY HOLDBACK, without prejudice to any other right or remedy and without affecting

		the warranty period. The cost to the *Owner* of completing the *Work* including *Owner* and *Consultant* wages and materials shall be deducted from the *Contract Price.* 5.4.5 After publication of the certificate of the *Substantial Performance of the Work*, and provided that the *Contractor* has completed performance of the *Work* within the 40 calendar days following certification of *Substantial Performance of the Work*, the *Contractor* may submit an application for payment of the outstanding *Construction Act* holdback amount, which application for payment shall: .1 include all of the requirements listed in EXHIBIT "1" - PROJECT SPECIFIC REQUIREMENTS FOR A PROPER INVOICE, as applicable to the application for payment of the holdback amount; and .2 include a statement that the *Contractor* has not received any written notices of lien or any claims for liens from any *Subcontractor* or *Supplier.* 5.4.6 The *Construction Act* holdback amount shall become due and payable the day immediately following the expiration of the holdback period prescribed by the *Construction Act* (in most cases being the 61st calendar day following the publication of the certificate of *Substantial Performance of the Work* referred to in GC 5.4.4.1), subject to the occurrence of any of the following: .1 the preservation of a lien in respect of the *Project* that has not been satisfied, discharged or otherwise provided for in accordance with the *Construction Act*; .2 receipt by the *Owner* of a written notice of lien that has not been satisfied, discharged or otherwise provided for in accordance with the *Construction Act*; or .3 prior to the expiry of 40 calendar days following the publication of the certificate of *Substantial Performance of the Work,* the *Owner* publishes a *Notice of Non-Payment* of holdback in accordance with the *Construction Act* (Form 6)*,* setting out the amount of holdback that will not be paid, which may include non-payment to secure the correction of deficiencies and/or the completion of the *Work*. 5.4.7 Notwithstanding the *Owner's* obligation to make payment of the holdback amount in accordance with GC 5.4.6, the processing of such payment remains subject to the *Owner's* internal *EFT* timing limitations. The *Owner* covenants, and the *Contractor* agrees, that payment of the holdback shall be made by *EFT* at the first opportunity during the *Owner's* normal processing of *EFTs* upon the holdback becoming due in accordance with GC 5.4.6..

GC 5.5 FINAL PAYMENT

SC35.1	GC 5.5	Delete GC 5.5 in its entirety, including all subparagraphs thereunder and replace it with the following: "5.5.1 When *Ready-for-Takeover* has been achieved in accordance with GC 12.1 – READY-FOR-TAKEOVER and the *Contractor* considers the *Work* is complete, and after the *Contractor*, the *Owner*, and the *Consultant* have attended a *Pre-Invoice Submission Meeting* analogous

to the requirement in GC 5.2.1 (the "***Final Pre-Invoice Submission Meeting***"), the *Contractor* may submit an application for final payment to the *Owner* and to the *Consultant*, which application for payment shall:

.1 include all of the requirements set out in GC 5.2.2, including without limitation those requirements listed in APPENDIX "1" - PROJECT SPECIFIC REQUIREMENTS FOR A PROPER INVOICE that are specific to an application for final payment; and

.2 if applicable, (a) a certificate from the *Consultant* or written confirmation from the *Owner* that the deficiencies or incomplete *Work* waived by the *Owner* pursuant to GC 12.1.2 have been fully rectified as of the date of the *Contractor's* application for final payment, and/or (b) written confirmation, signed by the *Owner* and the *Contractor,* that the *Contract Price* has been reduced by a specified amount in exchange for the *Owner* releasing the *Contractor* of its obligation to rectify the certain outstanding deficiencies and/or incomplete *Work* waived by the *Owner* pursuant to GC 12.1.2, as detailed in such written confirmation.

5.5.2 No later than 5 calendar days prior to the *Final Pre-Invoice Submission Meeting*, the *Contractor* will, if not already provided, submit to the *Consultant* all *Close-Out Documentation*.

5.5.3 Delivery of all *Close-Out Documentation* is a requirement for the *Proper Invoice* for final payment.

5.5.4 After receipt by the *Owner* and the *Consultant* of an application for payment submitted by the *Contractor* that is a *Proper Invoice* and by no later than 10 calendar days after the receipt of the *Proper Invoice*:

.1 the *Consultant* will either:

(a) issue to the *Owner* with a copy to the *Contractor*, a progress payment certificate in the amount applied for by the *Contractor* in the *Proper Invoice*, or

(b) deliver a finding to the *Owner* with reasons why an amount other than what is claimed in the *Proper Invoice* is properly due to the *Contractor*, which finding the *Owner* may accept or amend prior to issuing a *Notice of Non-Payment* (Form 1.1), if any, in accordance with GC 5.5.2;

.2 the *Owner* shall make payment to the *Contractor* on account as provided in Article A-5 PAYMENT,

(a) in the amount stated in the certificate for payment, or

(b) in the amount stated in the certificate for payment less such amount stated in the *Owner's Notice of Non-Payment* issued pursuant to GC 5.5.5,

on the 28th calendar day after receipt of a *Proper Invoice*, unless such 28th calendar day lands on a day that is other than a *Working Day*, in which case payment shall be made on the next *Working Day* after such 28th day.

		5.5.5 In the event that the application for final payment delivered by the *Contractor* does not include the requirements of GC 5.5.1 (including the requirements for a *Proper Invoice*) and GC 5.5.2 or where the *Owner* disputes the amount claimed as payable in the *Proper Invoice*, then the *Owner* shall within 14 calendar days of receipt of the application for payment, issue a *Notice of Non-Payment*. Where the *Owner* has delivered a *Notice of Non-Payment*, as specified under this GC 5.5.5, the *Owner* and the *Contractor* shall first engage in good faith negotiations to resolve the dispute. If within 5 calendar days following the issuance of a *Notice of Non-Payment*, despite good faith efforts by both parties with the assistance of the *Consultant*, the *Owner* and the *Contractor* cannot resolve the dispute, either party may commence an *Adjudication* in accordance with the procedures set out in the *Construction Act*. Any portion of the *Proper Invoice* which is not the subject of the *Notice of Non-Payment* shall be payable within the time period set out in GC 5.5.4.2. 5.5.6 Subject to the provisions of the *Construction Act* and any other rights conferred on the *Owner* at law or under this *Contrac*t to withhold payment or back charge or set-off against payment, the *Owner* shall pay the amount payable under a *Proper Invoice* for final payment in accordance with the *Construction Act*. 5.5.7 When the *Consultant* issues a certificate of completion in accordance with GC 5.5.4.1, the *Consultant* shall also issue a certificate for release of any holdback for finishing work amount. In accordance with the *Construction Act,* the *Owner* may retain any amounts which are required by law to satisfy any liens against the *Work*, in respect of any third party claims made to the *Owner* in respect of the *Contract* or the *Work*, and in respect of any claims the *Owner* may have against the *Contractor*. Subject to the foregoing, the *Owner* shall release the holdback in accordance with the *Construction Act.*"

GC 5.6 DEFERRED WORK

SC33.1	5.6.1	Delete paragraph 5.6.1 and replace with the following: "5.6.1 If because of conditions reasonably beyond the control of the *Contractor*, there are items of work that cannot be performed, payment in full for that portion of the *Work* which has been performed as certified by the *Consultant* shall not be withheld or delayed by the *Owner* on account thereof, but the *Owner* may withhold, subject to its requirement to issue a *Notice of Non-Payment* under the *Construction Act*, until the remaining portion of the *Work* is finished, only such an amount that the *Consultant* determines is sufficient and reasonable to cover the cost of performing such remaining work. The remaining work shall be valued as deficient work as defined in GC 5.8.1."

***NEW* GC 5.8 DEFICIENCY HOLDBACK**

SC34.1	5.8.1	Add new GC 5.8 – DEFICIENCY HOLDBACK as follows: "**GC 5.8 DEFICIENCY HOLDBACK** 5.8.1 Notwithstanding any provisions contained in the *Contract Documents* concerning certification and release of monies to the *Contractor*, the *Owner* reserves the right to retain a *Deficiency Holdback*, In addition to the Construction Act holdback. The *Deficiency*

		Holdback in the value of 2% shall be applied against the total Contract value and shall be applied to each progress payment. The *Deficiency Holdback* shall be payable to the Contractor upon the confirmation of completion of all deficiencies and defects in work by the Consultant and the Owner. 5.8.2 In performing the calculation under GC 5.8.1, .1 no individual deficiency will be valued at less than five hundred dollars ($500.00); and .2 for any *Close-Out Documentation* not submitted in advance of or as part of the *Contractor's* application for *Substantial Performance of the Work*, an amount shall be retained by the *Owner* as part of the deficiency holdback that is equal to the estimated time and material costs to retain a third-party to re-create the applicable *Close-Out Documentation*, as determined by the *Consultant*, until such time as the applicable *Close-Out Documentation* is submitted and approved. 5.8.3 The deficiency holdback shall be due and payable to the *Contractor* on the 61st day following completion of all of the deficiencies listed by the *Consultant* and confirmed to be corrected, there being no claims for lien registered against the title to the *Place of the Work* issued in accordance with the *Construction Act*, and less any amounts disputed under an *Owner*'s *Notice of Non-Payment* (Form 1.1)."

PART 6 CHANGES IN THE WORK

GC 6.1 OWNER'S RIGHT TO MAKE CHANGES

SC37.1	6.1.2	Add the following to the end of GC 6.1.2: "This requirement is of the essence and it is the express intention of the parties that any claims by the *Contractor* for a change in the *Contract Price* and/or *Contract Time* shall be barred unless there has been strict compliance with PART 6 - CHANGES IN THE WORK. No verbal dealings between the parties and no implied acceptance of alterations or additions to the *Work* and no claims that the *Owner* has been unjustly enriched by any alteration or addition to the *Work*, whether in fact there is any such unjust enrichment or not, shall be the basis of a claim for additional payment under this *Contract,* an increase to the *Contract Price*, or a claim for any extension of the *Contract Time*."
	6.1.3 to 6.1.8	Add new paragraphs 6.1.3, 6.1.4, 6.1.5, 6.1.6, 6.1.7 and 6.1.8 as follows: "6.1.3 The *Contractor* agrees that changes resulting from construction coordination, including but not limited to, scheduling, site surface conditions, site coordination, and *Subcontractor and Supplier* coordination are included in the *Contract Price* and the *Contractor* shall be precluded from making any claim for a change in the *Contract Price* as a result of such changes. 6.1.4 Labour costs shall be actual, prevailing rates at the *Place of the Work* paid to workers, plus statutory charges on labour including WSIB, unemployment insurance, Canada pension,

		vacation pay, hospitalization and medical insurance. The *Contractor* shall provide these rates, when requested by the *Consultant*, for review and/or agreement. 6.1.5 Quotations for changes to the *Work* shall only include *Direct Costs* and be accompanied by itemized breakdowns together with detailed, substantiating quotations or cost vouchers from *Subcontractors* and *Suppliers,* submitted in a format acceptable to the *Consultant* and shall include any *Direct Costs* associated with extensions in *Contract Time.* 6.1.6 When both additions and deletions covering related *Work* or substitutions are involved in a change to the *Work*, payment, including *Overhead* and profit, shall be calculated on the basis of the net difference, if any, with respect to that change in the *Work*. 6.1.7 Changes to the contract shall be quoted to permit the work to be executed within the *Contract Time* unless approved by the *Consultant* and the *Owner.* 6.1.8 No extension to the *Contract Time* shall be granted for changes in the *Work* unless the *Contractor* can clearly demonstrate that such changes significantly alter the overall construction schedule submitted at the commencement of the *Work.* Extensions of *Contract Time* and all associated costs, if approved, shall be included in the relevant *Change Order.* 6.1.9 When a change in the *Work* is proposed or required, the *Contractor* shall within 10 calendar days submit to the *Consultant* for review a claim for a change in *Contract Price* and/or *Contract Time.* Should 10 calendar days be insufficient to prepare the submission, the *Contractor* shall within 5 calendar days, advise the *Consultant* in writing of the proposed date of submission of the claim. Claims submitted after the dates prescribed herein will not be considered."

GC 6.2 CHANGE ORDER

SC38.1	6.2.1	In paragraph 6.2.1 after the last sentence in the paragraph add the following: "The adjustment in the *Contract Time* and the *Contract Price* shall include an adjustment, if any, for delay or for the impact that the change in the *Work* has on the *Work* of the *Contractor*, and once such adjustment is made, the *Contractor* shall be precluded from making any further claims for delay or impact with respect to the change in the *Work.*"
	6.2.3 to 6.2.5	Add new paragraphs 6.2.3, 6.2.4, and 6.2.5 as follows: "6.2.3 The value of a change shall be determined in one or more of the following methods as directed by the *Consultant*: .1 by estimate and acceptance of a lump sum; .2 by negotiated unit prices which include the *Contractor's* overhead and profit, or;

		.3 by the actual *Direct Cost* to the *Owner,* such costs to be the actual cost after all credits included in the change have been deducted, plus the following ranges of mark-up on such costs: .1 Contractor on work of their own forces, 5% overhead, 5% profit. .2 Subcontractor on work of their own forces, 5% overhead, 5 % profit .3 Contractor on work of Subcontractor, 5% overhead only. 6.2.4 All quotations shall include *Direct Costs* and be submitted in a complete manner listing: .1 quantity of each material, .2 unit cost of each material, .3 man hours involved, .4 cost per hour, .5 *Subcontractor* quotations submitted listing items 1 to 4 above and item 6 below. .6 mark-up. 6.2.5 The *Owner* and the *Consultant* will not be responsible for delays to the *Work* resulting from late, incomplete or inadequately broken-down valuations submitted by the *Contractor.*"

GC 6.3 CHANGE DIRECTIVE

SC39.1	6.3.6.1	Amend paragraph 6.3.6.1 by deleting the final period and adding the following: ".1 Contractors work by their own forces - 5% overhead and 5% profit, Subcontractor work by their own forces – 5% overhead and 5% profit, Contractors on Subcontractors work – 5% overhead only.
	6.3.6.2	Delete paragraph 6.3.6.2 and replace it with the following: ".2 If a change in the *Work* results in a net decrease in the *Contract Price*, the amount of the credit shall be the net cost, without deduction for *Overhead* or profit."
	6.3.7.1(4)	Delete GC 6.3.7.1(4).
	6.3.7.7	Amend GC 6.3.7.7 by deleting the words "described in paragraph 6.3.7.1" and replacing them with "approved by the *Owner* in writing and in advance of any such expenses being incurred;"
	6.3.7.9	Amend GC 6.3.7.9 by adding the following to the end of the paragraph: "…when specifically requested by the *Owner* or as directed by the *Consultant*;".

	6.3.7.10	Amend GC 6.3.7.10 by adding the following to the end of the paragraph: ", provided that such amounts are not caused by negligent acts, omissions, or default of the *Contractor* or *Subcontractor*;".
	6.3.7.13	Delete GC 6.3.7.13.
	6.3.7.15	Delete GC 6.3.7.15.
	6.3.7.17	Delete GC 6.3.7.17 in its entirety including all subparagraphs.
	6.3.11	Delete GC 6.3.11 and replace it with the following: "6.3.11 The value of the *Work* performed as a result of a *Change Directive* shall not be eligible to be included in progress payments until the amount, including the method for determining the amount, of such *Change Directive* has been determined."

GC 6.4 CONCEALED OR UNKNOWN CONDITIONS

SC40.1	6.4.1	Delete paragraph 6.4.1 in its entirety and replace with the following: "6.4.1.1 Prior to the submission of the bid on which the Contract was awarded, the Contractor confirms that it carefully investigated the Place of the Work insofar as the Place of Work was available for investigation and, in doing so, applied to that investigation the degree of care and skill required by paragraph 3.14.1 6.4.1.2 No claim by the *Contractor* will be considered by the *Owner* or the *Consultant* in connection with conditions which could reasonably have been ascertained by such investigation or other due diligence undertaken prior to the execution of the *Contract*.
	6.4.2	Amend paragraph 6.4.2 by adding a new first sentence as follows: "Having regard to paragraph 6.4.1, if the *Contractor* believes that the conditions of the *Place of the Work* differ materially from those reasonably anticipated, differ materially from those indicated in the *Contract Documents* and were concealed from discovery notwithstanding the conduct of the investigation described in paragraph 6.4.1, it shall provide the *Owner* and the *Consultant* with *Notice in Writing* no later than five (5) *Working Days* after the first observation of such conditions." -and- amend the existing second sentence of paragraph 6.4.2 in the second line, following the word "materially" by adding the words "or were concealed from discovery notwithstanding the conduct of the investigation described in paragraph 6.4.1,".
	6.4.3	Delete paragraph 6.4.3 in its entirety and substitute the following:

		"6.4.3 If the *Consultant* makes a finding pursuant to paragraph 6.4.2 that no change in the *Contract Price* or the *Contract Time* is justified, the *Consultant* shall report in writing the reasons for this finding to the *Owner* and the *Contractor*."
	6.4.5	Add new paragraph 6.4.5 as follows: "6.4.5 No claims for additional compensation or for an extension of *Contract Time* shall be allowed if the *Contractor* fails to give *Notice in Writing* to the *Owner* or *Consultant,* as required by paragraph 6.4.2."

GC 6.5 DELAYS

SC41.1	6.5.1	In paragraph 6.5.1 delete the words after the word "for" in the fourth line and replace them with the words "…reasonable *Direct Costs* directly flowing from the delay, but excluding any consequential, indirect or special damages (including, without limitation, loss of profits, loss of opportunity or loss of productivity)."
	6.5.2	Delete GC 6.5.2 in its entirety and replace it with the following: "6.5.2 If the *Contractor* is delayed in the performance of the *Work* by a stop work order issued by a court or other public authority and providing that such order was issued on account of a direct breach, violation, contravention, or a failure to abide by any laws, ordinances, rules, regulations, or codes by the *Owner*, *Other Contractor(s)*, or the *Consultant*, and relating to the *Work* or the *Place of the Work*, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may determine. The *Contractor* shall be reimbursed by the *Owner* for reasonable *Direct Costs* directly flowing from the delay, but excluding any consequential, indirect or special damages (including, without limitation, loss of profits, loss of opportunity or loss of productivity)."
	6.5.3	Delete paragraph 6.5.3 in its entirety and replace with the following: "6.5.3 If either party is delayed in the performance of their obligations under this *Contract* by *Force Majeure*, then the *Contract Time* shall be extended for such reasonable time as the *Owner* and the *Contractor* shall agree. The extension of time shall not be less than the time lost as a result of the event causing the delay, unless the parties agree to a shorter extension. Neither party shall be entitled to payment for costs incurred by such delays. Upon reaching agreement on the extension of the *Contract Time* attributable to the *Force Majeure* event, the *Owner* and the *Contractor* shall execute a *Change Order* indicating the length of the extension to the *Contract Time* and confirming that there are no costs payable by the either party for the extension of *Contract Time*. However, if at the time an event of *Force Majeure* arises a party is in default of its obligations under the *Contract* and has received a notice of default pursuant to PART 7 – DEFAULT NOTICE, this paragraph 6.5.3 shall not excuse a party from its obligation to cure the default(s). For greater certainty, the defaulting party, to the extent possible, must continue to address and cure the default notwithstanding an event of *Force Majeure*."

	6.5.4	Delete paragraph 6.5.4 in its entirety and replace it with the following: "6.5.4 No extension or compensation shall be made for delay or impact on the *Work* unless notice in writing of a claim is given to the *Consultant* not later than ten (10) *Working Days* after the commencement of the delays or impact on the *Work*, provided however, that, in the case of a continuing cause of delay or impact on the *Work*, only one notice of claim shall be necessary."
	6.5.6 to 6.5.8	Add new paragraphs 6.5.6, 6.5.7 and 6.5.8 as follows: "6.5.6 If the *Contractor* is delayed in the performance of the *Work* by an act or omission of the *Contractor* or anyone directly or indirectly employed or engaged by the *Contractor,* or by any cause within the *Contractor's* control, then (i) firstly, at its expense, and to the extent possible, the *Contractor* shall accelerate the work and/or provide overtime work to recover time lost by a delay arising under this paragraph 6.5.6, and (ii) secondly, where it is not possible for the *Contractor* to recover the time lost by implementing acceleration measures and/or overtime work, the *Contract Time* may be extended for such reasonable time as the *Owner* may decide in consultation with the *Consultant* and the *Contractor*. The *Owner* shall be reimbursed by the *Contractor* for all reasonable costs incurred by the *Owner* as the result of such delay, including, but not limited to, Owner's staff costs, the cost of all additional services required by the *Owner* from the *Consultant* or any sub-consultants, project managers, or others employed or engaged by the *Owner*, and in particular, the costs of the *Consultant's* services during the period between the date of *Substantial Performance of the Work* stated in Article A-1 herein, as the same may be extended through the provision of these General Conditions, and any later or actual date of *Substantial Performance of the Work* achieved by the *Contractor*. 6.5.7 Without limiting the obligations of the *Contractor* described in GC 3.2 – CONSTRUCTION BY OWNER OR OTHER CONTRACTORS or GC 9.4 – CONSTRUCTION SAFETY, the *Owner* or *Consultant* may, by *Notice in Writing*, direct the *Contractor* to stop the *Work* where the *Owner* or *Consultant* determines that there is an imminent risk to the safety of persons or property at the *Place of the Work*. In the event that the *Contractor* receives such notice, it shall immediately stop the *Work* and secure the site. The *Contractor* shall not be entitled to an extension of the *Contract Time* or to an increase in the *Contract Price* unless the resulting delay, if any, would entitle the *Contractor* to an extension of the *Contact Time* or the reimbursement of the *Contractor's* costs as provided in paragraphs 6.5.1, 6.5.2 or 6.5.3. 6.5.8 No claim for delay shall be made by the *Contractor* and the *Contract Time* shall not be extended due to climatic conditions or arising from the *Contractor's* efforts to maintain the *Construction Schedule*."

PART 7 DEFAULT NOTICE

GC 7.1 OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK OR TERMINATE THE CONTRACT

SC43.1	7.1.2	In GC 7.1.2, delete the words "and if the *Consultant* has given a written statement to the *Owner* and *Contractor* which provides the detail of such neglect to perform the *Work* properly or such failure to comply with the requirements of the *Contract* to a substantial degree".
SC43.2	7.1.3.4	Add a new subparagraph 7.1.3.4 as follows: ".4 an "acceptable schedule" as referred to in subparagraph 7.1.3.2. means a schedule approved by the *Consultant* and the *Owner* wherein the default can be corrected within the balance of the *Contract Time* and shall not cause delay to any other aspect of the *Work* or the work of other contractors, and in no event shall it be deemed to give a right to extend the *Contract Time*."
	7.1.4.1	Delete subparagraph 7.1.4.1 and replace it with the following: ".1 correct such default and deduct the cost, including *Owner's* expenses, thereof from any payment then or thereafter due the *Contractor*."
	7.1.4.2	Delete subparagraph 7.1.4.2 and replace it with the following: ".2 by providing *Notice in Writing* to the *Contractor*, terminate the *Contractor's* right to continue with the *Work* in whole or in part or terminate the *Contract*, and publish a notice of termination (Form 8) in accordance with the *Act*."
	7.1.5.3	In subparagraph 7.1.5.3 delete the words: "however, if such cost of finishing the *Work* is less than the unpaid balance of the *Contract Price*, the *Owner* shall pay the *Contractor* the difference"
	7.1.6 to 7.1.10	Delete GC 7.1.6 and replace it with new paragraphs 7.1.6, 7.1.7, 7.1.8, 7.1.9 and 7.1.10 as follows: "7.1.6 In addition to its right to terminate the *Contract* set out herein, the *Owner* may terminate this *Contract* at any time for any other reason and without cause upon giving the *Contractor* fifteen (15) *Working Days Notice in Writing* to that effect. In such event, the *Contractor* shall be entitled to be paid for all *Work* performed including reasonable profit, for loss sustained upon *Products* and *Construction Equipment*, and such other damages as the *Contractor* may have sustained as a result of the termination of the *Contract*, but in no event shall the *Contractor* be entitled to be compensated for any loss of profit on unperformed portions of the *Work*, or indirect, special, or consequential damages incurred. 7.1.7 The *Owner* may suspend *Work* under this *Contract* at any time for any reason and without cause upon giving the *Contractor Notice in Writing* to that effect. In such event, the *Contractor* shall be entitled to be paid for all *Work* performed to the date of suspension and be compensated for all actual costs incurred arising from the suspension, including reasonable profit, for loss sustained upon *Products* and *Construction Equipment*, and such other damages as the *Contractor* may have sustained as a result of the suspension of the *Work*, but in no event shall the *Contractor* be entitled to be compensated for any indirect, special, or consequential damages incurred. In the event that the suspension continues for more than thirty (30) calendar days, the *Contract* shall be deemed to be terminated and the provisions of paragraph 7.1.6 shall apply. 7.1.8 In the case of either a termination of the *Contract* or a suspension of the *Work* under GC 7.1 - OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, OR TERMINATE THE CONTRACT or GC 7.2 - CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the *Contractor* shall use its best commercial efforts to mitigate the financial consequences to the *Owner* arising out of the termination or suspension, as the case may be.

		7.1.9 Upon the resumption of the *Work* following a suspension under GC 7.1 - OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, OR TERMINATE THE CONTRACT or GC 7.2 - CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the *Contractor* will endeavour to minimize the delay and financial consequences arising out of the suspension. 7.1.10 The *Contractor's* obligations under the *Contract* as to quality, correction, and warranty of the *Work* performed by the *Contractor* up to the time of termination or suspension shall continue after such termination of the *Contract* or suspension of the *Work*."

GC 7.2 CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT

SC44.1	7.2.2	Delete paragraph 7.2.2 and replace it with the following: "7.2.2 If the *Work* is suspended or otherwise delayed for a period of 40 consecutive *Working Days* or more under a stop work order issued by a court or other public authority on account of a breach, violation, contravention, or a failure to abide by any laws, ordinances, rules, regulations, or codes directly by the *Owner*, the *Owner's* other contractor(s), or the *Consultant*, and relating to the *Work* or the *Place of the Work*, the *Contractor* may, without prejudice to any other right or remedy the *Contractor* may have, terminate the *Contract* by giving the *Owner* Notice in *Writing* to that effect."
SC44.2	7.2.3.1	Delete subparagraph 7.2.3.1 in its entirety.
	7.2.3.2	Delete subparagraph 7.2.3.2 in its entirety.
	7.2.3.4	In subparagraph 7.2.3.4, delete the words "except for GC 5.1 - FINANCING INFORMATION REQUIRED OF THE OWNER".
	7.2.5	Delete paragraph 7.2.5 and replace it with the following: "7.2.5 If the default cannot be corrected within the 5 *Working Days* specified in paragraph 7.2.4, the *Owner* shall be deemed to have cured the default if it: .1 commences correction of the default within the specified time; .2 provides the *Contractor* with an acceptable schedule for such correction; and, .3 completes the correction in accordance with such schedule."
	7.2.6 to 7.2.9	Add new paragraphs 7.2.6, 7.2.7, 7.2.8 and 7.2.9 as follows: "7.2.6 If the *Contractor* terminates the *Contract* under the conditions described in GC 7.2 – CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the *Contractor* shall be entitled to be paid for all *Work* performed to the date of termination, as determined by the *Consultant*. The *Contractor* shall also be entitled to recover the direct costs associated with termination, including the costs of demobilization and losses sustained

		on *Products* and *Construction Equipment*. The *Contractor* shall not be entitled to any recovery for any special, indirect or consequential losses, including loss of profit. 7.2.7 The *Contractor* shall not be entitled to give notice of the *Owner's* default or terminate the *Contract* in the event the *Owner* withholds certificates or payment or both in accordance with the *Contract* because of: .1 the *Contractor's* failure to pay all legitimate claims promptly, or .2 the failure of the *Contractor* to discharge construction liens which are registered against the title to the *Place of the Work.* 7.2.8 The *Contractor's* obligations under the *Contract* as to quality, correction and warranty of the *Work* performed by the *Contractor* up to the effective date of termination shall continue in force and shall survive termination of this *Contract* by the *Contractor*. 7.2.9 If the *Contractor* suspends the *Work* or terminates the *Contract* as provided for in GC 7.2 – CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the *Contractor* shall ensure the site and the *Work* are left in a safe, secure condition as required by authorities having jurisdiction at the *Place of the Work* and the *Contract Documents*."

PART 8 DISPUTE RESOLUTION

GC 8.1 AUTHORITY OF THE CONSULTANT

SC45.1	8.1.3	Delete paragraph 8.1.3 in its entirety and substitute as follows: "8.1.3 If a dispute is not resolved promptly, the *Consultant* will give such instruction as in the *Consultant's* opinion are necessary for the proper performance of the *Work* and to prevent delays pending settlement of the dispute. The parties shall act immediately according to such instructions, it being understood that by doing so neither party will jeopardize any claim the party may have."

GC 8.2 ADJUDICATION

SC45.2	8.2.2 to 8.2.7	Add new GC 8.2.2, 8.2.3, 8.2.4, 8.2.5, 8.2.6, and 8.2.7 as follows: "8.2.2 Save and except where the *Contractor* has given an undertaking, in accordance with the *Act*, to refer a dispute to *Adjudication*, prior to delivering a notice of *Adjudication* in a form prescribed by the *Act*, the parties agree to first address all disputes with at least one in-person meeting with the *Owner's* representative, the *Consultant's* representative, and the *Contractor's* representative. The parties agree that such steps will be taken to resolve any disputes in a timely and cost-effective manner. 8.2.3 Notwithstanding any other provisions in PART 8 DISPUTE RESOLUTION, the parties shall engage in *Adjudication* proceedings as required by, and in accordance with, the *Construction Act*. 8.2.4 The following procedures shall apply to any *Adjudication* the parties engage in under the *Construction Act*:

.1 any hearings shall be held at a venue within the jurisdiction of the *Place of the Work* or such other venue as the parties may agree and which is acceptable to the adjudicator;

.2 the *Adjudication* shall be conducted in English;

.3 each party may be represented by counsel throughout an *Adjudication*;

.4 there shall not be any oral communications with respect to issues in dispute that are the subject of an *Adjudication* between a party and the adjudicator unless it is made in the presence of both parties or their legal representatives; and

.5 a copy of all written communications between the adjudicator and a party shall be given to the other party at the same time.

8.2.5 Any documents or information disclosed by the parties during an *Adjudication* are confidential and the parties shall not use such documents or information for any purpose other than the *Adjudication* in which they are disclosed and shall not disclose such documents and information to any third party, unless otherwise required by law, save and except the for the adjudicator.

8.2.6 If the *Contractor* fails to comply with any of the notice requirements set out in the *Contract*, including the time limits set out in any of the following:

.1 GC 6.4 – CONCEALED OR UNKNOWN CONDITIONS;
.2 GC 6.5 – DELAYS;
.3 GC 6.6 – CLAIMS FOR A CHANGE IN CONTRACT PRICE;
.4 PART 8 DISPUTE RESOLUTION
.5 GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES
.6 GC 9.3 – ARTIFACTS AND FOSSILS; or
.7 GC 9.5 - MOULD

in respect of any claim or dispute, the *Contractor* shall have no entitlement whatsoever (including to an increase in the *Contract Price*, or an extension of *Contract Time*) in the context of an *Adjudication* under the *Construction Act* and waives the right to make any such claims or disputes in an *Adjudication*. This GC 8.2.6 shall operate conclusively as an estoppel and bar in the event such claims or disputes are brought in an *Adjudication* and the *Owner* may rely on this GC 8.2.6 as a complete defence to any such claims or disputes.

8.2.7 The parties hereby acknowledge and agree,

.1 that counterclaims, claims of set-off or the exercise or use of other contractual rights that permit the *Owner* to withhold, deduct or retain from monies otherwise owed to the *Contractor* under the *Contract* may be referred to, and included as part of, *Adjudications* under the *Construction Act*;

.2 that disputes related to the termination or abandonment of the *Contract*, as well as any disputes that arise or are advanced following the termination or abandonment of the *Contract*, shall not be referred to *Adjudication* under the *Construction Act*;

.3 that notice(s) of *Adjudication,* with respect to any dispute or claim relating to the *Project,* shall not be given, and no *Adjudication* shall be commenced following *Contract* completion, *Contract* abandonment, or termination of the *Contract*;

.4 that any *Adjudication* between the *Contractor* and a *Subcontractor* or a supplier that relates to an *Adjudication* between the *Owner* and the *Contractor* shall be

		joined together to be adjudicated by a single adjudicator, provided that the adjudicator agrees to do so, and the *Contractor* shall include a provision in each of its contracts that contain an equivalent obligation to this GC 8.2.7.4; and .5 that, other than where the *Contractor* is obliged to commence an *Adjudication* pursuant to an undertaking under the *Construction Act,* neither the *Owner* nor the *Contractor* shall commence an *Adjudication* during the *Restricted Period*. 8.2.8 The parties acknowledge and agree that no *Adjudication*, arbitration, action, suit or other proceeding may be brought by the *Contractor* against the *Owner* in respect of a claim for an increase to the *Contract Price* as set out in GC 6.6, before the *Consultant* has issued its findings in respect of same, pursuant to GC 6.6.5. For greater clarity and without limiting the foregoing, the amount applied for in each *Proper Invoice* shall not include any amounts pertaining to the *Contractor's* claim for an increase in *Contract Price* unless and until the *Consultant* has issued a written notice to the *Contractor* regarding the validity of such claim, as provided for in GC 6.6.5. However, nothing in this GC 8.2.8 shall prevent a *Contractor* from commencing an *Adjudicatio*n where, pursuant to the *Construction Act*, the *Contractor* is required to give an undertaking to a *Subcontractor* to commence an *Adjudication* following delivery of a *Notice of Non-Payment*."

GC 8.3 NEGOTIATION, MEDIATION AND ARBITRATION

SC46.1	8.3.1	Amend paragraph 8.3.1 by changing part of the second line from "shall appoint a *Project Mediator*" to "may appoint a *Project Mediator,* except that such an appointment shall only be made if both the *Owner* and the *Contractor* agree."
	8.3.4	Amend paragraph 8.3.4 by changing part of the second line from "the parties shall request the *Project Mediator"* to "and subject to paragraph 8.3.1 the parties may request the *Project Mediator".*
	8.3.6 to 8.3.9	Delete paragraphs 8.3.6, 8.3.7 and 8.3.8 in their entirety and replace them with the following new GCs 8.3.6, 8.3.7, 8.3.8, and 8.3.9: "8.3.6 The dispute may be finally resolved by arbitration under the Rules for Arbitration of Construction Disputes as provided in CCDC 40 in effect at the time of bid closing, provided that both the *Contractor* and the *Owner* agree. If the *Contractor* and the *Owner* agree to resolve the dispute by arbitration, the arbitration shall be conducted in the jurisdiction of the *Place of the Work*. 8.3.7 Prior to delivering a notice of *Adjudication* in a form prescribed by the *Act*, the parties agree to first address all disputes by attending at least one meeting with the *Owner*'s representative, the *Consultant*'s representative, and the *Contractor*'s representative, prior to commencing an *Adjudication*. The parties agree that such steps will be taken to resolve any disputes in a timely and cost effective manner. If a resolution to the dispute(s) is not made at such a meeting, any party who plans to commence an *Adjudication* shall provide the other party with 5 *Working Days' Notice in Writing* of its intention to issue a notice of *Adjudication*. 8.3.8 Other than where the *Contractor* is obliged to commence an *Adjudication* pursuant to an undertaking under the *Construction Act*, neither the *Owner* nor the *Contractor* shall commence an *Adjudication* during the *Restricted Period*. 8.3.9 Where either party has delivered a notice of *Adjudication* in a form prescribed by the *Act*, the procedures and rules set out under the *Construction Act* and the regulations thereto shall govern the *Adjudication*."

PART 9 PROTECTION OF PERSONS AND PROPERTY

GC 9.1 PROTECTION OF WORK AND PROPERTY

SC47.1	9.1.1.1	Delete subparagraph 9.1.1.1 in its entirety and substitute the following: ".1 errors in the *Contract Documents* which the *Contractor* could not have discovered applying the standard of care described in paragraph 3.14.1;"
	9.1.2	Delete paragraph 9.1.2 in its entirety and substitute as follows: "9.1.2 Before commencing any *Work*, the *Contractor* shall determine the locations of all underground or hidden utilities and structures indicated in or inferable from the *Contract Documents*, or that are inferable from an inspection of the *Place of the Work* exercising the degree of care and skill described in paragraph 3.14.1."
	9.1.5	Add new paragraph 9.1.5 as follows: "9.1.5 With respect to any damage to which paragraphs 9.1.3 or 9.1.4 apply, the *Contractor* shall neither undertake to repair or replace any damage whatsoever to the work of other contractors, or to adjoining property, nor acknowledge that the same was caused or occasioned by the *Contractor*, without first consulting the *Owner* and receiving written instructions as to the course of action to be followed from either the *Owner* or the *Consultant*. Where, however, there is danger to life, the environment, or public safety, the *Contractor* shall take such emergency action as it deems necessary to remove the danger."

GC 9.2 TOXIC AND HAZARDOUS SUBSTANCES

SC48.1	9.2.1	Amend GC 9.2.1 by inserting the following to the end of the paragraph: "For the purposes of GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES, *Excess Soil* shall not be considered a 'toxic and hazardous substance'."
SC48.2	9.2.5.5	Add a new subparagraph 9.2.5.5 as follows: ".5 in addition to the steps described in subparagraph 9.2.5.3, take any further steps it deems necessary to mitigate or stabilize any conditions resulting from encountering toxic or hazardous substances or materials."
	9.2.6	Amend GC 9.2.6 by adding the following words after the word "responsible" in the second line: "or whether any toxic or hazardous substances or materials already at the *Place of the Work* (and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the *Contractor* or anyone for whom the *Contractor* is responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment, or material damages to the property of the *Owner* or others,".

	9.2.8	Amend GC 9.2.8 by adding the following words after the word "responsible" in the second line: "or whether any toxic or hazardous substances or materials already at the *Place of the Work* (and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the *Contractor* or anyone for whom the *Contractor* is responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment, or material damages to the property of the *Owner* or others,".
	9.2.10	Add new paragraph 9.2.10 as follows: "9.2.10 The *Contractor*, *Subcontractors* and *Suppliers* shall not bring on to the *Place of the Work* any toxic or hazardous substances and materials except as required in order to perform the *Work*. If such toxic or hazardous substances or materials are required, storage in quantities sufficient to allow work to proceed to the end of any current work week only shall be permitted. All such toxic and hazardous materials and substances shall be handled and disposed of only in accordance with all laws and regulations that are applicable at the *Place of the Work*."

GC 9.4 CONSTRUCTION SAFETY

SC49.1	9.4.1	Delete GC 9.4.1 in its entirety and replace it with the following: "9.4.1 The *Contractor* shall be solely responsible for construction safety at the *Place of the Work* and for compliance with the rules, regulations, and practices required by the *OHSA*, including, but not limited to those of the "constructor", and shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the *Work*. The *Contractor*'s health and safety program documentation shall be made available for review by the *Owner* or *Consultant* immediately upon request. Without limiting the foregoing, the *Contractor* shall be solely responsible for construction safety in respect of the *Consultant*, *Subcontractors* and *Suppliers*, the *Owner's* own forces, *Other Contractors*, and all persons attending the *Place of the Work* during the course of the *Project*."
	9.4.2	Amend GC 9.4.2 by adding the following words after "and the *Contractor*": ", *Subcontractors* and *Suppliers*".
	9.4.3	Amend GC 9.4.3 by adding the following words after "and the *Contractor*": ", *Subcontractors* and *Suppliers*".
	9.4.4	Delete GC 9.4.4 and replace it with the following:

		"9.4.4 The *Owner* undertakes to include in its contracts with other contractors and in its instructions to its own forces the requirement that the other contractor or its own forces, as the case may be, comply with the policies and procedures of and the directions and instructions from the *Contractor* with respect to occupational health and safety and related matters."
	9.4.5	Delete GC 9.4.5 in its entirety and replace it with the following: "9.4.5 Prior to the commencement of the *Work*, the *Contractor* shall submit to the *Owner*: .1 a current WSIB clearance certificate; .2 copies of the *Contractor*'s insurance policies having application to the *Project* or certificates of insurance, at the option of the *Owner*; .3 documentation setting out the *Contractor*'s in-house safety programs; .4 a copy of the Notice of Project filed with the Ministry of Labour naming itself as "constructor" under the *OHSA*; and . 5 copies of any documentation or notices to be filed or delivered to the authorities having jurisdiction for the regulation of occupational health and safety at the *Place of the Work*;"
	9.4.6 to 9.4.12	Add new GC 9.4.6, 9.4.7, 9.4.8, 9.4.9, 9.4.10, 9.4.11, and 9.4.12 as follows: "9.4.6 The *Contractor* shall indemnify and save harmless the *Owner*, its agents, trustees, officers, directors, employees, consultants, successors, appointees, and assigns from and against the consequences of any and all safety infractions committed by the *Contractor* under *OHSA* and any other occupational health and safety legislation in force at the *Place of the Work* including the payment of legal fees and disbursements on a solicitor and client basis. Such indemnity shall apply to the extent to which the *Owner* is not covered by insurance. 9.4.7 If the *Owner* is of the reasonable opinion that the *Contractor* has not taken such precautions as are necessary to ensure compliance with the requirements of paragraph 9.4.1, the *Owner* may take any remedial measures which it deems necessary, including stopping the performance of all or any portion of the *Work,* and the *Owner* may use its employees, the *Contractor*, any *Subcontractor* or any other contractors to perform such remedial measures. 9.4.8 The *Contractor* shall file any notices or any similar document required pursuant to the *Contract* or the safety regulations in force at the *Place of the Work*. This duty of the *Contractor* will be considered to be included in the *Work* and no separate payment therefore will be made to the *Contractor*. 9.4.9 Unless otherwise provided in the *Contract Documents*, the *Contractor* shall develop, maintain and supervise for the duration of the *Work* a comprehensive safety program that will effectively incorporate and implement all required safety precautions. The program shall, at a minimum, respond fully to the applicable safety regulations and general construction practices for the safety of persons or property, including, without limitation, any general safety rules and regulations of the *Owner* and any workers' compensation or occupational health and safety statutes or regulations in force at the *Place of the Work*.

		9.4.10 The *Contractor* shall provide a copy of the safety program described in GC 9.4.9 hereof to the *Consultant* for delivery to the *Owner* prior to the commencement of the *Work*, and shall, ensure, as far as it is reasonably practical to do so, that every employer and worker performing work in respect of the *Project* complies with such program. 9.4.11 The *Contractor* shall arrange regular safety meetings, and shall supply and maintain, at its own expense, at its office or other well-known place at the job site, safety equipment necessary to protect the workers and general public against accident or injury as prescribed by the authorities having jurisdiction at the *Place of the Work*, including, without limitation, articles necessary for administering first-aid to any person and an emergency procedure for the immediate removal of any injured person to a hospital or a doctor's care. 9.4.12 The *Contractor* shall promptly report in writing to the *Owner* and the *Consultant* all accidents of any sort arising out of or in connection with the performance of the *Work*, whether on or adjacent to the job site, giving full details and statement of witnesses. If death or serious injuries or damages are caused, the accident shall be promptly reported by the *Contractor* to the *Owner* and the *Consultant* by telephone or messenger in addition to any reporting required under the applicable safety regulations."."

PART 10 GOVERNING REGULATIONS

GC 10.1 TAXES AND DUTIES

SC50.1	10.1.2	Amend paragraph 10.1.2 by adding the following sentence to the end of the paragraph: "For greater certainty, the *Contractor* shall not be entitled to any mark-up for overhead or profit on any increase in such taxes and duties and the *Owner* shall not be entitled to any credit relating to mark-up for overhead or profit on any decrease in such taxes. The *Contractor* shall provide a detailed breakdown of Additional taxes if requested by the *Owner* in a form satisfactory to the *Owner*."
	10.1.3	Add new paragraph 10.1.3 as follows: "10.1.3 Where the *Owner* is entitled to an exemption or a recovery of sales taxes, customs duties, excise taxes or *Value Added Taxes* applicable to the *Contract*, the *Contractor* shall, at the request of the *Owner*, assist with the application for any exemption, recovery or refund of all such taxes and duties and all amounts recovered or exemptions obtained shall be for the sole benefit of the *Owner*. The *Contractor* agrees to endorse over to the *Owner* any cheques received from the federal or provincial governments, or any other taxing authority, as may be required to give effect to this paragraph."

GC 10.2 LAWS, NOTICES, PERMITS, AND FEES

SC51.1	10.2.5	Amend paragraph 10.2.5 by adding the words "Subject to paragraph 3.4" at the beginning of the paragraph. -and- Add the following to the end of the second sentence:

		"…and no further *Work* on the affected components of the *Contract* shall proceed until these directives have been obtained by the *Contractor* from the *Consultant*."
	10.2.6	Amend paragraph 10.2.6 by adding the following sentence to the end of the paragraph: "In the event the *Owner* suffers loss or damage as a result of the *Contractor's* failure to comply with paragraph 10.2.5 and notwithstanding any limitations described in paragraph 12.1.1, the *Contractor* agrees to indemnify and to hold harmless the *Owner* and the *Consultant* from and against any claims, demands, losses, costs, damages, actions suits or proceedings resulting from such failure by the *Contractor*."
	10.2.7	Amend paragraph 10.2.7 by inserting the words "which changes were not, or could not have reasonably been known to the *Owner* or to the *Contractor*, as applicable, at the time of bid closing and which changes did not arise as a result of a public emergency or other *Force Majeure* event" to the second line, after the words "authorities having jurisdiction".
	10.2.8	Add new paragraph 10.2.8 as follows: "10.2.8 The *Contractor* shall furnish all certificates that are required or given by the appropriate governmental authorities as evidence that the *Work* as installed conforms with the laws and regulations of authorities having jurisdiction, including certificates of compliance for the *Owner's* occupancy or partial occupancy. The certificates are to be final certificates giving complete clearance of the *Work*, in the event that such governmental authorities furnish such certificates."

GC 10.4 WORKERS' COMPENSATION

SC52.1	10.4.1	Delete paragraph 10.4.1 and replace with the following: "10.4.1 Prior to commencing the *Work*, and with each and every application for payment thereafter, including the *Contractor's* application for payment of the holdback amount following *Substantial Performance of the Work* and again with the *Contractor's* application for final payment, the *Contractor* shall provide evidence of compliance with workers' compensation legislation in force at the *Place of the Work*, including payments due thereunder."

GC 11.1 INSURANCE

SC53.1	11.1	Delete entirety of GC 11.1 and replace with the following: "**GC 11.1 INSURANCE** 11.1.1 Without restricting the generality of GC 12 – INDEMNIFICATION, the *Contractor* shall provide, maintain, and pay for the insurance coverages specified in GC 11.1 – INSURANCE. Unless otherwise stipulated, the duration of each insurance policy shall be from the date of commencement of the *Work* until the expiration of the warranty periods set out in the *Contract Documents*. Prior to commencement of the *Work* and upon the placement, renewal, amendment, or extension of all or any part of the insurance, the *Contractor* shall promptly provide the *Owner* with confirmation of coverage and, if required, a certified true copy of the policies certified by an authorized representative of the insurer together with copies of any amending endorsements. .1 **General Liability Insurance**

General liability insurance shall be in the name of the *Contractor,* with the *Owner* and the *Consultant* named as Additional insureds, with limits of not less than $5,000,000.00 inclusive per occurrence for bodily injury, death, and damage to property, including loss of use thereof, for itself and each of its employees, *Subcontractors* and/or agents. The insurance coverage shall not be less than the insurance required by IBC Form 2100, or its equivalent replacement, provided that IBC Form 2100 shall contain the latest edition of the relevant CCDC endorsement form. To achieve the desired limit, umbrella, or excess liability insurance may be used. All liability coverage shall be maintained for completed operations hazards from the date of *Ready-for-Takeover*, as set out in the certificate of *Ready-for-Takeover,* on an ongoing basis for a period of 6 years following *Ready-for-Takeover*. Where the *Contractor* maintains a single, blanket policy, the Addition of the *Owner* and the *Consultant* is limited to liability arising out of the *Project* and all operations necessary or incidental thereto. The policy shall be endorsed to provide the *Owner* with not less than 30 days' notice, in writing, in advance of any cancellation and of change or amendment restricting coverage.

.2 **Automobile Liability Insurance**

Automobile liability insurance in respect of licensed vehicles shall limits of not less than $2,000,000.00 inclusive per occurrence for bodily injury, death and damage to property, covering all licensed vehicles *owned* or leased by the *Contractor*, and endorsed to provide the *Owner* with not less than 30 days' notice, in writing, in advance of any cancellation, change or amendment restricting coverage. Where the policy has been issued pursuant to a government-operated automobile insurance system, the *Contractor* shall provide the *Owner* with confirmation of automobile insurance coverage for all automobiles registered in the name of the *Contractor.*

.3 **Aircraft and Watercraft Liability Insurance**

Intentional Deleted. Not Applicable

.4 Property and Boiler and Machinery Insurance

(1) Builder's Risk property insurance shall be in the name of the *Contractor* with the *Owner* and the *Consultant* named as Additional insureds. The policy shall insure against all risks of direct physical loss or damage to the property insured which shall include all property included in the *Work*, whether owned by the *Contractor* or the owner or owned by others, so long as the property forms part of the *Work*. The property insured also includes all materials and supplies necessary to complete the work, whether installed in the work temporarily or permanently, in storage on the project site, or in transit to the project site, as well as temporary buildings, scaffolding, falsework forms, hoardings, excavation, site preparation and similar work. The insurance shall be for not less than the sum of the amount of the contract price and the full value of products that are specified to be provided by the owner for incorporation into the work, if applicable, with the deductible of $10,000.00 payable by the contractor. The insurance shall include the foregoing and, otherwise, shall not be less than the insurance required by IBC Form 4042 or its equivalent replacement provided that the IBC Form 4042 shall include the latest Addition of the relevant CCDC endorsement form. The coverage shall be based on a completed value form and shall be maintained continuously until ten (10) days after the date of the final certificate of payment.

		(2) Boiler and machinery insurance shall be in the name of the *Contractor*, with the *Owner* and the *Consultant* named as Additional insureds, for not less than the replacement value of the boilers, pressure vessels and other insurable objects forming part of the *Work*. The insurance provided shall not be less than the insurance provided by the "Comprehensive Boiler and Machinery Form" and shall be maintained continuously from commencement of use or operation of the property insured and until 10 days after the date of the final certificate for payment. (3) The policies shall allow for partial or total use or occupancy of the *Work.* (4) The policies shall provide that, in the case of a loss or damage, payment shall be made to the *Owner* and the *Contractor* as their respective interests may appear. The *Contractor* shall act on behalf of the *Owner* for the purpose of adjusting the amount of such loss or damage payment with the insurers. When the extent of the loss or damage is determined, the *Contractor* shall proceed to restore the *Work*. Loss or 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 the *Contract Time,* relative to the extent of the loss or damage, as determined by the *Owner*, in its sole discretion. (5) The *Contractor* shall be entitled to receive from the *Owner*, in Addition to the amount due under the *Contract*, the amount at which the *Owner's* interest in restoration of the *Work* has been appraised, such amount to be paid as the restoration of the *Work* proceeds and as provided in GC 5.2 – APPLICATIONS FOR PROGRESS PAYMENT and GC 5.3 – PROGRESS PAYMENT. In Addition, the *Contractor* shall be entitled to receive from the payments made by the insurer the amount of the *Contractor's* interest in the restoration of the *Work*. (6) In the case of loss or damage to the *Work* arising from the work of other contractors, or the *Owner's* own forces, the *Owner*, in accordance with the *Owner's* obligations under paragraph 3.2.2.4 of GC 3.2 – CONSTRUCTION BY OWNER OR OTHER CONTRACTORS, shall pay the *Contractor* the cost of restoring the *Work* as the restoration of the *Work* proceeds and as provided in GC 5.2 – APPLICATIONS FOR PROGRESS PAYMENT and GC 5.3 – PROGRESS PAYMENT. **.5 Contractors' Equipment Insurance** "All risks" contractors' equipment insurance covering construction machinery and equipment used by the *Contractor* for the performance of the *Work*, excluding boiler insurance, shall be in a form acceptable to the *Owner* and shall not allow subrogation claims by the insurer against the *Owner.* The policies shall be endorsed to provide the *Owner* with not less than 30 days' notice, in writing, in advance of cancellation, change or amendment restricting coverage. Subject to satisfactory proof of financial capability by the *Contractor* for self-insurance of his equipment, the *Owner* agrees to waive the equipment insurance requirement. 11.1.2 The *Contractor* shall be responsible for deductible amounts under the policies except where such amounts may be excluded from the *Contractor's* responsibility by the terms of GC 9.1 - PROTECTION OF WORK AND PROPERTY and GC 9.2 - DAMAGES AND MUTUAL RESPONSIBILITY.

		11.1.3 Where the full insurable value of the *Work* is substantially less than the *Contract Price*, the *Owner* may reduce the amount of insurance required to waive the course of construction insurance requirement. 11.1.4 If the *Contractor* fails to provide or maintain insurance as required by the *Contract Documents*, then the *Owner* shall have the right to provide and maintain such insurance and provide evidence of same to the *Contractor*. The *Contractor* shall pay the costs thereof to the *Owner* on demand, or the *Owner* may deduct the amount that is due or may become due to the *Contractor*. 11.1.5 All required insurance policies shall be with insurers licensed to underwrite insurance in the jurisdiction of the *Place of the Work*."

***NEW* GC 11.2 CONTRACT SECURITY**

SC52.1	GC 11.2	Add new GC 11.2 – CONTRACT SECURITY as follows: "**GC 11.2 CONTRACT SECURITY** 11.2.1 The *Contractor* shall, prior to the execution of the *Contract*, furnish a performance bond and labour and material payment bond which meets the requirements under paragraph 11.2.2. 11.2.2 The performance bond and labour and material payment bond shall: .1 be issued by a duly licensed surety company, which has been approved by the *Owner* and is permitted under the *Construction Act*, .2 be issued by an insurer licensed under the *Insurance Act* (Ontario) and authorized to transact a business of suretyship in the Province of Ontario; .3 shall be in the form prescribed by the *Construction Act*; .4 have a coverage limit of at least 50 per cent of the *Contract Price*, or such other percentage of the *Contract Price* as stated in the *Contract Documents*; .5 extends protection to *Subcontractors*, *Suppliers,* and any other persons supplying labour or materials to the *Project*; and .6 shall be maintained in good standing until the fulfillment of the *Contract*, including all warranty and maintenance periods set out in the *Contract Documents*.. 11.2.3 It is the intention of the parties that the performance bond shall be applicable to all of the *Contractor's* obligations in the *Contract Document* and, wherever a performance bond is provided with language which conflicts with this intention, it shall be deemed to be amended to comply. The *Contractor* represents and warrants to the *Owner* that it has provided its surety with a copy of the *Contract Documents* prior to the issuance of such bonds. 11.2.4 Without limiting the foregoing in any way, the bonds shall indemnify and hold harmless the *Owner* for and against costs and expenses (including legal and *Consultant* services and court costs) arising out of or as a consequence of any default of the *Contractor* under this *Contract*. 11.2.4 The *Contractor* shall be responsible for notifying the surety company of any changes made to the *Contract* during the course of construction.

		11.2.5 The premiums for bonds required by the *Contract Documents* shall be included in the *Contract Price*. 11.2.6 Should the *Owner* require additional bonds by the *Contractor* or any of his *Subcontractors*, after the receipt of bids for the *Work*, the *Contract Price* shall be increased by all direct costs attributable to providing such bonds. The *Contractor* shall promptly provide the *Owner*, through the *Consultant*, with any such bonds that may be required."

PART 12 OWNER TAKEOVER

GC 12.1 READY-FOR-TAKEOVER

SC55.1	12.1.1	Delete GC 12.1.1 in its entirety and replace it with the following: "12.1.1 *Ready-for-Takeover* shall be achieved when all of the following has occurred, as verified and approved by the *Owner*: .1 *Substantial Performance of the Work* has been achieved, as certified by the *Consultant*; .2 a permit for occupancy of the *Place of the Work* has been obtained from the authorities having jurisdiction; .3 the *Work* to be performed under the *Contract* has satisfied the requirements for deemed completion in accordance with Section 2(3) of the *Construction Act*, .4 final cleaning and waste removal, as required by the *Contract Documents*; .5 the *Contractor* has delivered to the *Consultant* and the *Owner* all inspection certificates from authorities having jurisdiction with respect to any component of the *Work* which has been completed; .6 subject only to GC 12.1.2, the entire *Work* has been completed to the requirements of the *Contract Documents*, including completion of all items on the punch list prepared at the time of *Substantial Performance of the Work* and the *Work* is being used for its intended purpose, and is so certified by the *Consultant*; .7 subject only to GC 12.1.2, the *Contractor* has submitted to the *Owner* and the *Consultant* in a collated and organized matter, all *Close-Out Documentation* and any other materials or documentation required by the *Contract Documents*; .8 subject only to GC 12.1.2, all *Products*, systems and components of the *Project* have been commissioned and certified for operation and accepted by the *Owner* and *Consultant*, and 9 subject only to GC 12.1.2, the *Contractor* has submitted to the *Owner* and the *Consultant* full and complete as-built drawings and *Specifications* revised by the *Contractor* to reflect the as-built state of the *Work*, clearly showing changes to the *Drawings* and *Specifications* from the original *Contract Documents*, all of which have been approved by the *Owner* acting reasonably."
SC55.2	12.1.2	Delete GC 12.1.2 in its entirety and replace it with the following:

		"12.1.2 The *Owner* may, in its sole, absolute, and unfettered discretion, waive compliance with a requirement, or a part thereof, for achieving *Ready-for-Takeover* set out in GC 12.1.1.6 to 12.1.1.9 (inclusive). Where the *Owner* exercises the discretion afforded under this GC 12.1.2, the *Contractor* shall be required to comply with GC 5.5.1.2 as part of its application for final payment and the *Owner* and the *Contractor*, in consultation with the *Consultant*, shall establish a reasonable date for completing the *Work*."
SC55.3	12.1.3	Delete GC 12.1.3 in its entirety and replace it with the following: "12.1.3 When the *Contractor* considers the *Work Ready-for-Takeover*, it shall submit a written application to the *Owner* and the *Consultant* for review."
SC55.4	12.1.4	In GC 12.1.4, delete the words "list and" from the second line.
SC55.5	12.1.5	Delete GC 12.1.5 in its entirety and replace it with the following: "12.1.5 Following the confirmation of the date of *Ready-for-Takeover* by the *Consultant* and as confirmed by the *Owner*, the *Contractor* may submit a final application for payment in accordance with GC 5.5 – FINAL PAYMENT."
SC55.6	12.1.6	Delete GC 12.1.6 in its entirety.

GC 12.2 EARLY OCCUPANCY

SC56.1	GC 12.2	Delete GC 12.2 – EARLY OCCUPANCY BY THE OWNER in its entirety, including all subparagraphs thereunder and replace it with the following: "12.2.1 The Owner reserves the right to take possession of and use for any intended purpose any portion or all of the undelivered portion of the Project even though the Work may not have reached Substantial Performance of the Work. Where the Work extends beyond the Contract Time, progress and completion of the Work shall not unduly interfere with the delivery of scheduled school programs. The taking of possession or use of any such portion of the Project shall not be deemed to be the Owner's acknowledgement or acceptance of the Work or Project nor shall it relieve the Contractor of any of its obligations under the Contract. 12.2.2 Whether the Project contemplates Work by way of renovations in buildings which will be in use or be occupied during the course of the Work or where the Project involves Work that is adjacent to a structure which is in use or is occupied, the Contractor, without in any way limiting its responsibilities under this Contract, shall take all reasonable steps to avoid interference with fire exits, building access and egress, continuity of electric power and all other utilities, to suppress dust and noise and to avoid conditions likely to propagate mould or fungus of any kind and all other steps reasonably necessary to promote and maintain the safety and comfort of the users and occupants of such structures or adjacent structures."

GC 12.3 WARRANTY

SC57.1	12.3.1 12.3.2	Delete from the first line of paragraph 12.3.1 the words "one year" and replace it with the words "two years" Delete from the first line of paragraph 12.3.2 the word "The" and replace it with the words "Subject to GC 1.1.3, the…"
	12.3.7 to 12.3.12	Add new paragraphs 12.3.7 to 12.3.12 as follows: "12.3.7 Where required by the *Contract Documents*, the *Contractor* shall provide a maintenance bond as security for the performance of the *Contractor's* obligations as set out in GC 12.3 WARRANTY. 12.3.8 The *Contractor* shall provide fully and properly completed and signed copies of all warranties and guarantees required by the *Contract Documents*, containing: .1 the proper name of the *Owner*; .2 the proper name and address of the *Project*; .3 the date the warranty commences, which shall be at the "*Ready-for-Takeover*" unless otherwise agreed upon by the *Consultant* in writing. .4 a clear definition of what is being warranted and/or guaranteed as required by the *Contract Documents*; and .5 the signature and seal (if required by the governing law of the *Contract*) of the company issuing the warranty, countersigned by the *Contractor*. 12.3.9 Should any *Work* need to be repaired or replaced during the time period for which it is covered by the specified warranty, a new warranty shall be provided under the same conditions and for the same period as specified herein before. The new warranty shall commence at the completion of the repair or replacement. 12.3.10 The *Contractor* shall ensure that its *Subcontractors* are bound to the requirements of GC 12.3 – WARRANTY for the *Subcontractor's* portion of the *Work.* 12.3.11 The *Contractor* shall ensure that all warranties, guarantees or other obligations for *Work*, services or *Products* performed or supplied by any *Subcontractor, Supplier* or other person in connection with the *Work* are obtained and available for the direct benefit of the *Owner.* In the alternative, the *Contractor* shall assign to the *Owner* all warranties, guarantees or other obligations for *Work*, services or *Products* performed or supplied by any *Subcontractor, Supplier* or other person in connection with the *Work* and such assignment shall be with the consent of the assigning party, where required by law, or by the terms of that party's contract. Such assignment shall be in addition to, and shall in no way limit, the warranty rights of the *Owner* under the *Contract Documents*. 12.3.12 The *Contractor* shall commence or correct any deficiency within 2 *Working Days* after receiving a *Notice in Writing* from the *Owner* or the *Consultant*, and shall complete the *Work* as expeditiously as possible, except in the case where the deficiency prevents maintaining security or where basic systems essential to the ongoing business of the *Owner* and/or its tenants cannot be maintained operational as designed. In those circumstances all necessary corrections and/or installations of temporary replacements shall be carried out immediately as an emergency service. Should the *Contractor* fail to provide this emergency service within 8 hours of a request being made during the

		normal business hours of the *Contractor*, the *Owner* is authorized, notwithstanding GC 3.1, to carry out all necessary repairs or replacements at the *Contractor's* expense."

PART 13 INDEMNIFICATION AND WAIVER

GC 13.1 INDEMNIFICATION

SC58.1	GC 13.1	Delete GC 13.1 – INDEMNIFICATION in its entirety and replace it with the following: "13.1.1 The *Contractor* shall indemnify and hold harmless the *Owner*, its parent, subsidiaries and affiliates, their respective partners, trustees, officers, directors, agents and employees and the *Consultant* from and against any and all claims, liabilities, expenses, demands, losses, damages, actions, costs, suits, or proceedings (hereinafter called "claims"), whether in respect of claims suffered by the *Owner* or in respect of claims by third parties, that directly or indirectly arise out of, or are attributable to, the acts or omissions of the *Contractor*, its employees, agents, *Subcontractors*, *Suppliers* or any other persons for whom it is in law responsible (including, without limitation, claims that directly or indirectly arise out of, or are attributable to, loss of use or damage to the *Work*, the *Owner's* property or equipment, the *Contractor's* property or equipment or equipment or property adjacent to the *Place of the Work* or death or injury to the *Contractor's* personnel). 13.1.2 The *Owner* shall indemnify and hold the *Contractor*, its agents and employees harmless from and against claims, demands, losses, costs, damages, actions, suits or proceedings arising out of the *Contractor*'s performance of the *Contract* which are attributable to a lack of or defect in title or an alleged lack of or defect in title to the *Place of the Work*. 13.1.3 The provisions of GC 13.1 - INDEMNIFICATION shall survive the termination of the *Contract,* howsoever caused and no payment or partial payment, no issuance of a final certificate of payment and no occupancy in whole or in part of the *Work* shall constitute a waiver or release of any of the provisions of GC 13.1 13.1.4 Notwithstanding the provisions of GC1.1 - CONTRACT DOCUMENTS, GC 1.1.6, GC13.1 - INDEMNIFICATION shall govern over the provisions of GC 1.3.1 of GC1.3 – RIGHTS AND REMEDIES."

GC 13.2 WAIVER OF CLAIMS

	13.2.1	In paragraph 13.2.1 in the third line after the word "limitation" add the words "claims for delay pursuant to GC 6.5 DELAYS" -and- add the words "(collectively "**Claims**")" after "*Ready-for-Takeover*" in the fourth line.
	13.2.1.1	In subparagraph 13.2.1.1, in each instance change the word "claims" to "Claims" and change the word "claim" to "Claim".

	13.2.1.2	In subparagraph 13.2.1.2 change the word “claims” to “Claims”.
	13.2.1.3	Delete subparagraph 13.2.1.3 in its entirety.
	13.2.1.4	In paragraph 13.2.1.4 change the word “claims” to “Claims”.
	13.2.2.1	In paragraph 13.2.2.1 delete the words “in paragraphs 13.2.1.2 and 13.2.1.3” and replace them with “in paragraph 13.2.1.2” -and- change the word “claims” to “Claims” in both instances and change the word “claim” to “Claim”.
	13.2.3	Delete paragraph 13.2.3 in its entirety.
	13.2.4	Delete paragraph 13.2.4 in its entirety.
	13.2.5	Delete paragraph 13.2.5 in its entirety.
	13.2.6	In paragraph 13.2.6 change the word “claim” to “Claim” in all instances in the paragraph.
	13.2.8	In paragraph 13.2.8 change “The party” to “The *Contractor* -and- change the word “claim” to “Claim” in all instances in the paragraph.
	13.2.9	In paragraph 13.2.9 delete the words “under paragraphs 13.2.1 or 13.2.3” and replace them with “under paragraph 13.2.1” -and- change both instances of the words “the party” to “the *Contractor*”. Change the word “claim” to “Claim” in all instances in the paragraph.

***NEW* PART 14 OTHER PROVISIONS**

SC58.1	14.1	Add new PART 14 – OTHER PROVISIONS as follows: “**PART 14 OTHER PROVISIONS** **GC 14.1 OWNERSHIP OF MATERIALS**

		14.1.1 Unless otherwise specified, all materials existing at the *Place of the Work* at the time of execution of the *Contract* shall remain the property of the *Owner*. All *Work* and *Products* delivered to the *Place of the Work* by the *Contractor* shall be the property of the *Owner.* The *Contractor* shall remove all surplus or rejected materials as its property when notified in writing to do so by the *Consultant*."
	14.2	Add new GC 14.2 – CONSTRUCTION LIENS as follows: **"GC 14.2 LIENS** 14.2.1 Notwithstanding any other provision in the *Contract*, the *Consultant* shall not be obligated to issue a certificate, and the *Owner* shall not be obligated to make payment, subject to the *Owner*'s requirement to issue a *Notice of Non-Payment* (Form 1.1) to the *Contractor*, if at the time such certificate or payment was otherwise due: .1 a claim for lien has been registered against the *Project* lands by a *Subcontractor* or a *Supplier* that has not been vacated or discharged by the *Contractor* in accordance with the requirements of this *Contract*, or .2 if the *Owner* or a mortgagee of the *Project* lands has received a written notice of a lien that has not been resolved by the *Contractor* through the posting of security or otherwise. 14.2.2 In the event a construction lien arising from the performance of the *Work* is registered or preserved against the *Project* lands by a *Subcontractor* or a *Supplier*, or a written notice of a lien is given or a construction lien action is commenced against the *Owner* by a *Subcontractor* or a *Supplier*, then the *Contractor* shall, at its own expense: .1 within 10 calendar days of registration of the construction lien, vacate or discharge the lien from title to the premises (i.e. the *Place of the Work*). If the lien is merely vacated, the *Contractor* shall, if requested, undertake the *Owner*'s defence of any subsequent action commenced in respect of the lien, at the *Contractor*'s sole expense; .2 within 10 calendar days of receiving notice of a written notice of a lien, post security with the Ontario Superior Court of Justice so that the written notice of a lien no longer binds the parties upon whom it was served; and .3 satisfy all judgments and pay all costs arising from such construction liens and actions and fully indemnify the *Owner* against all costs and expenses arising from same, including legal costs on a full indemnity basis. 14.2.3 In the event that the *Contractor* fails or refuses to comply with its obligations pursuant to paragraph 14.2.2, the *Owner* shall, at its option, be entitled to take all steps necessary to address any such construction liens including, without limitation and in addition to the *Owner's* rights under paragraph 13.2.4, the posting of security with the Ontario Superior Court of Justice to vacate the claim for lien from title to the *Project* lands, and in so doing will be entitled to a full indemnity from the *Contractor* for all legal fees, security,

		disbursements and other costs incurred and will be entitled to deduct same from amounts otherwise owing to the *Contractor*. 14.2.4 In the event that any *Subcontractor* or *Supplier* registers any claim for lien with respect to all or part of the *Place of Work*, the *Owner* shall have the right to withhold, in addition to the statutory holdback, the full amount of said claim for lien plus either: (a) $250,000 if the claim for lien is in excess of $1,000,000 or (b) 25% of the value of the claim for lien and to bring a motion to vacate the registration of said claim for lien and any associated certificate of action in respect of that lien, in accordance with Section 44 of the *Act*, by paying into court as security the amount withheld. 14.2.5 Nothing in this GC 14.2 serves to preclude the *Contractor* from preserving and perfecting its lien in the event of non-payment by the *Owner*."

APPENDIX 1
to the Supplementary Conditions

Project-specific requirements for a "*Proper Invoice*"

To satisfy the requirements for a *Proper Invoice*, the following criteria, as may be applicable in each case, must be included with the *Contractor's* application for payment:

.1 the written bill or request for payment must be in writing;

.2 the *Contractor*'s name and current address;

.3 the *Contractor*'s HST registration number;

.4 the date the application for payment was prepared by the *Contractor*;

.5 the period of time in which the services or materials were supplied to the *Owner*;

.6 the purchase order number provided by the *Owner*;

.7 reference to the provisions of the *Contract* under which payment is being sought (e.g. GC 5.3 –PAYMENTS for progress payments, GC 5.4 – SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK GC 5.5 – FINAL PAYMENT for final payment, etc.);

.8 a description, including quantities where appropriate, of the services or materials, or a portion thereof, that were supplied and form the basis of the *Contractor's* request for payment;

.9 the amount the *Contractor* is requesting to be paid by the *Owner*, set out in a statement based on the schedule of values approved under GC 5.2.4, separating out any statutory or other holdbacks, set-offs and HST;

.10 a sworn Statutory Declaration in the form CCDC 9A-2018, only for second and subsequent progress payments;

.11 a current Workplace Safety Insurance Board clearance certificate;

.12 a pre-approved schedule of values, supplied by the *Contractor*, for Divisions 1 through 14 of the *Specifications* (or equivalent Construction Specifications Institute Masterformat) of the *Work*, aggregating the total amount of the *Contract Price*, including all supporting invoicing;

.13 a separate pre-approved schedule of values, supplied by each *Subcontractor*, for each of Division 15, 16, and 17 of the *Specifications* (or equivalent Construction Specifications Institute Masterformat) of the *Work*, aggregating the total amount of the *Contract Price*, including all supporting invoicing;

.14 invoices and other supporting documentation for all claims against the cash allowance;

.15 a current, acceptable, and up to date *Construction Schedule Update*;

.16 if requested by the *Owner*, a current and valid certificate(s) of insurance as required under GC 11.1 – INSURANCE;

.17 the name, title, telephone number and mailing address of the person at the place of business of the *Contractor* to whom payment is to be directed;

.18 a current, up to date, and approved *Shop Drawing* log;

.19 in the case of the *Contractor's* application for final payment, in addition to the foregoing requirements (as applicable):

(a) any *Close-Out Documentation*, together with complete and final as-built drawings;

(b) the *Contractor's* written request for release of the deficiency holdback, including a statement that no written notices of lien have been received by it;

(c) the *Contractor's* written certification that there are no outstanding claims, pending claims or future claims from the *Contractor* or their *Subcontractors* or *Suppliers*; and

(d) sufficient evidence of the *Contractor's* compliance with GC 3.11.

END OF AMENDMENTS TO CCDC 2 - 2020

DIVISION 01 - GENERAL REQUIREMENTS

01 14 00 – Work Restrictions

1.0 GENERAL

1.1. SECTION INCLUDES

.1 Connecting to existing services

.2 Special scheduling requirements

1.2. RELATED SECTIONS

.1 Section 01 53 00 - Temporary Construction.

.2 Section 01 33 00 - Submittal Procedures.

.3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3. EXISTING SERVICES

.1 Notify Owner and Consultant and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Consultant and Owner forty-eight (48) hours of notice for necessary interruption of mechanical or electrical service throughout the course of work.

.1 Keep duration of interruptions minimum.

.2 Perform interruptions after normal working hours of occupants, preferably on weekends.

.2 Provide for vehicular, pedestrian and personnel traffic.

.3 Construct barriers in accordance with Section 01 53 00.

1.2. AFTER HOURS WORK

.1 Schedule Work with school staff through the Board's contact so as to limit disruption to school operations. Include for any overtime, to ensure orderly and continuous progression of Work and operation of school.

.2 Direct calls from Contractors to Board staff to adjust alarms and to arrange for access will not be accepted. All correspondence must be through the Project Manager.

.3 Arrange 48 hours in advance with the Board to obtain an access card and adjust security alarms for after hours Work.

.4 Bidders are cautioned that the Board will be compensated by the Contractor for false alarms. Any costs associated with each false alarm will be levied against the

Contractor for false fire alarm activation or security alarm activation. These costs may include, but are not limited to:

.1 Fines or penalties imposed by the local Fire Services,

.2 Fines or penalties imposed by the local Police Services,

.3 Overtime costs borne by the Board.

.5 Contractors are responsible for ensuring doors and windows are secured prior to leaving school.

.6 Unless specifically stated otherwise school activities take precedence over Contractor's activities.

1.3. SPECIAL REQUIREMENTS

.1 Schedule and perform work in occupied areas to the Board Representative's approval.

.2 Schedule and perform noise generating work to the Board Representative's approval.

.3 Submit schedule of special requirements or disruptions in accordance with Section 01 33 00.

.4 All Contractor personnel are restricted to the job site and necessary access routes. No personnel shall visit other areas or buildings without specific authorization.

END OF SECTION

01 19 00 – Specifications and Documents

1.0 GENERAL

1.1. RELATED DOCUMENTS

.1 This section describes requirements applicable to all sections within Divisions 02 to 49.

1.2. WORDS AND TERMS

.1 Conform to definitions and their defined meanings in the Agreement and Definitions portion of CCDC 2 for Supplementary Words and Terms listed in Section 00 56 13.

1.3. COMPLEMENTARY DOCUMENTS

.1 Generally, drawings indicate graphically, the dimensions and location of components and equipment. Specifications indicate specific components, assemblies, and identify quality.

.2 Drawings, specifications, diagrams and schedules are complementary, each to the other, and what is required by one, to be binding as if required by all.

.3 Should any conflict or discrepancy appear between documents, which leaves doubt as to the intent or meaning, apply the Precedence of Documents article below or obtain guidance or direction from Consultant.

.4 Examine all discipline drawings, specifications, schedules, diagrams and related Work to ensure that Work can be satisfactorily executed.

.5 All specification sections of the Project Manual and Drawings are affected by requirements of Division 01 sections.

1.4. PRECEDENCE OF DOCUMENTS

.1 In the event of conflict within and between the Contract Documents, the order of priority within specifications and drawings for this project are - from highest to lowest:

- .1 the Agreement and Definitions between the Owner and the Construction
- .2 the Defined Terms, Definitions;
- .3 Supplementary Conditions;
- .4 the General Conditions;
- .5 Sections of Division 01 of the specifications;
- .6 Technical specifications Sections of Divisions 02 through 49 of the specifications.

.7 Schedules and Keynotes:
  .1 Material and finishing schedules within the specifications, then;
  .2 Material and finishing schedules on drawings, then;
  .3 Keynotes and definitions thereto, then;
.8 Drawings:
  .1 Drawings of larger scale shall govern over those of smaller scale of the same date, then;
  .2 Dimensions shown on drawings shall govern over dimensions scaled from drawings, then;
  .3 Location of utility outlets indicated on architectural detail drawings takes precedence over positions or mounting heights located on mechanical or electrical Drawings.
.9 Later dated documents shall govern over earlier documents of the same type.

1.5. SPECIFICATION GRAMMAR

.1 Specifications are written in the imperative command mode, in an abbreviated form.
.2 Imperative language of the technical sections is always directed to the Contractor identified as a primary constructor, as sole executor of the Contract, unless specifically noted otherwise.
  .1 This form of imperative command mode statement requires the primary constructor to perform such action or Work.
  .2 Perform all requirements of the Contract Documents whether stated imperatively or otherwise.
.3 Division of the Work among subcontractors, suppliers, or others is solely the prime contractor's responsibility. The Consultant(s) and specification authors assume no responsibility to function or act as an arbiter to establish subcontract scope or limits between sections or divisions of Work.

END OF SECTION

01 21 00 – Allowances

1.0 GENERAL

1.1. RELATED SECTIONS

.1 Section 01 45 00 – Quality Control.

.2 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. GENERAL

.1 Allowances included herein are for items of Work which could not be fully quantified prior to Bidding.

.2 Expend each allowance as directed by the Consultant. Work covered by allowances shall be performed for such amounts and by such persons as directed by Consultant.

.3 Funds will be expended by means of Cash Allowance allocations and contingency allowance allocations.

.4 Progress payments for Work and Products authorized under allowances will be made in accordance with the payment terms set out in the Conditions of the Contract.

.5 The Contractor shall bid the work involved and submit the Bids received to the Consultant and the Board, for approval

.6 The Contractor shall submit 3 bids unless directed by the Board.

1.3. CASH ALLOWANCES

.1 Cash allowances, cover the net cost to the Contractor of services, products, construction machinery and equipment, freight, handling, unloading, storage, installation where indicated, and other authorized expenses incurred in performing the Work. Cash allowances shall not be included by a subcontractor in the amount for their subcontract work.

.2 Supply only allowances shall include:

- .1 Net cost of Products.
- .2 Delivery to Site.
- .3 Applicable taxes and duties, excluding HST.

.3 Supply and install allowances shall include:

- .1 Net cost of Products.
- .2 Delivery to Site.
- .3 Unloading, storing, handling or products on site.
- .4 Installation, finishing and commissioning of products.

.5 Applicable taxes and duties, excluding HST.

.4 Inspection and testing allowances shall include:
  .1 Net cost of inspection and testing services.
  .2 Applicable taxes and duties, excluding HST.

.5 Other costs related to work covered by cash allowances are not covered by the allowance, but shall be included in the Contract Price.

.6 Where costs under a cash allowance exceed the amount of the allowance, the Contractor will be compensated for any excess incurred and substantiated plus an allowance for overhead and profit as set out in the Contract Documents.

.7 Progress payments on accounts of work authorized under cash allowances shall be included in the monthly certificate for payment.

.8 Submit, before application for final payment, copies of all invoices and statements from suppliers and subcontractors for work which has been paid from cash allowances.

1.4. ALLOWANCES SCHEDULE

Include in the Bid Price a cash allowance of to address the cost of the following items:

1	Designated Substance Removal. (Additional removal not already identified in the ACM Summary report)	$6000
2	Independent Testing & Inspection (soil, concrete, mortar, structural steel, air barrier, paving, painting) (As directed by the Consultant)	$10,000
3	Data and security installation and network equipment (Including terminations)	$20,000
4	Furniture and Equipment	$50,000
5	Remedial Painting (in addition to painting in contract)	$10,000
6	Public Address (PA) systems. (Including all cabling and hardware)	$15,000
7	Door Hardware	$80,000
	Total of all Allowances	**$191,000**

END OF SECTION

01 31 00 – Project Managing And Coordination

1.0 GENERAL

1.1. RELATED SECTIONS

.1 Section 01 32 00 - Construction Progress Documentation.

.2 Section 01 33 00 - Submittal Procedures.

.3 Section 01 53 00 – Temporary Construction Facilities

.4 Section 01 61 00 – Product Requirements

.5 Section 01 78 10 – Closeout Submittals and Requirements

.6 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. PROJECT COORDINATION

.1 Perform coordination of progress schedules, submittals, use of site, temporary utilities, construction facilities and construction Work, with progress of Work of other contractors, under instructions of the Consultant.

.2 The Contractor shall have total control of the Work and shall effectively direct and supervise the Work so as to ensure conformity with the Contract Documents and within the Contract Time.

.3 The Contractor shall be solely responsible for the construction means, methods, sequences, and procedures and for coordinating parts of the Work under the contract.

.4 Coordinate progress of the Work, progress schedules, submittals, use of site, temporary utilities, construction facilities, safety regulations and fire protection, as per authorities having jurisdiction codes.

.5 The Consultant has the authority to stop the Work:

.1 whenever they observe or are made aware of unsafe conditions.

.2 whenever it is deemed necessary to protect the interests of the Board,

.3 whenever materials or workmanship are in contravention to the Contract Documents.

1.3. SITE SUPERVISOR AND PROJECT MANAGER

.1 If requested, the Contractor shall provide the Consultant, in writing, the name of the Project Manager and Site Supervisor, and proof of competent experience in similar projects.

.2 Performance of the Contractors Project Manager and Site Supervisor

.1 If the Board and or the Consultant become concerned with any of: Site Safety, Project Schedule, or general compliance with the tender documents due to the performance of the Site Supervisor or Project Manager, the Consultant and or the Board will identify the concerns in writing to the Contractor.

.2 The Contractor shall respond in writing to the Board and Consultant with a corrective action for each item within 24 hours.

.3 If it is found that any of the corrections are not immediately implemented, the Consultant and the Board shall meet with the General Contractor to review the credentials including curriculum vitae and comparable experience of a replacement Site Supervisor and or Project Manager proposed by that Contractor.

.4 All outstanding concerns initiating the replacement of the personnel will be immediately addressed to the satisfaction of the Consultant and the Board.

.3 If the Board and or the Consultant become concerned with site safety, project schedule or general compliance with the tender documents due to the performance of the Site Supervisor or the Project Manager, the Consultant or the Board will issue the concerns in writing to the Contractor. The Contractor shall respond in writing within 24 hours to the Consultant and the Board. If any of the corrections are not immediately implemented, the Consultant or the Board will schedule a meeting with the Consultant, General Contractor and the Board. At this meeting the Contractor will introduce the new Project Manager, and or Site Supervisor and present the Curriculum Vitae for each showing proof of comparable experience in similar projects. The Contractor will then address the outstanding concerns to the satisfaction of the Consultant and the Board.

.4 The Project Manager, and/or Site Supervisor shall not be replaced by the Contractor without prior written approval from the Board and the Consultant.

1.4. PERMITS

.1 **The Board will obtain & pay for all building permits, but the Contractor is responsible for all other permits, including electrical inspection and fire alarm verification.**

1.5. CONSTRUCTION DOCUMENTS

.1 The Consultant will provide the Contractor with PDF copies of both the drawings and the specification and CAD format files of the drawings at no charge to the Contractor. All printing will be at the cost of the Contractor including the AS-BUILT documents.

1.6. PRE-CONSTRUCTION MEETING

.1 Immediately prior to construction and upon notification by the Consultant of a time and date, the Contractor shall attend the preconstruction meeting at a location as determined by the Consultant, along with authoritative representatives of certain key subcontractors as specifically indicated in the conference notice. Agenda to include following:

- .1 Appointment of official representative of participants in Work.
- .2 Project communications procedures
- .3 Schedule of Work, progress scheduling (including long lead items, cash allowance items) as specified in Section 01 32 00.
- .4 Schedule of submission of shop drawings, samples, colour chips as specified in Section 01 33 00.
- .5 Requirements for temporary facilities, washrooms, refuse bin, site sign, offices, storage sheds, utilities, fences as specified in Section 01 53 00.
- .6 Delivery schedule of specified equipment as specified in Section 01 61 00.
- .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.
- .8 Owner furnished products.
- .9 Record drawings as specified in Section 01 78 10.
- .10 Maintenance material and data as specified in Section 01 78 10.
- .11 Take-over procedures, acceptance, and warranties as specified in Section 01 78 10.
- .12 Monthly progress claims, administrative procedures, photographs, and holdbacks.
- .13 Appointment of inspection and testing agencies
- .14 Insurances and transcript of policies.
- .15 Review Vendor Performance Evaluation for the Contractor and Subcontractors
- .16 Hot Work Permit Process
- .17 Security Access, Fire Alarm shutdown procedures
- .18 Any other items as required by the owner, contractor, or Consultant.

1.7. ON-SITE DOCUMENTS

.1 Maintain at job site at all times, one copy (written or digital) each of the following:

- .1 Complete set of Contract drawings.
- .2 Specifications.
- .3 All Addenda.

.4 Site Instructions and Sketches
.5 Reviewed shop drawings and samples.
.6 Change Orders and Contemplated Change Orders.
.7 Other modifications to Contract.
.8 Site Instructions
.9 Colour schedule
.10 Hardware List
.11 Field test reports.
.12 Copy of approved Work schedule.
.13 Manufacturers' installation and application instructions.
.14 Progress reports and meeting minutes.
.15 Approved building permit documents.
.16 Copy of current Ontario Building Code and National Building Code.
.17 CSA Standard, CGSB Specifications. ASTM Documents and other standards referenced to in the specifications.
.18 Labour conditions and wage schedules.
.19 Applicable current editions of municipal regulations and by-laws. Current building codes, complete with addenda bulletins applicable to the Place of the Work.

1.8. SCHEDULES

.1 Within three weeks following the award of the Contract, submit a detailed, trade by trade progress schedule for the work in a bar chart form acceptable to the Consultant.
.2 Submit preliminary construction progress schedule as specified in Section 01 32 00 to Consultant coordinated with Consultant's project schedule.
.3 After review, revise and resubmit schedule to comply with revised project schedule.
.4 During progress of Work revise and resubmit as directed by the Consultant.
.5 Provide schedule updates every month with request for Payment, for duration of Contract.

1.9. CONSTRUCTION PROGRESS MEETINGS

.1 Prior to the commencement of the Work, the Contractor together with the Consultant shall mutually agree to a sequence for holding regular "on site meetings".
.2 The Contractor will organize site meetings. Ensure persons, whose presence is required, are present and relative information is available to allow meetings to be conducted efficiently.

.3 Contractor, major subcontractors and consultants involved in Work are to be in attendance.

.4 Post and forward copies of progress schedules for advice of Subcontractors, Owner and Consultant.

.5 Notify parties minimum five (5) days prior to meetings.

.6 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within two (2) days after meeting.

.7 Agenda to include following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems, conflicts.

.4 Problems which impede construction schedule.

.5 Review of off-site fabrication delivery schedules.

.6 Corrective measures and procedures to regain projected schedule.

.7 Revision to construction schedule.

.8 Progress schedule, during succeeding work period.

.9 Review submittal schedules: expedite as required.

.10 Maintenance of quality standards.

.11 Review proposed changes for effect on construction schedule and on completion date.

.12 Review site security issues.

.13 Other business.

.8 Schedule additional meetings, to expedite progress, should work require it.

.9 Keep Owner and Consultant informed of progress, of delays and potential delays during all stages of Work. Do everything possible to meet progress schedule

.10 Schedule and administer pre-installation meetings when specified in sections and when required to coordinate related or affected Work.

1.10. SUBMITTALS

.1 Prepare and issue submittals to Consultant for review.

.2 Submit preliminary Shop Drawings, product data and samples for review for compliance with Contract Documents; for field dimensions and clearances, for relation to available space, and for relation to Work of other contracts. After review, revise and resubmit for transmittal to Consultant.

.3 Submit requests for payment for review, and for transmittal to Consultant.

.4 Submit requests for interpretation of Contract Documents, and obtain instructions through Consultant.

.5 Process substitutions through Consultant.

.6 Process change orders through Consultant.

.7 Deliver closeout submittals for review and preliminary inspections, for transmittal to Consultant.

1.11. RECORD (AS-BUILT) DOCUMENTS AND SAMPLES

.1 Procedures for record as-built documents and samples as specified in Section 01 78 10.

.2 Keep as-built documents and samples available for inspection by the Consultant.

1.12. CLOSEOUT PROCEDURES

.1 Take-over procedures, acceptance, and warranties as specified Section 01 78 10

.2 Notify Consultant and Board when Work is considered ready for Substantial Performance.

.3 Accompany Consultant and Board on preliminary inspection to determine items listed for completion or correction.

.4 Comply with Consultant's instructions for correction of items of Work listed in executed certificate of Substantial Performance.

.5 Notify Consultant of instructions for completion of items of Work determined in Consultant's final inspection.

END OF SECTION

01 32 00 – Construction Progress Documentation

1.0 GENERAL

1.1. RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. SCHEDULES

.1 Within seven 7 days following the award of the Contract, submit a detailed cash flow chart broken down on a monthly basis, in a manner acceptable to the Consultant. Cash flow chart shall indicate anticipated Contractor's monthly progress billings from commencement of work until completion.

.2 Update cash flow chart whenever changes occur to scheduling and in manner and at times satisfactory to Consultant.

.3 Submit schedule of values at least fourteen (14) days before the first application

.4 Submit schedules as follows:

.1 Submittal Schedule for Shop Drawings and Product Data.

.2 Submittal Schedule for Samples.

.3 Submittal Schedule for timeliness of Owner-furnished Products.

.4 Product Delivery Schedule.

.5 Cash Allowance Schedule for acquiring Products and Installation.

.6 Shutdown or closure activity.

1.3. CONSTRUCTION PROGRESS SCHEDULING

.1 Submit initial schedule to the Consultant and the Board in duplicate within seven (7) days after following the award.

.2 Schedule Format.

.1 Prepare schedule in form of a horizontal bar chart.

.2 Split horizontally for projected and actual performance.

.3 Provide horizontal time scale identifying each Working Day of each week.

.3 Schedule Submission.

.1 Consultant will review schedule and return reviewed copies within five (5) days after receipt.

.2 Submit schedules in electronic format, forward to the Consultant and Owner as a pdf. file.

.3 Resubmit finalized schedule within five (5) days after return of review copy.

.4 Submit revised progress schedule with each application for payment.

.5 Distribute copies of revised schedule to:

.1 Job site office.

.2 Subcontractors.

.3 Other concerned parties.

.6 Instruct Consultant to report to Contractor within ten (10) days, any problems anticipated by timetable shown in schedule.

.4 Submit revised schedules with Application for Payment, identifying changes since previous version.

.5 Select either of the following paragraphs to identify the type and format of schedule required.

.6 Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

.7 Indicate estimated percentage of completion for each item of Work at each submission.

.8 Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner and required by Allowances.

.9 Include dates for commencement and completion of each major element of construction:

.1 Site clearing.

.2 Site utilities.

.3 Foundation Work.

.4 Structural framing.

.5 Subcontractor Work.

.6 Equipment Installations.

.7 Finishes.

.10 Indicate projected percentage of completion of each item as of first day of month.

.11 Indicate progress of each activity to date of submission schedule.

.12 Indicate changes occurring since previous submission of schedule:

.1 Major changes in scope.

.2 Activities modified since previous submission.

.3 Revised projections of progress and completion.

.4 Other identifiable changes.

.13 Provide a written report to define:

.1 Problem areas, anticipated delays, and impact on schedule.

.2 Corrective action recommended and its effect.

.3 Effect of changes on schedules of other subcontractors.

1.4. PROGRESS PHOTOGRAPHS

.1 Digital Photography:

.1 Submit electronic copy of progress photographs of project, Digital format, minimum 300 in megapixel resolution.

.2 Identification: Name and number of project and date of exposure indicated.

.3 Provide both interior and exterior photographs.

.4 Number of Viewpoints: Locations of viewpoints determined by Consultant.

.5 Frequency: Monthly with progress statement. Provide the required number of pictures to accurately reflect the submitted progress percentage.

1.5. SHOP DRAWING SUBMITTAL SCHEDULE

.1 Include schedule for submitting shop drawings, product data, samples

.2 Indicate dates for submitting, review time, resubmission time, and last date for meeting fabrication schedule.

.3 Include dates when shop drawings and samples will be required for Owner-furnished products.

.4 Include dates when reviewed submittals will be required from Consultant.

.5 Provide final signed off copies of the shop drawings in digital format to the Board.

END OF SECTION

01 33 00 – Submittal Procedures

1.0 GENERAL

1.1 RELATED SECTIONS

1. Section 01 32 00 - Construction Progress Documentation.
2. Section 01 78 10 - Closeout Submittals.
3. This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.1 ADMINISTRATIVE

1. Submit to Consultant submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
2. Work affected by submittal shall not proceed until review is complete.
3. Present Shop Drawings, product data, samples and mock-ups in Metric (SI) units. Shop drawings containing imperial measurements will be rejected.
4. Where items or information is not manufactured or produced in SI Metric units, converted values within the metric measurement to the next largest imperial size available. Tolerances of .0625 acceptable.
5. Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents.
6. Submittals not stamped, signed, dated, identified as to specific project, and attesting to their being reviewed will be returned without being examined and shall be considered rejected.
7. Shop drawings which require the approval of a legally constituted authority having jurisdiction shall be submitted by Contractor to such authority for approval. Such shop drawings shall receive final approval of authority having jurisdiction before Consultant's final review.
8. No work, requiring a shop drawing submission, shall be commenced until the submission has received Consultant's final review. Only shop drawings bearing Consultant's review stamp are to be sent and used on the job site.
9. Notify Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

10. Shop drawings shall not contain substituted materials unless such substitutions have been requested in advance and approved by Consultant.
11. Verify field measurements and affected adjacent Work are coordinated.
12. Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.
13. Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.
14. Keep one (1) reviewed copy of each submission on site.

1.2 SHOP DRAWINGS AND PRODUCT DATA

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

.2 The term "design team" means Consultant and Sub-consultants whether Sub-consultants are employees of Consultant or not, and includes structural, mechanical, electrical, etc.

.3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow fourteen (14) days for Consultant's review of each submission.

.5 Adjustments made on Shop Drawings by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.

.6 Make changes in Shop Drawings as Consultant may require, consistent with Contract Documents. When resubmitting, notify Consultant in writing of any revisions other than those requested.

.7 Accompany submissions with transmittal letter, containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.8 Submissions shall include:

- .1 Date and revision dates.

.2 Project title and number.

.3 Name and address of:

.1 Subcontractor.

.2 Supplier.

.3 Manufacturer.

.4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

.5 Details of appropriate portions of Work as applicable:

.1 Fabrication.

.2 Layout, showing dimensions, including identified field dimensions, and clearances.

.3 Setting or erection details.

.4 Capacities.

.5 Performance characteristics.

.6 Standards.

.7 Operating weight.

.8 Wiring diagrams.

.9 Single line and schematic diagrams.

.10 Relationship to other parts of the Work.

.9 After Consultant's review, distribute copies.

.10 Submit Shop Drawings in Pdf. format for each requirement requested in specification Sections and as consultant may reasonably request.

.11 Submit product data sheets or brochures in Pdf. format for requirements requested in specification sections and as requested by Consultant where Shop Drawings will not be prepared due to standardized manufacture of product.

.12 Delete information not applicable to project.

.13 Supplement standard information to provide details applicable to project.

.14 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, the drawings will be stamped as reviewed or reviewed as modified and will be returned. At this point fabrication and installation of Work may proceed. If Shop Drawings are rejected, noted copy will be returned and re-submission of corrected Shop Drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.15 Signed drawings shall be returned to and retained by Contractor who is then responsible for distribution of copies of corrected shop drawing to appropriate

Subcontractors for appropriate action and to municipal building department for their records of those subjects required by authorities.

.16 The Consultant's review is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean the Consultant approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and this review shall not relieve the Contractor of his responsibility for meeting the requirements of the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site for information that pertains solely to fabrication processes or to techniques of construction and installation and for coordination of the work of all subtrades.

1.3 SAMPLES

.1 Submit for review to the Consultant three (3) samples as requested in respective specification Sections.

.2 Submit samples with identifying labels bearing material or component description, manufacturer's name and brand name, Contractor's name, project name, location in which material or component is to be used, and date.

.3 Deliver samples prepay any shipping charges involved for delivering samples to destination point and returning to point of origin if required.

.4 Provide samples of special products, assemblies, or components when so specified.

.5 No work requiring a sample submission shall commence until submission has received Consultant's final review.

.6 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.7 Where colour, pattern or texture is criterion, submit full range of samples.

.8 Adjustments made on samples by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.

.9 Make changes in samples which Consultant may require, consistent with Contract Documents.

.10 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 MOCK-UP

.1 Erect mock-ups to Section 01 45 00.

1.5 ` CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, and prior to commencing the work submit the performance bond and the labour and materials payment bond as described in the bid documents.

.2 Submit transcription of certified true copies of insurance immediately after award of Contract.

.3 A current WSIB clearance certificate

.4 The bidder's health and safety policy for the project.

.5 A copy of the notice of project issued by the ministry of labour for the project

.6 Building materials, components and elements specified without the use of trade or proprietary names shall meet requirements specified. If requested by Consultant, submit evidence of meeting requirements specified. Evidence shall consist of certification based on tests carried out by an independent testing agency. Certification based on previous tests for same materials, components or elements is acceptable. Certification shall be in form of written test reports prepared by testing agency.

END OF SECTION

01 35 17 – Fire Safety Procedures

1.0 GENERAL

1.1. RELATED SECTIONS

.1 Section 01 14 00 – Work Restrictions.

.2 Section 01 31 00 - Project Managing and Coordination.

.3 Section 01 33 00 - Submittal Procedures.

.4 Section 01 35 23 – Health and Safety

.5 This section describes requirements applicable to all Sections within Divisions 02 to 49.

.6 Appendix 01 35 17A Contractor Hot Work Permit

1.2. FIRE SAFETY PLAN

.1 Contractors and their personnel will be familiar with this section and its requirements.

.2 The contractor must take all necessary precautions during the carrying out of the work to prevent the possibility of fire occurring.

1.3. FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by the governing codes, regulations and bylaws.

.2 The contractor will, at all times, when welding, brazing and performing any operation with an open flame, combustible adhesives or flammable solvents keep a portable, operable fire extinguisher within 3 meters of the operation.

1.4. HOT WORK

.1 Take all precautions to Work safely and to provide the necessary protection to persons and property from Hot Work. This includes, but is not limited to Brazing, Cutting, Grinding, Soldering, Thawing Pipe, Torch Applied Roofing and Welding. With all such activity these steps are to be followed:

.1 Whenever possible, complete Hot Work in a welding shop or out of doors at the school.

.2 Flammable liquids, dust lint and oily deposits to be removed from within 50-ft (15m) of Work. Remove other combustibles where possible. Otherwise protect with fire-resistive tarpaulins or metal shields.

.3 Explosive atmosphere in area eliminated. Floors swept clean. Combustible floors wet down, covered with damp sand or fire-resistive tarpaulins.

.4 All wall and floor openings covered. Fire-resistive tarpaulins suspended beneath Work.

.5 For on-site Work (indoor and out of doors), advise the Head Custodian, Principal, Consultant (if assigned) and Project Coordinator prior to Work being performed, and of related dangers.

.6 Where the Fire Alarm system is required to be set to stand-by to discourage false alarms from smoke detectors provide a firewatch throughout the building or structure being worked on. NEVER put the fire alarm system in stand-by mode when the building is occupied by staff or students.

.7 In the event of a fire as a result of the Hot Work, notify the fire department immediately. Report incident to the head custodian, the Consultant, if assigned, and Project Coordinator immediately, whether extinguished or not. Provide a fire incident report to the Board.

.8 Barriers must be set up to protect staff and students (i.e. pylons, shields, and caution tape) from exposure to arc flash and smoke migration.

.9 Have all necessary doors, windows and/or drapes closed. Confer with the Head Custodian to shut down all fan systems in the area to reduce or eliminate smoke distribution.

.10 Provide and keep fire extinguishers handy and in good Working condition. Temporarily cover all smoke detectors in the area during time of Work.

.11 Provide a fire watch/spot check for several hours after Work is completed. Uncover smoke detectors.

.12 On new construction, the requirements of the Hot Wok permit may be waived, until such time as either Substantial Completion or Occupancy is granted, whichever comes first.

.13 On additions to existing buildings, the requirements for Hot Work permits shall remain in place.

1.5. HOT WORK PERMIT

.1 **A sample Hot Work Permit is attached to the specifications – refer to attached Appendix 01 35 17-A**

.2 Each permit is valid for seven (7) days only and must be renewed prior to its expiration date

.3 The contractor must obtain Hot Work Permits from the School Board's representative prior to the start of work.

.4 The contractor must complete the form as required and must keep the form on site.

.5 Return each completed form to the School Board's representative on the date of expiration.

.6 The most current version of the Permit and its requirements shall be used for the purposes of the Work.

1.6. FIRE PROTECTION SYSTEMS

.1 Any Modifications to Fire Alarm system and its devices including service, additions and changes in device location must be performed only by a Certified Fire Alarm Technician as per the Ontario Fire Code section 1.1, subsection 1.1.5.

.2 The Contractor will receive from the Board's contact a contact number for the monitoring service and a school system number.

.3 Bidders are cautioned that the Board will be reimbursed for the cost of false alarms. Refer to Section 01 14 00 Work Restrictions, Para. 1.4.4.

.4 An approved inspection firm shall verify all new fire alarm devices, in accordance with CSA regulations. Certificate of Verification is required before occupancy.

1.7. FIRE ALARM SHUT-DOWN PROCEDURE

.1 Plan the operation such that the required work minimizes system down time to the least amount possible. Do not shut the system down or engage silence mode when the building is occupied by students. Only shut the system down when necessary.

.2 For the purposes of this section, unoccupied shall mean when the school is not occupied by students.

.3 Wherever possible, shut down only the zone needing work,

.4 and schedule down time in unoccupied school hours.

.5 Contractor(s) shall ensure all costs are included in their bid price for work related to the fire alarm system outside of regular hours and/or during unoccupied school hours. This shall include evening and weekend work.

.6 A fire alarm system must remain active when the building is not occupied by school or contractor's forces and should never be offline overnight.

.7 Procedure

The following procedure shall be followed when a fire alarm system is completely or partially affected by maintenance, shutdown, bypass, silence, loss of power, or any other nomenclature that affects the proper operation of the complete system.

.1 Inform both the principal and head custodian whenever the fire alarm system is to be disabled prior to any partial or whole system shut down. Where school staff are not available, ensure that the Project Coordinator and/or area supervisor are informed.

.2 Ensure that the school or building administration has advised all staff when the fire alarm system is disabled and/or when it is back online. This will include instructions to call 911 if they detect smoke or a fire.

.3 Immediately prior to alarm system shutdown and upon restoring the fire alarm system, the person supervising the shutdown must:

1.7.7.1.3.1. obtain the school account number, located on a red decal attached to the fire alarm panel. This number will be formatted as 20-9xxx, with the xxx being the school location code,

1.7.7.1.3.2. contact Direct Detect at 519-741-2494 (the fire alarm monitoring company), to inform them of the state of the fire alarm and the approximate amount of time the fire alarm will be offline. They will require the building name and account number, the contact name, the contractor name as well as any other information they request, and

1.7.7.1.3.3. contact Bestell at 519-741-2494 (the current security monitoring company), to inform them of the state of the fire alarm and the approximate amount of time the fire alarm will be offline. They may require the building name and account number as well as any other information they request.

.4 A fire watch, at the Contractor's expense, shall be undertaken by a person with the sole and express purpose of completing the following tasks and in the event of the detection of smoke, fire, or any other emergency, notifying the fire department, and the building occupants. The fire watch patrol shall:

1.7.7.1.4.1. patrol all halls and high-risk areas affected,

1.7.7.1.4.2. have access to a phone and call 911 if they see or detect smoke or fire,

1.7.7.1.4.3. report any other problems they encounter,

1.7.7.1.4.4. notifying the building occupants in the event of an emergency and

1.7.7.1.4.5. remain on patrol until the fire alarm system is reactivated and fully operational.

.5 Contact Direct Detect, Bestell, and school administration to inform them that the fire alarm is back online.

.6 In the event that a fire alarm system is activated, whether by smoke, fire or accidentally, the system must not be reset until authorized by the Fire Department (verbally or in person) and the cause of the alarm has been investigated.

1.8. FIRE PROTECTION EQUIPMENT IMPAIRMENT

.1 Fire Protection Equipment referred to in this section includes sprinkler systems, special fire suppression systems, and kitchen hood suppression systems.

.2 The Contractor will take all precautions including restrict all Hot Work operations and shut down hazardous processes during all Fire protection equipment impairment.

.3 Do not shut the Fire protection equipment down unless necessary. Plan the operation required to reduce system impairment time to the least amount possible.

.4 Wherever possible, shut down only the Fire protection equipment needing Work and schedule this impairment time for unoccupied school hours. Allow for this in your bid pricing.

.5 Discuss the possible down time with the head custodian and principal prior to any partial or whole system impairment.

.6 The school administration shall advise all staff of Fire protection equipment shut down. This will include instructions to call 911 if they see a fire and when system is back online

.7 The Contractor will plan to use temporary protection such as extra extinguishers, charged hose lines and temporary sprinkler protection during all Fire protection equipment impairment.

.8 If the sprinkler system is restorable, either in whole or in part, the Contractor or subcontractor shall assign someone to restore the system promptly in the event of a fire.

.9 A fire patrol may need to be established and will include the following at the Contractor's expense:

- .1 Patrol all halls and high-risk areas affected.
- .2 Fire patrol shall have access to a phone and call 911 if they see a fire.
- .3 Report all other problems they encounter.
- .4 Remain on patrol until the system is back on.

.10 The Contractor shall inform all sub trades that the Board has a Red Tag Permit System and it shall be used for all Fire protection equipment impairment.

.11 For ease of use, a Factory Mutual hanging wall kit has been put in place at all Board Fire protection equipment locations. Supplies of Red Tag Permits are provided there.

1.9. FIRE ALARM MODIFICATIONS AND MAINTENANCE

.1 Very important changes to Ontario Building Code as they relate to the Standard for the Verification of Fire Alarm Systems CAN/ULC-S537-M have taken effect December 24, 1999. (Minister's Ruling 99-BC-01)

.1 Clause 5.1; "Addition of conventional field device(s), or modification(s), to existing input circuit(s) or output circuit(s) shall require re-verification of all devices served by those input circuit(s) or output circuit(s)." If one device is added to a zone, the entire zone or in the case of a single zone panel the entire system is to be verified.

.2 Clause 5.2 "Addition of input circuit(s) or output circuit(s) to an existing fire alarm system shall require verification of the new circuit(s) in accordance with this standard, and shall also require all previously existing circuit(s) to be tested as follows:

.3 TEST: One conventional field device on each circuit shall be operated to confirm activation of all output circuits in accordance with the systems design." Even though no other zones have been touched, one device per input zone is to be tested when the Fire Alarm system is modified.

.4 Clause 5.5 "Where a transponder is added to an existing system, the transponder shall be verified in accordance with subsections 3.2, Wiring; and subsection 3.3 Control Units; and with CAN/ULC-S536, Standard for the Inspection and Testing of Fire Alarm Systems as well as re-verification of existing field devices and verification of new conventional field devices." If a new addressable device is added to a system, the new device is to be tested; as well a test must be conducted on all addressable devices on the loop.

.5 Clause 5.6 "Where an existing fire alarm system control unit is replaced with a new control unit, it shall be verified in accordance with CAN/ULC-S536, Standard for the Inspection and Testing of Fire Alarm Systems. Replacement of any control panel will require the testing of all existing fire alarm devices.

.2 The Contractor and subcontractors shall include in the bid price for the above ULC Standards requirements referenced in the Ontario Building Code.

1.10. INSTALLATION AND/OR REPAIR OF ROOFING

.1 The Contractor will review with the Consultant and the Board's representative of the location of any asphalt kettles and the dates the kettles will be in use. The Contractor, in the course of performing roofing work, will ensure all personnel utilize the following precautions:

.1 Use only kettles equipped with thermometers or gauges in good working order.

.2 Locate kettles in a safe place outside of the building.

.3 Maintain continuous supervision while kettles are in operation and provide metal covers for the kettles to smother any flames in case of fire.

.4 All roofing materials stored in locations no closer than 15 meters to any structures.

1.11. FIRE DEPARTMENT ACCESS

.1 Designated fire routes must be maintained. The Fire Department must be advised of any work that would impede fire apparatus response.

1.12. SMOKING PRECAUTIONS

.1 Smoking is not permitted anywhere on Board properties. Workers who wish to smoke must leave the property, and not within sight of students. Any worker found to be in contravention of the Ontario Smoke Free Act will be subject to legislated fines.

1.13. FLAMMABLE LIQUIDS

.1 The handling and storage on site of flammable liquids are to be governed by the current National Fire Code of Canada.

.2 Flammable liquids such as gasoline, kerosene and naphtha may be kept for ready use in quantities not exceeding 10 imperial gallons provided they are stored in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval.

.3 Transfer of flammable liquids is prohibited within buildings.

.4 Transfer of flammable liquids must not be carried out in the vicinity of open flame or any type of heat producing devices.

.5 Flammable liquids having a flashpoint below 100° F (37.7°C) such as naphtha or gasoline must not be used as solvents or cleaning agents.

.6 Flammable waste liquids, for disposal, must be stored in approved containers located in a safe ventilated area. Quantities are to be kept to a minimum.

END OF SECTION

Appendix 013517-A Contractor Hot Work Permit

Waterloo Region District School Board

Appendix - 013517-A

Facility Services

CONTRACTOR HOT WORK PERMIT

STOP!
Avoid hot work or seek an alternative method if possible.

This hot work permit is required for any temporary operation involving open flames or producing heat and/or sparks.
This includes but is not limited to: brazing, cutting, grinding, soldering, torch-applied roofing and welding.
A SEPARATE PERMIT IS REQUIRED FOR EACH AREA

Board Supervisor/ Manager/Proj. Coordinator Responsibilities:
i. Verify precautions taken in Section A
ii. Complete and retain Part 1
iii. Complete Section B prior to commencement of Hot Works
iv. Issue Part 2 to Contractor completing Hot Work & Post
v. Obtain Part 2 when Fire Monitoring complete
vi. Return Part 1 and Part 2 to Controller, Facility Services

Contractor Responsibilities:
i. Verify precautions taken in Section A
ii. Complete Section C during each day that Hot Works takes place
iii. Return Part 2 to Board Supervisor/ Manager/Proj. Coordinator

PART 1

Section A Indicate Precautions Taken

☐ Available sprinklers, hose streams, and extinguishers available and in service

Within 35' or 11m of hot work
☐ Flammable liquid, dust, lint and oily deposits removed
☐ Explosive atmosphere in area eliminated
☐ Floors swept clean
☐ All wall and floor openings covered
☐ Combustible floors covered with fire resistant sheets
☐ Protect or shut down ducts that might carry sparks/smoke

Hot work on walls, ceiling or roofs
☐ Construction is noncombustible and without combustible covering or insulation
☐ Combustible materials on other side of walls, ceilings or roofs moved away
☐ Combustible structure wetted down

Hot work on enclosed equipment
☐ Enclosed equipment cleaned of all combustible material
☐ Containers purged of flammable liquid/vapour
☐ Pressurized vessels, piping & equipment removed from service, isolated & vented

Fire watch/hot work and monitoring
☐ Fire watch will be provided during and for 1 hour after work including break
☐ Fire watch is trained and supplied with suitable extinguishers
☐ Fire watch is trained in the use of sounding fire alarm
☐ Fire watch conducted in adjoining areas, above and below the space where appropriate
☐ Monitor hot work area for an additional 2 hours after fire watch
☐ Other precautions taken (please detail):

_____
_____
_____
_____

Section B Authorization Granted

Board Supervisor/Manager/Proj. Coordinator: _____
Print Name Signature

Permit Valid from / to: (max. 7 days) _____ _____
From This Date To This Date

(Maximum 7 days or until end of hot work whichever is sooner)

Section C Contractor and Location Affected

Dates: (max 7 days)	Name of Contractor conducting hot work	Name & signature of individual assigned to fire watch	Name & signature of individual assigned to fire monitoring

School:

Room/Area: _____

Nature of Job: _____

I verify the above location has been examined each day, the precautions listed in Section A have been taken each day, and permission is authorized for this work.
I further acknowledge that if activity is during school operational hours, that appropriate notification has been given to school administration.

Hot Works Contractor: _____
Signature

School Administrator notified: _____
Print Name

In Case of Emergency call: 911 - Then call: 519-570-0003 Ext. 4123

Refer to WRDSB Administration Procedure 1200 Hot Works/Fire Watch (Copies Available on Request)

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01 35 23 – Health And Safety

1.0 GENERAL

1.1. RELATED SECTIONS

.1 Section 01 31 00 - Project Managing and Coordination.

.2 Section 01 33 00 - Submittal Procedures.

.3 Section 01 35 17 – Fire Safety Requirements

.4 Section 01 35 43 –**Designated Substances**

.5 Section 01 41 00 – Regulatory Requirements

.6 Section 01 53 00 – Temporary Construction Facilities

.7 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. REFERENCES

.1 Province of Ontario, including requirements for a "Prime Contractor" as defined by the Act.

1.3. SAFETY PLAN

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to commencing any site Work and continue to implement, maintain, and enforce plan until final demobilization from site. The Health and Safety Plan must address project specifications.

.2 Consultant may respond in writing, where deficiencies or concerns are noted and may request resubmission with correction of deficiencies or concerns.

.3 Be governed by pertinent safety requirements of Federal or Provincial Governments and of municipal bodies having authority, particularly the Ontario Construction Safety Act, The Occupational Health and Safety Act for Ontario, and regulations of Ontario Ministry of Labour, and work in conjunction with proper safety associations operating under the authority of Ontario Workers' Compensation Act. Protect Owner, Owner's employees, the public and those employed on the Work from bodily injury and to protect adjacent public and private property and Owner's property from damage. Furnish and maintain protection, such as warning signs, tarpaulins, guard rails, barriers, guard lights, night lights, railings around shafts, pits and stairwells, etc. as required. Remove temporary protective measures when no longer required.

1.4. TEMPORARY WORK

.1 Temporary work requiring engineering proficiency for the design, erection, operation maintenance and removal shall be designed and bear the stamp of the registered professional Engineer or Architect. Detail drawings will be submitted to the Consultant for review prior to commencing any work.

.2 Before a temporary structure is used, the person responsible for design, or their representative, shall inspect the structure and certify it has been constructed according to their design.

1.5. RESPONSIBILITY

.1 The "Prime Contractor" according to applicable local jurisdiction, is 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 the extent that they may be affected by conduct of Work.

.2 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.

.3 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, and follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Health and Safety Act having jurisdiction. Advise the Board and the Consultant verbally and in writing.

.4 The Contractor shall make their own arrangements for emergency treatment of accidents. Any accidents shall be reported immediately to the Board contact.

.5 The Contractor agrees to hold the Board harmless of any and all liability of every nature and description, which may be suffered through bodily injuries, involving deaths of any persons, by reasons of negligence of the Contractor, his agents, employees, or his subcontractors.

1.6. SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00.

.2 Submit site-specific Health and Safety Plan: Within ten (10) days after the date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operation

.3 Submit one (1) copy of Contractor's authorized representative's work site health and safety inspection reports to Consultant and Owner.

.4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.5 Submit copies of incident and accident reports.

.6 Submit Material Safety Data Sheets (MSDS) to Consultant.

.7 Consultant's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.8 Medical Surveillance: Where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Consultant.

.9 On-site Contingency and Emergency Response Plan: Address standard operating procedures to be implemented during emergency situations.

.10 File Notice of Project with the Ministry of Labour prior to commencement of Work.

1.7. SAFETY ACTIVITIES

.1 Perform site specific safety hazard assessment related to the project.

.2 Schedule and administer Health and Safety meeting with Consultant prior to commencement of Work.

.3 Perform Work in accordance with Section 01 41 00 - Regulatory Requirements and this section.

1.8. HEALTH AND SAFETY COORDINATOR

.1 Employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Coordinator must:

.1 have previous experience as a Health & Safety coordinator,

.2 have working knowledge of occupational safety and health regulations,

.3 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,

.4 be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan, and

.5 be on site during execution of Work.

1.9. POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Health and Safety Act having jurisdiction, and in consultation with Consultant.

1.10. CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Consultant or by the Board.

.2 Provide Consultant and/or Board with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Consultant and or the Board may stop Work if non-compliance of health and safety regulations is not corrected.

1.11. PROJECT/SITE CONDITIONS

.1 Work at site will involve contact with:

.1 Refer to Section 01 35 43 **Designated Substances**

1.12. HAZARDOUS WORK

.1 Blasting or other use of explosives is not permitted at the place of work.

1.13. WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

1.14. LOCKOUT PROCEDURES

.1 All Work to be done on electrical systems or machinery, where the unexpected switching on of the system or machinery could result in personal injury to a student, staff, employee, or the Contractor's employee, must be done in accordance with the Contractor's standard lockout procedure.

.2 The Contractor shall provide his/her own locks for the above procedure.

.3 The lock shall include contact information for the person(s) locking out such devices.

1.15. OVERHEAD LIFTING

.1 Under no circumstances will a crane or lifting device be used over an occupied space.

.2 When working adjacent to occupied spaces, ensure a clearance of one (empty) classroom, or a minimum of 10m between any occupied space and the furthest possible reach of the crane.

1.16. WARNING SIGNS AND NOTICES

.1 Notices shall be posted advising of the hazard but will not be considered a substitute for providing approved protection, separation, and space from the hazard.

1.17. FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by the governing codes, regulations and bylaws.

.2 Burning rubbish and construction waste materials is not permitted on site.

.3 Maintain placed or installed Fire Protection to protect the portions of the Work during construction.

1.18. SCENT-FREE ENVIRONMENT

.1 The Board requires that, where advised, a building may be deemed scent-free and as such, the wearing of scented products is prohibited.

.2 Any methods or materials that are found to create negative responses in staff or students shall cease and be removed under advisement of the Consultant and or the Board, until alternate methods can be determined.

END OF SECTION

01 35 43 –Designated Substances

1.0 GENERAL

1.1. RELATED SECTIONS

.1 Section 01 35 23 – Health and Safety Requirements.

.2 Section 01 41 00 – Regulatory Requirements.

.3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. REFERENCES

.1 Province of Ontario, including requirements for a "Prime Contractor" as defined by the Act.

1.3. ASBESTOS and OTHER REGULATED SUBSTANCES

.1 An Asbestos Audit, as prepared by WRDSB retained consultants, for this facility, is attached under Appendix 013543 A. A duplicate set is also available in the Facilities Services Departments located in the Education Centre. Unless specifically covered by a Cash Allowance or Contingency Allowance that states otherwise, include in this Contract the required removal of all asbestos containing materials (ACM) to complete the work. No claims for extra costs will be accepted for areas known to contain ACM that are within the scope of this Work.

.2 A Project Specific Designated Substance / Lead Report, as prepared by WRDSB retained consultants or Environmental Officer for this facility, is attached under Appendix 013543 B.

.3 Comply with applicable legislation regarding asbestos. Should the Contractor encounter asbestos not noted in the referenced Asbestos Audit that would be disturbed during the course of the Work, they should stop the work in that immediate area and report the same to the Consultant and Board contact.

.4 In addition, Lead, Mercury, Silica, and Isocyanates are anticipated to be present in existing facilities. New construction, renovations, or alterations require compliance by the Contractor with the applicable legislation.

1.4. PROTOCOL FOR ABATEMENT WORK

.1 This Protocol establishes the requirements to be followed by all Asbestos Abatement Contractors working in buildings owned or operated by the Waterloo Region District School Board (hereinafter referred to as the Board). This protocol applies to Type 1, Type 2 and Type 3 Operations as identified in the most current

form of Ontario Regulation 278 as amended, and applies to both emergency and non-emergency work, whether directly retained by the Board or working as a subcontractor to a General Contractor retained by the Board.

.2 Asbestos Abatement Contractors must maintain appropriate insurance coverage and WSIB certification and provide proof upon request.

.3 Asbestos Abatement Contractors shall only use personnel certified by the Ontario College of Trades and must provide the Board with proof of asbestos certification (AAS and AAW) for all supervisors and all staff involved.

.4 School Access: During regular school hours, all abatement contractors are to report to the school office upon arrival. They must sign in all personnel and identify to a person of authority, preferably the Principal, their purpose for being there as well as the area of work. After school hours, ensure card-in/card-out procedures are followed and building security is maintained. Contractor staff shall NOT prop doors open, and ensure that doors are locked.

.5 Communication:

.1 Asbestos Abatement Contractor will contact the school's Principal and/or Vice Principal (phone numbers are available on the WRDSB website) to set up a firm date and time for the abatement (removal/repair). This communication shall allow at least 72 hours notice ahead of the proposed work unless it is emergency work.

.2 Confirmation of the date shall be via email to the following:

.1 Principal / Vice-principal

.2 Facility Manager

.3 Environmental Officers (environmental@wrdsb.ca)

.3 When working under a general contractor, also notify:

.1 Project manager for the General Contractor

.2 Architect/Consultant for the project

.3 The Board's Project Coordinator

.4 This communication shall indicate the date, the start time, the anticipated completion time (including any required air clearances and teardowns), the asbestos abatement type, and the areas of work within the school or building. It should also identify any mechanical equipment that is required to be disabled for the duration of the operations.

.5 For emergency work where requested by Area Supervisors, Facility Managers, On-Call Manager/Supervisor, or Environmental Officers, no notification to the school is required by the abatement contractor. Notification to the Principal

or Vice-Principal will be managed by the Area Supervisor, Facility Manager, On-Call Manager/Supervisor, or Environmental Officers.

.6 For **Type 2 Removals**, also notify: the Ministry of Labour, Immigration, Training and Skills Development (MLITSD) where required by Regulation.

.7 For Type 3 Removals, also notify: Manager of Health, Safety & Security, (healthandsafety@wrdsb.ca); and, the MLITSD where required by Regulation.

.8 Discussions related to the work, whether with media, school staff, or any others, is NOT permitted. Questions or enquiries shall be directed to the Board's Communication Officer (comms-team@wrdsb.ca) by the person(s) seeking information, where warranted.

.6 Asbestos Removal Assessment

.1 When working directly with the Board to undertake non-emergency abatement, the contractor is to assess the work on site and provide a cost estimate to the Environmental Officer. Some work will require discussion with the Facility Manager or Environmental Officer to determine if additional work should be done to completely remove all additional ACM material from the area or similar.

.2 When abatement is to be done under a General Contractor, the proposed work is to be quoted directly to the General Contractor. Additional abatement not already within the original scope of work or tender is to be quoted to the General Contractor for approval by the Project Coordinator or Architect.

.7 Asbestos Operations

.1 Asbestos operations shall be conducted according to Type, where each Type will require special timing and considerations as follows:

.2 **Type 1:** Any time behind a secured door or enclosure.

.3 **Type 2:** Any time when students and teaching staff are NOT present in the building, and behind a secured door or enclosure. During the school year, the work shall be performed outside of the regular program hours, Monday to Friday, anytime on weekends, when no regular programs are scheduled.

.4 The work shall be performed anytime during March Break, Winter Break, and Summer Break, when teaching staff are NOT present in the building.

.5 **Type 3:** Outside of school regular program hours, during unoccupied times, and behind a secured door or enclosure. During the school year, the work shall be performed outside of the regular program hours, Monday or Friday, anytime on weekends, provided all rentals are cancelled and card access is restricted for teaching staff entering the facility.

.6 The work shall be performed anytime during March Break, Winter Break, and Summer Break, provided all rentals are cancelled and card access is restricted for teaching staff entering the facility

.7 Facility Services personnel and Office staff may be present in the building due to training in Asbestos Awareness.

.8 All Type 3 work must consider one (1) additional day in case the clearance sampling fail.

.9 Emergency work shall be carried out the same day (evening/night) or under exceptional conditions the following day/evening/night. Contractors shall exercise discretion when working in the school to minimize the potential for health and safety concerns by the staff, students, and school community. Where warranted, contact Area Supervisor, Facility Manager, On-Call Manager/Supervisor, or Environmental Officer to obtain further direction.

.10 Before beginning any Type 1, Type 2, or Type 3 Operations, the work area must be secured, all doors locked, WHITE poly and caution tape used in open areas/corridors and “construction” warning signs added to all access points to keep school staff and students clear of all work areas.

.11 If the work area is in use by Board staff, contact the Area Supervisor to assist in vacating the area. If unable, contact the Area Supervisor, Facility Manager, On-Call Manager/Supervisor, Environmental Officer, or Project Coordinator to reschedule the work.

.12 Board preference is to use “construction” warning signs at all areas accessible to school staff and students. Behind those secured areas, a sufficient number of “asbestos” signs, posted in compliance with O. Reg. 278/05.

.13 The Asbestos Abatement Contractor is responsible to disable the air handling unit/fan serving the work area (school wing, floor, or multiple floors if air handling unit/fan serve more than one floor) and prevent operation using Lock-out/Tag-out devices for each air handling unit/fan. Exercise caution during the heating season to ensure areas of the building are maintained above freezing and ensure equipment is turned back on after abatement/air clearance completed.

.14 Asbestos Abatement Contractor’s employees shall put on/take off PPE within the work area marked by construction signs. No employee shall leave the work area wearing PPE.

.15 All dust and waste is to be cleaned up and removed at frequent/regular intervals as the work proceeds and immediately upon completion, but no later than the end of the work day. No waste bags or similar are to be left behind. No additional construction work shall be performed by an Asbestos Abatement Contractor.

1.5. SUBMITTALS

.1 Once the abatement is completed, forward a Letter of Completion to the Environmental Officers (environmental@wrdsb.ca). This letter shall be received no

later than 72 hours after completion of each abatement area/phase and shall include any sample results. The letter must also clearly identify what specifically has been abated and where (Fixed Reference Numbers), so that this information can be attached to the current AAU Asbestos Audits for future updates.

.2 For those projects requiring air clearance, ensure this info is sent without delay but in all cases no later than 24 hours after sampling. All Type 3 work must take into account that the initial samples may not pass and the contractor must allow one (1) additional day to re-clean and re-sample before school is to resume operations. For those projects not under the direct supervision of an Environmental Consultant, the contractor is to expedite the air clearance sampling with the lab of their choice and carry these costs.

.3 Forward Air Clearance results to:

.1 Principal/Vice-principal (contact info sent with Work Request)

.2 Facility Manager (contact info sent with Work Request)

.3 Environmental Officers (environmental@wrdsb.ca)

.4 Manager of Mechanical, Electrical and Environmental Services (lou_lima@wrdsb.ca)

.5 Manager of Health, Safety & Security (healthandsafety@wrdsb.ca)

.6 Project team when working under a General Contractor

1.6. ACKNOWLEDGEMENT

.1 The protocols for asbestos work must be read and understood by Asbestos Contractor.

.2 Submit a signed copy of the most current copy of *PROTOCOL FOR ABATEMENT WORK (ASBESTOS ABATEMENT CONTRACTORS)* to the General Contractor, the Consultant, and the Board's Environmental Officer.

END OF SECTION

Appendix 01 35 43A Asbestos Audit Report

Waterloo Region District School Board
51 Ardelt Avenue,
Kitchener, Ontario
N2C 2R5

Attention: Jeff Cull, Environmental Officer

Limited Pre-Renovation Designated Substance Survey
Health and Physical Education Renovation Project
Kitchener-Waterloo Collegiate Institute
787 King Street West, Kitchener, ON

EXP Project Number:
LON-26000265-A0

Prepared By:
EXP Services Inc.
405 Maple Grove Road
Cambridge, Ontario N3E 1B6 Canada

Date Submitted:
January 28, 2026

Executive Summary

EXP Services Inc. (EXP) was retained by the Waterloo Region District School Board (WRDSB) to conduct a Limited Pre-Renovation Designated Substances Survey of Kitchener-Waterloo Collegiate Institute (KCI) located at 787 King Street West, Kitchener, Ontario (the site), pertaining to the upcoming Health and Physical Education Renovation Project.

The survey was completed by Sarah Kruis and Kinjal Prajapati on January 11, 2026. The survey included only the portion(s) of the building to be renovated (project area). The project area was defined by the client and is represented by the drawings provided in Appendix C.

The following designated substances were identified:

Friable Asbestos-Containing Materials

- Asbestos-containing Aircell pipe insulation was observed in Room 046B, 050, 050D, 069A, 069D of the 1947 building era during the survey. Approximately forty-five (45) linear feet of this material was observed.
- Asbestos-containing parging cement was observed on pipe elbows in the Room 050, 050D, 069A, 407 of the 1947 building era during the survey. Six (6) elbows were observed.
- Friable materials may be present inside inaccessible areas of the building (wall voids, pipe chases etc.).

Non-Friable Asbestos-Containing Materials

- Asbestos-containing 12”x12” vinyl floor tiles *Beige with White/Brown Streaks* was identified in Room 060 of the 1947 building era during the survey. Approximately three hundred (300) square feet of this material was observed.
- Asbestos-containing white caulking associated with vertical beams was identified in Room 040 of the 1966 building era during the survey. Approximately hundred (100) linear feet of this material were observed.
- Asbestos-containing concrete block filler compound was identified on concrete block walls in the 1947 building era during the survey. Approximately nine thousand five hundred (9,500) square feet of this material were observed.
- Asbestos-containing concrete block filler compound was identified on two-phase plaster in the 1947 building era during the survey. Approximately three thousand (3,000) square feet of this material were observed.
- Asbestos-containing concrete block filler compound was identified on mortar lines of glazed blue concrete block walls in Room 040 of the 1966 building era during the survey. Approximately five hundred (500) square feet of this material were observed.

- Asbestos-containing concrete block filler was identified on concrete block walls and concrete ledges in the 1966 building era during the survey. Approximately four hundred (400) square feet of this material were observed.
- Non-friable materials may be present inside inaccessible areas of the building (wall voids, pipe chases etc.).
- All roofing materials should be considered asbestos containing until sampling and analysis proves otherwise.

Lead-Containing Materials

- Results indicate that samples 26000265-Pb-01, 02 & 03 have lead concentrations of less than 0.1% and should be considered to have low levels of lead.
- Results indicate that sample 26000265-Pb-05 has a lead concentration greater than 0.1% but less than 0.5% and should be considered to be lead-containing.
- Results indicate that sample 26000265-Pb-04 has a lead concentration greater than 0.5% and should be considered to be lead-based.
- Lead is expected to be present in solder on copper plumbing throughout the building.

Mercury

- Mercury is present as a vapour in pressure gauges. Approximately two (2) gauges were observed.

Silica

- Crystalline silica is present in concrete products, mortar, brick, etc. These construction products are typically found throughout building structures.

Mould

- No suspect mould was identified.
- Minor amounts of concealed mould growth may not be identified as part of the survey in the absence of visual indicators.

Recommendations

If identified asbestos-containing materials are to be disturbed as part of upcoming renovations, removal of the asbestos-containing materials must be completed following the precautions and procedures outlined in Ontario Regulation 278/05 as amended.

Destructive investigation of flooring and wall/ceiling voids was not completed as part of this survey. Concealed locations should be investigated immediately prior to project start up. Materials suspected of containing asbestos or other designated substances should be sampled upon discovery.

Any materials suspected of containing asbestos and not addressed within this report must be assumed to be asbestos containing until sampling and analysis proves otherwise.

Refer to Section 6.0 for procedures required when disturbing or removing the hazardous materials identified in this report.

Remedial Recommendations

Based on observations made during the survey the following poor condition asbestos-containing materials will require remediation or removal:

- Approximately four hundred (400) square feet of poor condition asbestos-containing block filler compound were observed in Room 040 during the survey.
- Approximately eighty (80) square feet of poor condition beige paint on plaster walls were observed in Room 402 during the survey.
- Approximately two hundred fifty (250) square feet of poor condition grey/red paint on concrete floor were observed in Room 015 during the survey.

TABLE OF CONTENTS

1.0 INTRODUCTION 1
2.0 SITE BACKGROUND 1
3.0 SURVEY METHODOLOGY 2
3.1 Asbestos 2
3.2 Lead 4
3.3 Mercury 6
3.4 Silica 7
3.5 Visible Suspect Mould 7
4.0 REGULATORY REQUIREMENTS 7
5.0 RESULTS 8
5.1 Asbestos-Containing Materials (ACM) 8
5.1.1 Sprayed Fireproofing 8
5.1.2 Texture Coat 8
5.1.3 Mechanical Pipe Insulation 9
5.1.4 HVAC System 9
5.1.5 Mechanical Equipment 10
5.1.6 Vermiculite 10
5.1.7 Acoustic Ceiling Tiles 10
5.1.8 Plaster Finishes 12
5.1.9 Drywall Joint Compound 12
5.1.10 Asbestos Cement Products 12
5.1.11 Vinyl Floor Tiles and Mastic Adhesive 13
5.1.12 Vinyl Sheet Flooring 13
5.1.13 Roofing 13
5.1.14 Mastic 13
5.1.15 Caulking 14
5.1.16 Firestops and Sealants 15
5.1.17 Mortars 16
5.1.18 Leveling Compound 16
5.1.19 Tar Paper 17
5.1.20 Concrete Block Filler Compounds 17
5.2 Visible Mould 18
5.3 Lead-Containing Materials 18
5.4 Mercury 20
5.5 Silica 20
5.6 Ethylene Oxide 21
5.7 Vinyl Chloride 21

5.8 Benzene 21
5.9 Coke Oven Emissions 21
5.10 Acrylonitrile 21
5.11 Isocyanates 21
5.12 Arsenic 21
6.0 RECOMMENDATIONS 21
6.1 Short Term General Recommendations 21
6.2 Short Term Recommendations Regarding Asbestos 22
6.2.1 Abatement Precautions and Procedures 22
6.2.1.1 Mechanical Insulation 22
6.2.1.2 Vinyl Floor Tile 22
6.2.1.3 Caulking 22
6.2.1.4 Concrete Block Filler Compound 22
6.3 Recommendations Regarding Lead During Renovation, Maintenance or Repair 23
6.4 Recommendations Regarding Mercury 24
6.5 Recommendations Regarding Silica 24
7.0 LIMITATIONS AND WARRANTY 25

APPENDICES

APPENDIX A Asbestos Bulk Analysis Results
APPENDIX B Lead Paint Analysis Results
APPENDIX C Drawings

1.0 INTRODUCTION

EXP Services Inc. (EXP) was retained by the Waterloo Region District School Board (WRDSB) to conduct a Limited Pre-Renovation Designated Substances Survey of Kitchener-Waterloo Collegiate Institute (KCI) located at 787 King Street West, Kitchener, Ontario (the site), pertaining to the upcoming Health and Physical Education Renovation Project.

The survey was completed by Sarah Kruis and Kinjal Prajapati on January 11, 2026. The survey included only the portion(s) of the building to be renovated (project area). The project area was defined by the client and is represented by the drawings provided in Appendix C.

Under Section 30 of the Ontario Occupational Health & Safety Act (OSHA), an owner must determine whether any Designated Substances are present in a building and is required to prepare a list of all Designated Substances that are present prior to tendering any work that may disturb a Designated Substance in the project area. These substances may require special handling precautions or procedures.

The current OHSA regulation lists the following eleven (11) substances as Designated Substances in the workplace: acrylonitrile, arsenic, asbestos, benzene, coke oven emissions, ethylene oxide, isocyanates, lead, mercury, silica, and vinyl chloride. Prior to issuing any project plans the owner or an agent acting on behalf of the owner must provide the Designated Substance report to the constructors. Sequentially, the constructor must provide this report to any sub-contractors who would potentially disturb any Designated Substances identified in the report.

Based on the construction date and the reported use of the building, the survey completed by EXP included investigation into the following Designated Substances as listed by the Ministry of Labour, Immigration, Training and Skills Development: Asbestos, Lead, Mercury, and Silica. In addition, EXP included a limited assessment for suspect mould growth.

The survey did not include investigation into Arsenic, Acrylonitrile, Benzene, Coke Oven Emissions, Ethylene Oxide, Isocyanates and Vinyl Chloride as listed by the Ministry of Labour, Immigration, Training and Skills Development. These materials are not found within typical buildings and were not reported to EXP prior to the survey.

2.0 SITE BACKGROUND

The building is a three-storey structure with a basement, used as a secondary school, originally constructed in 1881. Ten (10) additions are reported for the building with construction dates of 1922, 1947, 1958, 1963, 1966, 1975, 1984, 1990, 2004 & 2011. Our project area included portions of the 1922, 1966, and 1947 building eras.

Each building era was treated as a separate structure when determining an appropriate sampling strategy.

The following reports have been previously completed for the building and provided to EXP:

- "2010 Asbestos Audit Update – Kitchener-Waterloo Collegiate Institute,", dated March 5, 2010, 787 King Street West, Kitchener, ON. MTE File No. 32523-800.
- "2014 Asbestos Audit Update – Kitchener-Waterloo Collegiate Institute,", dated May 9, 2014, 787 King Street West, Kitchener, ON. MTE File No. 34532-900.
- "2017 Asbestos Audit Update – Kitchener-Waterloo Collegiate Institute,", dated January 9, 2017, 787 King Street West, Kitchener, ON. MTE File No. C34532-909.
- "Kitchener-Waterloo Collegiate Institute 2020 Asbestos Audit Update,", dated September 23, 2020, 787 King Street West, Kitchener, ON. MTE File No. C34532-919.
- "Kitchener-Waterloo Collegiate Institute 2020 Asbestos Audit Update,", dated March 22, 2023, 787 King Street West, Kitchener, ON. MTE File No. C34532-941.

3.0 SURVEY METHODOLOGY

During this assessment the surveyor inspected the building for materials typically suspected of containing designated substances.

Note:

- Repetitive testing was generally not performed. Items, which were visually homogenous to others tested, were considered to be of like material and were not sampled again. However, due to the variable nature of some building materials, several additional samples may have been collected of a potentially identical material as required.
- Our survey was non-invasive in nature. The survey did not include demolition of walls, and ceilings to inspect voids and chases for concealed materials. EXP did not complete repairs of the locations where demolition has occurred. Doors, motors, equipment, and exterior finishes were not disassembled to inspect for concealed asbestos-containing materials.

3.1 *Asbestos*

The surveyor sampled typical friable and non-friable building materials historically suspected to contain asbestos.

Ontario Regulation 278/05 defines an asbestos-containing material (ACM) as a material that contains 0.5% or more asbestos by dry weight. The precautions and procedures regarding the disturbance or removal of the ACM in Ontario Regulation 278/05 are generally based upon what is referred to as the

friability of the material and the quantity of the material(s) to be disturbed. A friable material is defined as a material when dry, can be crumbled, pulverized, or powdered by hand pressure. Friable materials are considered more dangerous to human health by nature of the materials ability to generate airborne asbestos fibres. Non-friable products pose no danger of releasing airborne fibres unless cut, broken or otherwise physically abraded. Once airborne, asbestos fibres tend to be suspended in the air if not controlled and can be inhaled deep in the lungs past the body's natural defenses, causing asbestos related occupational diseases.

The most common friable building products used in construction include but are not limited to spray applied fireproofing, textured coat finishes, decorative or acoustic finishes and mechanical or pipe insulations. Manufactured non-friable materials containing asbestos include but are not limited to vinyl floor tiles, ceiling tiles, drywall joint compound (when painted), mastics, adhesives, asbestos cement products and textiles. In addition, some materials exist between friable and non-friable generalizations due to the nature of their application and the manner in which they behave when disturbed. Plaster exists in its typical state as non-friable material but when disturbed or removed must be treated as a friable product.

Samples were collected in accordance with Table 1 of Ontario Regulation 278/05 including determination of the accessibility and condition of each material. Remedial recommendations were prioritized based on the combination of accessibility and condition. Samples of suspected asbestos-containing materials were not collected if the sampling of the material created a hazard to the surveyor, required extensive demolition of covering materials to identify the material, or would create damage to the integrity of the building envelope. Building materials not sampled and analyzed are considered asbestos containing until proved otherwise as required by Ontario Regulation 278/05.

A number of materials may have been visually examined and identified to be asbestos containing based on historical knowledge including but not limited to, asbestos cement products and duct connectors.

Sample analysis was completed by EMSL Analytical Inc. (EMSL). Bulk asbestos analyses were performed in accordance with the method outlined in Asbestos on Construction Projects and in Buildings and Repair Operations – made under the Occupational Health and Safety Act Ontario Regulation 278/05, (EPA/600/R-93-116). EMSL holds accreditations with The National Laboratory Accreditation Program (NVLAP) for the determination of asbestos in bulk building materials and the interim method for the determination of asbestos in bulk insulation samples.

The analysis of the materials submitted was completed using a method referred to as "stop positive analysis". This method requires one result of greater than 0.5% asbestos to consider a material as asbestos-containing. Conversely, all samples of a sample set are subject to analysis before a material is considered a non-asbestos material. This approach is required by Ontario Regulation 278/05.

Materials comprised of more than one compound are analyzed in different phases to provide a result for each compound.

Where materials are listed as non-asbestos, or results indicate "none detected" it should be understood that this determination is based upon the limitations of analysis performed. Building materials defined as non-asbestos should be considered to contain no detectable concentrations of asbestos fibres. Materials found to contain less than 0.5% asbestos by dry weight have been labelled as containing trace amounts of asbestos. These materials are considered non-asbestos under Ontario Regulation 278/05.

Asbestos analytical certificates are included in Appendix A.

3.2 *Lead*

Suspected lead-containing paints or coatings present in more than a trivial amount, and/or where the condition was judged to poor were collected as part of the survey. Sample collection included determination of the accessibility and condition of each paint finish. Remedial recommendations were prioritized based on the combination of accessibility and condition. Other suspected lead materials were identified based on visual assessment and historical usage including but not limited to roof flashing, pipe solder and sound attenuation panels.

The EACC Lead Guideline for Construction, Renovation, Maintenance or Repair, dated October 2014 was prepared to aid building owners, constructors, contractors, subcontractors, and workers. The new guideline is intended to promote safe work practices, the appropriate use of or personal protective equipment and worker awareness/training. It was developed through an exhaustive review of pertinent regulatory and guidance documents as well as professional experiences of the abatement industry.

The guideline defines work on lead as operations involving drilling, handling, application, removal, disturbance, or clean-up of any material containing Lead during renovation work. The previous Ministry of Labour, Immigration, Training and Skills Development guideline for the control of lead exposures during the removal of lead on construction projects does not include criteria for categorizing paint as lead-based by concentration (% by weight, ppm, mg/kg, or ug/g). However, the EACC guideline has established a *de minimus* (virtually safe) concentration of lead in paints or coatings where a hazard during normal work would not likely be present in the absence of aggressive disturbance (sanding, grinding, abrading, torching etc.) or heating of the material. The guideline was established based on interpretation and adherence to the following regulations or guidelines:

- *The Surface Coating Materials Regulation (SOR/2005-109) as amended.*
- *Ontario Regulation 490/09 – Designated Substances; and,*
- *The Ministry of Labour, Immigration, Training and Skills Development Guideline – Lead on Construction Projects.*

The Surface Coating Materials Regulation (SOR/2005-109) as amended in October 2010 regulates the amount of lead present in a paint or coating to be 0.009% or less in Canada. Some exceptions have been granted to allow for higher lead concentrations. These exceptions include:

- as an anti-corrosive or an anti-weathering coating applied on the interior or exterior surface of any building or equipment that is used for an agricultural or industrial purpose;
- as an anti-corrosive or an anti-weathering coating applied on any structure, other than a building, that is used for an agricultural, industrial, or public purpose;
- as a touch-up coating for metal surfaces;
- on traffic signs;
- for graphic art on billboards or similar displays;
- for identification marks in industrial buildings; or
- as material for the purposes of arts, crafts, or hobbies, other than material for use by children (SOR/2010-224, s.1).

Ontario Regulation 490/09 applies to every employer and worker at a workplace where lead is present, produced, processed, used, handled, or stored where a worker is likely to be exposed to lead.

The Ministry of Labour, Immigration, Training and Skills Development Guideline (Lead on Construction Projects) is intended to assist people who have duties under the Occupational Health and Safety Act, and its regulations to protect all workers from exposure to inorganic lead. Additionally, all employers are required by Ontario Regulation 833 "Control of Exposure to Biological or Chemical Agents" to limit the exposure of workers to specified hazardous agents in accordance with the values set out within the regulation. This is in conjunction with the requirement of Ontario Regulation 490/09. The current airborne lead exposure limits for the relevant regulations are:

- *Ontario Regulation 490/09 – Designated Substances*
  - 0.05 mg/m^3 - Time Weighted Average (8 Hour Day or 40 Hour Work Week)
- *Ontario Regulation 833*
  - 0.05 mg/m^3 (8 Hour Day or 40 Hour Work Week)

The guideline has established the following recommendations based upon lead concentrations in paints or coatings:

- Paints or surface coatings containing less than or equal to 0.1% lead by weight (1000 µg/g or 1000 mg/kg or 1000 ppm lead) are considered low-level lead paints or surface coatings. If these materials (and the surfaces to which they are applied) are disturbed in a non-aggressive manner, performed using normal dust control procedures and are completed so that the TWA for PNOS is not exceeded, then worker protection from the inhalation of lead is not required. General health and safety precautions must still be

implemented, which may include, in part, prohibiting eating, drinking, smoking, and chewing in the work area, implementing dust suppression techniques, and washing facilities for workers to wash hands and face.

- Paints or surface coatings containing greater than 0.1% lead by weight (1000 µg/g, or 1000 mg/kg, or 1000 ppm) but less than 0.5% lead by weight (5000 µg/g, or 5000 mg/kg, or 5000 ppm lead) are considered lead-containing paints or surface coatings. Tasks performed that disturb these materials must be completed in accordance with the Classifications of Work Operations (in Section 7) and corresponding procedures (in Section 8). Alternatively, a hygiene or exposure assessment can be performed to determine procedures that are required.
- Construction operations involving lead-based paints or surface coatings (i.e., concentrations equal to or greater than 0.5% lead by weight (5000 µg/g, or 5000 mg/kg, or 5000 ppm lead) must always be completed in accordance with the procedures listed in the Classifications of Work Operations (in Section 7) and corresponding procedures (in Section 8). Alternatively, a hygiene or exposure assessment can be performed to determine procedures that are required.
- Regardless of lead content in paints or surface coatings, tasks that create an aggressive disturbance of coatings such as torching/welding, abrasive blasting must always be completed in accordance with the procedures listed in the Classifications of Work Operations (in Section 7) and corresponding procedures (in Section 8). Alternatively, a hygiene or exposure assessment can be performed to determine procedures that are required.

This guideline is used for interpretation of all results and any recommendations regarding lead paints or coatings identified during this survey.

A total of five (5) paint samples were collected from the building components where possible and were submitted to EMSL for analysis of total lead content by EPA Method No. 7000B; by flame atomic absorption spectrophotometry. EMSL holds accreditations with AIHA (American Industrial Hygiene Association).

Lead analytical certificates are included in Appendix B.

3.3 *Mercury*

Suspected mercury-containing materials were identified based on visual assessment and historical usage. Sampling of suspected mercury-containing materials was not completed.

3.4 *Silica*

Suspected silica-containing materials were identified based on visual assessment and historical usage. Sampling of suspected silica-containing materials was not completed.

3.5 *Visible Suspect Mould*

A limited visual assessment for the presence of mould and/or water damage was completed as part of the survey. No samples were collected.

4.0 REGULATORY REQUIREMENTS

“Designated Substance" as defined by the Ontario Occupational Health & Safety Act (OHSA) means “a biological, chemical or physical agent or combination thereof prescribed as a Designated Substance to which the exposure of a worker is prohibited, regulated, restricted, limited or controlled.” Under Section 30 of the OHSA prior to issuing any project plans the owner or an agent acting on behalf of the owner must provide the Designated Substance report to the constructors. Sequentially, the constructor must provide this report to any sub-contractors who would potentially disturb any designated substances identified in this report. Designated Substances are regulated under Ontario Regulation 490/09.

The Ministry of Labour, Immigration, Training and Skills Development (MOL) has issued a regulation (Ontario Regulation 278/05) with respect to the disturbance of asbestos on construction projects and has drafted guidelines for control of lead and silica exposures on construction projects.

Ontario Regulation 278/05 classifies all disturbance of asbestos as Type 1, Type 2, or Type 3, each of which is associated with defined work practices. All asbestos-containing material waste is subject to special handling and disposal practices and must be removed prior to renovation or demolition. Removal of any quantity of friable asbestos of greater than $1m^2$ requires notification of the MOL. Disposal of asbestos waste is subject to waste management regulations under Ontario Regulation 347/90 as amended to Ontario Regulation 102/07.

The MOL guideline for the control of lead exposures during the removal of lead on construction projects does not include criteria for categorizing lead paint. The MOL does not have a standard percentage of lead (by dry weight) or a concentration a material must have to be considered lead based.

The Designated Substance regulation (Ontario Regulation 490/09) specifies occupational exposure limits (OELs) for lead and, where necessary, requires implementation of a control program to ensure compliance with these OELs. The time-weighted average (TWA) OEL for lead (i.e., all lead except tetraethyl lead) is: 0.05 milligrams per cubic metre (mg/m^3) of air. However, under Subsection 3(3) of the Regulation, construction projects are excluded from the OELs and most of the other requirements of the Regulation. This exclusion should not be interpreted as meaning nothing is to be done for construction workers who are exposed to lead. The OELs establish an Ontario standard for worker

protection from lead. Procedures that provide an equivalent level of protection should, therefore, be implemented on construction projects where exposure to lead is a hazard. Ensuring such procedures are in place would, in the words of clause 25(2)(h) of the Occupational Health and Safety Act (OHSA), be "taking reasonable precautions to protect the health and safety of workers".

The EACC Lead Guideline for Construction, Renovation, Maintenance or Repair, dated October 2014 was prepared and released to aid building owners, constructors, contractors, subcontractors, workers, and engineering professionals who deal with the occupational environmental hazards. This guideline was written in conjunction with the MOL and was used to determine appropriate recommendations for the disturbance of lead-containing coatings by instituting administrative and engineering controls during the disturbance of lead-containing materials to adhere to the above-mentioned regulations regarding inorganic lead.

5.0 RESULTS

5.1 *Asbestos-Containing Materials (ACM)*

Asbestos is a general name for several varieties of highly fibrous silicate minerals. Commercially popular types of asbestos include Chrysotile, Amosite and Crocidolite. The fibres are valued for their heat and chemical resistance properties. The combination of fibrous structures, low heat conductivity, high electrical resistance, chemical inertness, strength, and flexibility, as well as its effectiveness as a reinforcing or binding agent when combined with cement and/or plastic, made asbestos popular for widespread industrial use.

One measure of the potential hazard of ACM is its friability. The Ontario Ministry of Labour, Immigration, Training and Skills Development asbestos regulation defines a friable material as one when dry can be crumbled, pulverized, or powdered by hand pressure. The friability of ACM is theoretically an indicator of the ease with which fibres may be released into the air. Non-friable products with bound asbestos pose no danger of releasing airborne fibres unless cut, broken up or otherwise physically abraded.

Friable Materials

5.1.1 Sprayed Fireproofing

Spray applied fireproofing was not identified in the project area during the survey.

5.1.2 Texture Coat

Texture coat was not identified in the project area during the survey.

5.1.3 Mechanical Pipe Insulation

Aircell pipe insulation was previously identified in Rooms 046B, 050, 050D, 069A, 069D of the 1947 building era during survey. Samples were previously collected and submitted for analysis (Historic Sample Group 2551.420.001). The Aircell insulation was found to contain >75% Chrysotile asbestos. Approximately forty-five (45) linear feet of this material was observed in good condition during the survey.

Parging cement fittings were previously identified in Rooms 050, 050D, 069A, 069D, 407 of the 1947 building era during survey. Samples were previously collected and submitted for analysis (Historic Sample Group 2551.420.005). The parging cement fittings were found to contain 50-75% Chrysotile asbestos. Approximately six (6) fittings were observed in good condition during the survey.

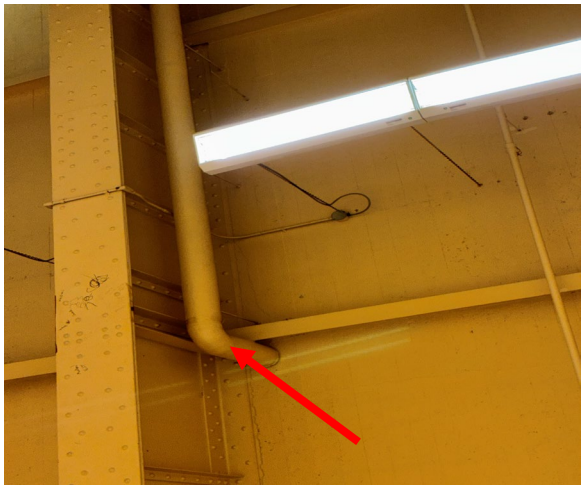
Non-asbestos fibreglass insulation is present on all remaining pipe systems in the project area.

Friable pipe insulations may be present inside inaccessible areas of the building (wall voids, pipe chases etc.).

Photographs of the mechanical insulations can be found below:



Photograph No. 1
Asbestos-Containing Aircell pipe insulation (Historic Sample Group 2551.420.001). Location 069D.



Photograph No. 2
Asbestos-Containing parging cement pipe fittings (Historic Sample Group 2551.420.005). Location 050.

5.1.4 HVAC System

All ducts were identified to be insulated with fibreglass and canvas or fibreglass foil face insulations. No parging cement was identified on the seams or edges of the insulation.

Friable and non-friable duct insulations may be present inside inaccessible areas of the building (wall voids, pipe chases etc.).

5.1.5 Mechanical Equipment

Mechanical equipment identified in the project area during the survey is either uninsulated or insulated with fibreglass.

5.1.6 Vermiculite

Vermiculite was not identified in the project area during the survey.

Non-Friable Materials

5.1.7 Acoustic Ceiling Tiles

Six (6) distinct patterns of acoustic ceiling tiles were identified in the project area during the survey. The following table represents our findings:

Style of Ceiling Tile	Pattern	Room Name or Number	Sample Group	Asbestos Present	Condition
Lay-in	2'x4' Bumpy Pinholes	Rooms 404, 404A	26000265-ASB-18A-C	None	N/A
Lay-in	2'x4' Long Fissures Random Pinholes	Room 015	26000265-ASB-23A-C	None	N/A
Lay-in	2'x4' Short Fissure Random Pinhole	Rooms 016, 056, 056A, 060, 060B, 405, 406, 407	Dated 07/02/05	None	N/A
Mechanically Fastened	1'x1' Cellulose Large and Small Pinhole	Room 040	S31A-C	None	N/A
Lay-in	2'x4' Small Fissures and Random Pinhole	Room 070	Dated 03/04/21	None	N/A

Style of Ceiling Tile	Pattern	Room Name or Number	Sample Group	Asbestos Present	Condition
Lay-in	2'x4' Short Fissure Random	Room 404A	Dated 03/01/23	None	N/A

Photographs of the ceiling tiles can be found below:



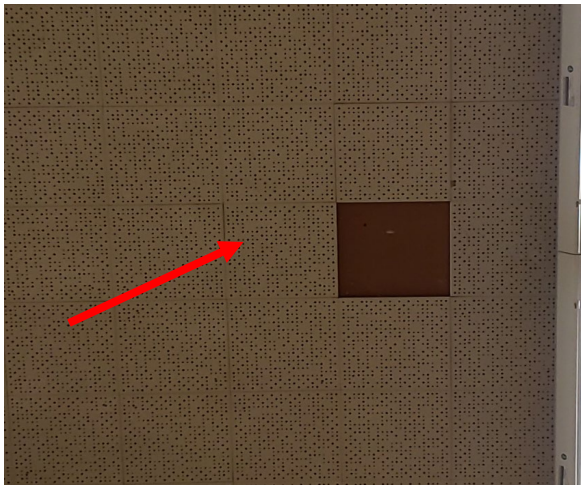
Photograph No. 3
Non-Asbestos 2'x4' Bumpy pinholes (Sample Group 26000265-ASB-18A-C). Location 404.



Photograph No. 4
Non-Asbestos 2'x4' Long fissure random pinhole (Sample Group 26000265-ASB-23A-C). Location 015.



Photograph No. 5
Non-Asbestos 2'x4' Short fissure random pinhole (Visually assessed. Dated 07/02/05). Location 407.



Photograph No. 6
Non-Asbestos 1'x1' Cellulose, Large and small pinhole (Historic Sample Group S31A-C). Mechanically Fastened. Location 040.



Photograph No. 7

Non-Asbestos 2'x4' Small fissure random pinhole (Visually assessed. Dated 03/04/21). Location 070.

5.1.8 Plaster Finishes

Plaster is considered to be non-friable while in general use. If the plaster becomes damaged or requires removal the material is to be considered friable.

Two-phase skim and rough coat plaster was identified on walls throughout the 1947 building era. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-07A-C). No asbestos was identified.

Two-phase skim and rough coat plaster was identified on walls throughout the 1922 building era. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-19A-C). No asbestos was identified.

Single phase rough coat plaster was identified on the ceiling in Room 403 of the 1922 building era. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-20A-C). No asbestos was identified.

5.1.9 Drywall Joint Compound

Drywall joint compound was identified on drywall walls and ceilings in the Room 068 of the 1947 building era. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-12A-C). No asbestos was identified.

5.1.10 Asbestos Cement Products

Transite was not identified in the project area during the survey.

5.1.11 Vinyl Floor Tiles and Mastic Adhesive

One (1) distinct type of vinyl floor tile, 12" x 12" *Beige with White/Brown Streaks*, and associated brown mastic, black mastic/levelling compound (inseparable) was identified in Room 060 of the 1947 construction era during the survey. Three (3) samples of each of layer were collected and submitted for analysis (Sample Group 26000265-ASB-08A-C). The vinyl floor tiles were found to contain 3% Chrysotile asbestos. Approximately 300 square feet of vinyl floor tiles were identified. No asbestos was identified in the brown mastic. No asbestos was identified in the inseparable black mastic/leveling compound.

Photographs of the vinyl floor tiles can be found below:



Photograph No. 8
Asbestos-Containing 12"x12" Vinyl Floor Tiles *Beige with White/Brown Streaks*, Non-Asbestos Brown Mastic, Non-Asbestos Black Mastic/Levelling Compound (Sample Group 26000265-ASB-08A-C). Location 060.

5.1.12 Vinyl Sheet Flooring

Vinyl sheet flooring was not identified in the project area during the survey.

5.1.13 Roofing

All roofing materials should be assumed to contain asbestos until sampling and analysis proves otherwise.

5.1.14 Mastic

Remnant brown puck mastic was identified above ceiling in Room 070 of the 1947 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-03A-C). No asbestos was identified.

Beige mastic associated with black vinyl baseboards was identified in the Room 070 of the 1947 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-06A-C). No asbestos was identified.

Beige mastic associated with brown carpet was identified in the Room 060A of the 1947 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-09A-C). No asbestos was identified.

Photographs of the mastic can be found below:



Photograph No. 9
Non-Asbestos remnant brown puck mastic (Sample Group 26000265-ASB-03A-C). Location 070.



Photograph No. 10
Non-Asbestos Beige mastic associated with carpet (Sample Group 26000265-ASB-09A-C). Location 060A.

5.1.15 Caulking

White caulking associated with vertical beams was identified in Room 040 in the 1966 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-17A-C). The white caulking was found to contain 2% Chrysotile asbestos. Approximately four hundred (400) linear feet of this material were observed.

Photographs of the caulking can be found below:



Photograph No. 11
Asbestos-Containing white caulking associated with vertical beams (Sample Group 26000265-ASB-17A-C). Location 040.

5.1.16 Firestops and Sealants

Red firestop was identified throughout the 1947 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-04A-C). No asbestos was identified.

Photographs of the firestopping can be found below:



Photograph No. 12
Non-Asbestos Red firestop (Sample Group 26000265-ASB-04A-C). Location 070.

5.1.17 Mortars

Grey mortar associated with brick walls was identified in the 1947 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-01A-C). No asbestos was identified.

Grey mortar associated with terracotta block walls was identified in the 1947 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-02A-C). No asbestos was identified.

Grey mortar associated with concrete block walls was identified in the 1947 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-05A-C). No asbestos was identified.

Grey mortar associated with glazed terracotta block walls was identified in the 1947 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-11A-C). No asbestos was identified.

Grey mortar associated with blue glazed concrete block walls was identified in the 1966 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-13A-C). No asbestos was identified.

Grey mortar associated with grey glazed concrete block walls was identified in the 1947 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-14A-C). No asbestos was identified.

Grey mortar associated with concrete block walls was identified in the 1966 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-16A-C). No asbestos was identified.

Grey mortar associated with brick walls was identified in the 1922 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-21A-C). No asbestos was identified.

Grey mortar associated with concrete block walls was identified in the 1922 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-22A-C). No asbestos was identified.

5.1.18 Leveling Compound

Leveling compound associated with 12”x12” vinyl floor tiles *Beige with White/Brown Streaks* was identified in Room 060 of the 1947 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-08A-C). No asbestos was identified.

5.1.19 Tar Paper

Tar paper was identified on fiberglass straight pipe insulation in Room 060C of the 1947 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-10A-C). No asbestos was identified.

Photographs of the tar paper can be found below:



Photograph No. 13
Non-Asbestos Tar Paper on Fibreglass (Sample Group 26000265-ASB-10A-C). Location 060C.

5.1.20 Concrete Block Filler Compounds

Concrete block filler compound was identified on concrete block walls in the 1947 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-05A-C). This material was found to contain 2% Chrysotile asbestos. Approximately nine thousand five hundred (9,500) square feet of this material were observed.

Concrete block filler compound was identified on two-phase plaster walls in the 1947 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-07A-C). This material was found to contain 2% Chrysotile asbestos. Approximately three thousand (3,000) square feet of this material were observed.

Concrete block filler compound was identified on mortar lines of the glazed blue concrete block wall in the Room 040 of 1966 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-13A-C). This material was found to contain 2% Chrysotile asbestos. Approximately five hundred (500) square feet of this material were observed.

Concrete block filler compound was identified on concrete block walls and concrete ledges in the 1966 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample

Group 26000265-ASB-15A-C). This material was found to contain 2% Chrysotile asbestos. Approximately four hundred (400) square feet of this material were observed.

Concrete block filler compound was identified on one-phase plaster ceiling in Room 403 and on brick walls in Room 055 of 1922 building era during the survey. Three (3) samples were collected and submitted for analysis (Sample Group 26000265-ASB-20C; 21A-C). This material was found to contain <0.25% Chrysotile asbestos and is considered to be non asbestos.

5.2 *Visible Mould*

No visual indicators of suspect mould were identified in the project area during the survey. Visible suspect mould was not observed.

Minor amounts or concealed mould growth may not be identified as part of the survey in the absence of visual indicators.

5.3 *Lead-Containing Materials*

Five (5) representative paint samples were collected from the project area during the survey. The following table represents our findings:

Sample Number	Description	Condition	Result %	Classification
26000265-Pb-01	White paint on concrete block wall - Room 069E – 1947 Building Era	Good	<0.0080	Low-level Lead Coating
26000265-Pb-02	Beige paint on concrete block wall - Room 069B – 1947 Building Era	Good	0.050	Low-level Lead Coating
26000265-Pb-03	Beige paint on concrete block wall - Room 040 – 1966 Building Era	Poor	0.098	Low-level Lead Coating
26000265-Pb-04	Grey/red paint on concrete floor - Room 015 – 1922 Building Era	Poor	0.65	Lead-based Coating
26000265-Pb-05	Beige paint on plaster wall - Room 402 – 1922 Building Era	Poor	0.29	Lead-containing Coating

Results indicate that samples 26000265-Pb-01, 02 & 03 have lead concentrations of less than 0.1% and should be considered to have low levels of lead. In the absence of aggressive disturbance (sanding,

torching, grinding) normal dust control measures and should be sufficient in controlling the requirement for respirators during renovation work. General safety precautions should still be adhered to when working in the area including no eating, smoking, chewing, or drinking. Workers shall be provided proper washing facilities to ensure workers wash hands and faces before leaving the work area.

Results indicate that sample 26000265-Pb-05 has a lead concentration greater than 0.1% percent but less than 0.5% and should be considered lead-containing. In the absence of aggressive disturbance (sanding, torching, grinding) normal dust control measures and should be sufficient in controlling the requirement for respirators during renovation work. General safety precautions should still be adhered to when working in the area including no eating, smoking, chewing, or drinking. Workers shall be provided proper washing facilities to ensure workers wash hands and faces before leaving the work area. Any abatement of this coating or aggressive disturbance during renovation work must be in accordance with the Classifications of Work Operations (Section 7) and the corresponding procedures in Section 8 of the EACC Lead Guideline. Alternatively, a project specific exposure assessment can be completed to further delineate the proper precautions and procedures required for the project.

Results indicate that sample 26000265-Pb-04 has a lead concentration greater than 0.5% lead and is considered to be lead-based. In the absence of aggressive disturbance (sanding, torching, grinding) normal dust control measures and should be sufficient in controlling the requirement for respirators during renovation work. General safety precautions should still be adhered to when working in the area including no eating, smoking, chewing, or drinking. Workers shall be provided proper washing facilities to ensure workers wash hands and faces before leaving the work area. Any abatement of this coating or aggressive disturbance must accordance with the Classifications of Work Operations (Section 7) and the corresponding procedures in Section 8 of the EACC Lead Guideline. Alternatively, a project specific exposure assessment can be completed to further delineate the proper precautions and procedures required for the project.

Any paint or coating that will be aggressively disturbed (grinding, sanding, torching, burning, abrasive blasting etc.) must be completed must be in accordance with the Classifications of Work Operations (Section 7) and the corresponding procedures in Section 8 of the EACC Lead Guideline. Alternatively, a project specific exposure assessment can be completed to further delineate the proper precautions and procedures required for the project.

Based on the building age of construction, lead is also expected to be present in solder on copper plumbing fixtures throughout the building.

Lead is present in all emergency back-up battery powered lighting systems.

Photographs of the poor condition paint can be found below:



Photograph No. 14
Poor Condition Beige paint on plaster wall. Location 402.



Photograph No. 15
Poor Condition Grey/Red paint on concrete floor. Location 0.15.



Photograph No. 16
Poor Condition Beige paint on plaster wall. Location 040.

5.4 *Mercury*

Mercury is assumed to be present in fluorescent light tubes throughout the project area.

Mercury is present in glass ampoules within mechanical gauges in Rooms 045 & 055C. A total of two (2) mercury-containing mechanical gauges are present in the project area.

5.5 *Silica*

Crystalline silica is present in concrete products, mortar, brick, etc. These construction products are typically found throughout building structures.

5.6 *Ethylene Oxide*

Evidence suggesting the presence of ethylene oxide was not observed at the Site. This product would not be expected to be present in this building.

5.7 *Vinyl Chloride*

Evidence suggesting the presence of vinyl chloride monomer was not observed at the Site. Vinyl chloride would not be expected to be present in this building.

5.8 *Benzene*

Evidence suggesting the presence of benzene was not observed at the Site. Benzene would not be expected to be present in this building.

5.9 *Coke Oven Emissions*

Evidence suggesting the presence of coke oven emissions was not observed at the Site. Coke oven emissions would not be expected to be present in this building.

5.10 *Acrylonitrile*

Evidence suggesting the presence of acrylonitrile was not observed at the Site. Acrylonitrile would not be expected to be present in this building.

5.11 *Isocyanates*

Evidence suggesting the presence of isocyanates was not observed at the Site. Isocyanates would not be expected to be present in this building.

5.12 *Arsenic*

Evidence suggesting the presence of arsenic was not observed at the Site. Arsenic would not be expected to be present in this building.

6.0 RECOMMENDATIONS

6.1 *Short Term General Recommendations*

Prior to issuing any project plans the owner or an agent acting on behalf of the owner must provide this report to the constructor. Sequentially, the constructor must provide this report to any sub-contractors who would potentially disturb any designated substances identified in this report.

Based on the quantity of designated substances identified during of the survey EXP recommends abatement specifications meeting be issued prior to any disturbance of the designated substances identified in this report.

6.2 *Short Term Recommendations Regarding Asbestos*

6.2.1 Abatement Precautions and Procedures

6.2.1.1 Mechanical Insulation

Removal or disturbance of friable asbestos-containing mechanical insulation on pipes, ducting and mechanical equipment is governed by the procedures outlined in Ontario Regulation 278/05. The disturbance of less than one (1) square metre of asbestos-containing mechanical insulation on pipes and ducts may be performed following Type 2, or Glove Bag precautions. If removal of greater than one (1) square metre of friable insulation is required, follow Type 3 precautions as outlined in Ontario Regulation 278/05.

Remediation of damaged friable mechanical insulation must be completed using Type 2 precautions as outlined in Ontario Regulation 278/05.

Advance notice of project to the Ministry of Labour, Immigration, Training and Skills Development is required when disturbing greater than one (1) square metre of friable insulation (Glove Bag and Type 3).

6.2.1.2 Vinyl Floor Tile

The removal of non-friable vinyl floor tiles with handheld non-powered tools may be completed following Type 1 precautions as outlined in Ontario Regulation 278/05. The use of power tools on non-friable asbestos materials must be performed under Type 3 precautions. Alternately, if the power tool is equipped with a HEPA filtered dust collection system the work may be completed following Type 2 precautions and procedures.

6.2.1.3 Caulking

Activities that will disturb the non-friable caulking must follow Type 1 precautions as outlined in Ontario Regulation 278/05. The use of power tools on non-friable asbestos materials must be performed under Type 3 precautions. Alternately, if the power tool is equipped with a HEPA filtered dust collection system the work may be completed following Type 2 precautions and procedures.

6.2.1.4 Concrete Block Filler Compound

Concrete block filler compound is considered to be non-friable while in general use. If the concrete block filler becomes damaged or requires removal the material is to be considered friable. As such, removal or disturbance of asbestos-containing concrete block filler is governed by the procedures outlined in Ontario Regulation 278/05. The disturbance of less than one (1) square metre of concrete block filler must be performed using Type 2 precautions. If removal greater than one (1) square metre of concrete block filler must be completed following Type 3 precautions as outlined in Ontario Regulation 278/05.

Advance notice of project to the Ministry of Labour, Immigration, Training and Skills Development is required when disturbing greater than one (1) square metre of concrete block filler (Type 3).

6.3 *Recommendations Regarding Lead During Renovation, Maintenance or Repair*

The EACC Lead Guideline for Construction, Renovation, Maintenance or Repair (October 2014) was used for interpretation of all results and any recommendations regarding lead paints or coatings identified during this survey. The application of a physical barrier (e.g., an encapsulate or new coat of paint) to a stabilized lead-containing material, or a paint or surface coating, is not considered a Lead Operation.

Please see below for specific recommendations pertaining to the paint(s) or coating(s) identified within the project area.

Low-level Lead Paint or Coating

Paints and coatings identified to have a lead concentration of less than 0.1% should be considered to contain low levels of lead. In the absence of aggressive disturbance (sanding, torching, grinding) normal dust control measures and should be sufficient in controlling the airborne lead concentrations and the requirement for respirators during work. General safety precautions should still be adhered to when working in the area including no eating, smoking, chewing, or drinking. Workers shall be provided proper washing facilities to ensure workers wash hands and faces before leaving the work area. A lead visual clearance assessment is required after the completion of the Class 1 or Class 2 abatements. The work area(s) or enclosure(s) shall pass the inspection of visually clean. Wipe and/or air sample clearances may be required depending on the scale of the abatement and the building occupants present or returning to the area.

Lead-Containing Coating

Paints and coating containing greater than 0.1 percent and equal to or less than 0.5% are considered lead-containing. All work completed that disturbs the identified paints must be in accordance with the Classifications of Work Operations (Section 7) and the corresponding procedures in Section 8 of the EACC Lead Guideline. General demolition work and renovation work is typically classified as a Type 1 Operation. Alternatively, a project specific exposure assessment can be completed to further delineate the proper precautions and procedures required for the project. All workers involved in the disturbance or handling of lead-containing or lead-based materials, or that may be exposed to lead must receive appropriate training as defined in the guideline. A lead visual clearance assessment and/or wipe/air sampling may be required after the completion of the Class 1 or Class 2 abatements. The Class 1 or 2 operation work area(s) or enclosure(s) shall pass the inspection of visually clean, and wipe and/or air sample results are within the criteria as outlined in Table 5 or the appropriate occupational health and safety regulation.

Additional wipe/air sample clearances may be required depending on the scale of the abatement and the building occupants present or returning to the area.

Lead Based Coating

Paints or coatings containing 0.5% or greater lead content are considered to be lead-based. All work must be in accordance with the Classifications of Work Operations (Section 7) and the corresponding procedures in Section 8 of the EACC Lead Guideline. Alternatively, a project specific exposure assessment can be completed to further delineate the proper precautions and procedures required for the project. All workers involved in the disturbance or handling of lead-containing or lead-based materials, or that may be exposed to lead must receive appropriate training as defined in the guideline. Lead clearance testing is required upon completion of any Class 3 Operation. Clearance testing may include wipe sampling and/or air testing within and outside the work area. Clearance testing must be completed by a competent person.

Additional wipe/air sample clearances may be required depending on the scale of the abatement and the building occupants present or returning to the area.

Please refer to The EACC Lead Guideline for Construction, Renovation, Maintenance or Repair (October 2014) for determination of the required precautions or procedures related to this specific project scope of work. EXP will be happy to review your project and the health and safety requirements related to lead.

6.4 *Recommendations Regarding Mercury*

The presence of mercury vapour in fluorescent light tubes poses minimal risk to occupants or workers provided the equipment is handled properly and the mercury is not allowed to escape. Prior to the demolition activities the light tubes should be removed intact to prevent the mercury vapour from escaping. These tubes can be recycled by specialized contractors.

It is good management practice to take precautions to prevent mercury vapour from becoming airborne during building demolition. Exposure to airborne mercury is regulated Ontario Regulation 490/09. The current TWAEV for mercury vapour is 0.025 mg/m^3 (except alkyl compounds).

Mercury waste must be handled and disposed of according to Ontario Regulation 347, as amended by O. Reg. 102/07, and may be subject to Leachate Criteria (Schedule 4) of this regulation.

6.5 *Recommendations Regarding Silica*

Disturbance of materials containing silica will occur during demolition of walls and ceilings, saw cutting floor slabs etc. and is regulated under Ontario Regulation 490/09. The current Time Weighted Average Exposure Value (TWAEV) for amorphous fused silica is 0.1 mg/m^3 and is 0.05 mg/m^3 for crystalline silica (quartz). This can be accomplished through proper work practices such as wetting the surface of the materials to reduce overall dust levels and providing workers with washing facilities and proper respiratory protection.

7.0 LIMITATIONS AND WARRANTY

EXP has prepared this report for the exclusive use of the Waterloo Region District School Board in evaluating the Site at the time of EXP's assessment. EXP will not be responsible for the use of this report by any third party, or reliance on or any decision to be made based on it without the prior written consent of EXP. EXP accepts no responsibility for damages, if any, by any third party because of decisions or actions based on this report.

The findings and conclusions documented in this report have been prepared for specific application to this project and have been developed in a manner consistent with that level of care and skill normally exercised by qualified professionals currently practicing in this area of environmental assessment. No other warranty, expressed or implied, is made.

The findings contained in this report are based upon conditions as they were observed at the time of investigation. No assurance is made regarding changes in conditions subsequent to the time of investigation.

If new information is developed in future work, EXP should be contacted to re-evaluate the conclusions of this report and to provide amendments as required.

Respectfully submitted,

EXP Services Inc.

Written By:



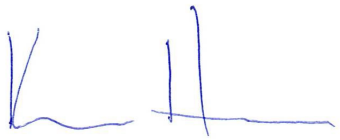
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APPENDIX A

ASBESTOS BULK ANALYSIS RESULTS

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Collected: 1/11/2026
Received: 1/14/2026
Analyzed: 1/21/2026

Proj: LON-26000265-A0 KCI Pre-Reno DSS

Summary Test Report for Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05

Client Sample ID: 26000265-ASB-01A **Lab Sample ID:** **552600649-0001**

Sample Description: Mortar associated with brick wall - Room 407 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-01B **Lab Sample ID:** **552600649-0002**

Sample Description: Mortar associated with brick wall - Room 407 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-01C **Lab Sample ID:** **552600649-0003**

Sample Description: Mortar associated with brick wall - Room 406 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-02A **Lab Sample ID:** **552600649-0004**

Sample Description: Mortar associated with terracotta concrete block wall - Room 070 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-02B **Lab Sample ID:** **552600649-0005**

Sample Description: Mortar associated with terracotta concrete block wall - Room 070 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-02C **Lab Sample ID:** **552600649-0006**

Sample Description: Mortar associated with terracotta concrete block wall - Room 060D (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-03A **Lab Sample ID:** **552600649-0007**

Sample Description: Brown puck mastic associated with ceiling - Room 070 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Tan	0.0%	100.0%	None Detected	

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Summary Test Report for Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05

Client Sample ID: 26000265-ASB-03B ***Lab Sample ID:*** **552600649-0008**

Sample Description: Brown puck mastic associated with ceiling - Room 070 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Tan	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-03C ***Lab Sample ID:*** **552600649-0009**

Sample Description: Brown puck mastic associated with ceiling - Room 070 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Brown	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-04A ***Lab Sample ID:*** **552600649-0010**

Sample Description: Red firestop - Room 070 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Red	5.0%	95.0%	None Detected	

Client Sample ID: 26000265-ASB-04B ***Lab Sample ID:*** **552600649-0011**

Sample Description: Red firestop - Room 070 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Red	5.0%	95.0%	None Detected	

Client Sample ID: 26000265-ASB-04C ***Lab Sample ID:*** **552600649-0012**

Sample Description: Red firestop - Room 046B (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Red	5.0%	95.0%	None Detected	

Client Sample ID: 26000265-ASB-05A ***Lab Sample ID:*** **552600649-0013**

Sample Description: Mortar associated with concrete block wall - Room 069E (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-05B - Block Filler ***Lab Sample ID:*** **552600649-0014**

Sample Description: Mortar associated with concrete block wall - Room 069B (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	98.0%	**2% Chrysotile**	

Client Sample ID: 26000265-ASB-05B - Mortar ***Lab Sample ID:*** **552600649-0014A**

Sample Description: Mortar associated with concrete block wall - Room 069B (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

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Summary Test Report for Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05

Client Sample ID: 26000265-ASB-05C ***Lab Sample ID:*** **552600649-0015**

Sample Description: Mortar associated with concrete block wall - Room 069A (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-06A ***Lab Sample ID:*** **552600649-0016**

Sample Description: Beige mastic associated with black vinyl baseboard - Room 070 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Beige	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-06B ***Lab Sample ID:*** **552600649-0017**

Sample Description: Beige mastic associated with black vinyl baseboard - Room 070 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Beige	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-06C ***Lab Sample ID:*** **552600649-0018**

Sample Description: Beige mastic associated with black vinyl baseboard - Room 070 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Beige	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-07A - Skim Coat ***Lab Sample ID:*** **552600649-0019**

Sample Description: Plaster (Skim & Rough Coat, on wall) - Room 069E (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-07A - Rough Coat ***Lab Sample ID:*** **552600649-0019A**

Sample Description: Plaster (Skim & Rough Coat, on wall) - Room 069E (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-07B - Skim Coat ***Lab Sample ID:*** **552600649-0020**

Sample Description: Plaster (Skim & Rough Coat, on wall) - Room 051 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-07B - Rough Coat ***Lab Sample ID:*** **552600649-0020A**

Sample Description: Plaster (Skim & Rough Coat, on wall) - Room 051 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

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Summary Test Report for Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05

Client Sample ID: 26000265-ASB-07C - Block Filler ***Lab Sample ID:*** **552600649-0021**

Sample Description: Plaster (Skim & Rough Coat, on wall) - Room 051 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Beige	0.0%	98.0%	**2% Chrysotile**	

Client Sample ID: 26000265-ASB-07C - Skim Coat ***Lab Sample ID:*** **552600649-0021A**

Sample Description: Plaster (Skim & Rough Coat, on wall) - Room 051 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-07C - Rough Coat ***Lab Sample ID:*** **552600649-0021B**

Sample Description: Plaster (Skim & Rough Coat, on wall) - Room 051 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	<1%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-08A - VFT ***Lab Sample ID:*** **552600649-0022**

Sample Description: Brown & black mastic with levelling compound associated with 12'x12' Beige with white/brown streaks VFT - Room 060B (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Brown/Beige	0.0%	97.0%	**3% Chrysotile**	

Client Sample ID: 26000265-ASB-08A - Mastic 1 ***Lab Sample ID:*** **552600649-0022A**

Sample Description: Brown & black mastic with levelling compound associated with 12'x12' Beige with white/brown streaks VFT - Room 060B (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Tan	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-08A - Mastic 2 / Leveling Compound ***Lab Sample ID:*** **552600649-0022B**

Sample Description: Brown & black mastic with levelling compound associated with 12'x12' Beige with white/brown streaks VFT - Room 060B (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Black/Beige	0.0%	100.0%	None Detected	Inseparable layers combined prior to analysis.

Client Sample ID: 26000265-ASB-08B - VFT ***Lab Sample ID:*** **552600649-0023**

Sample Description: Brown & black mastic with levelling compound associated with 12'x12' Beige with white/brown streaks VFT - Room 060B (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026				Positive Stop (Not Analyzed)	

Client Sample ID: 26000265-ASB-08B - Mastic 1 ***Lab Sample ID:*** **552600649-0023A**

Sample Description: Brown & black mastic with levelling compound associated with 12'x12' Beige with white/brown streaks VFT - Room 060B (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Tan	0.0%	100.0%	None Detected	

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Summary Test Report for Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05

Client Sample ID: 26000265-ASB-08B - Mastic 2 / Leveling Compound ***Lab Sample ID:*** **552600649-0023B**

Sample Description: Brown & black mastic with levelling compound associated with 12'x12' Beige with white/brown streaks VFT - Room 060B (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Black/Beige	0.0%	100.0%	None Detected	Inseparable layers combined prior to analysis.

Client Sample ID: 26000265-ASB-08C - VFT ***Lab Sample ID:*** **552600649-0024**

Sample Description: Brown & black mastic with levelling compound associated with 12'x12' Beige with white/brown streaks VFT - Room 060B (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/20/2026				Positive Stop (Not Analyzed)	

Client Sample ID: 26000265-ASB-08C - Mastic 1 ***Lab Sample ID:*** **552600649-0024A**

Sample Description: Brown & black mastic with levelling compound associated with 12'x12' Beige with white/brown streaks VFT - Room 060B (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Tan	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-08C - Mastic 2 / Leveling Compound ***Lab Sample ID:*** **552600649-0024B**

Sample Description: Brown & black mastic with levelling compound associated with 12'x12' Beige with white/brown streaks VFT - Room 060B (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Black/Beige	0.0%	100.0%	None Detected	Inseparable layers combined prior to analysis.

Client Sample ID: 26000265-ASB-09A ***Lab Sample ID:*** **552600649-0025**

Sample Description: Beige mastic associated with brown carpet - Room 060A (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Beige	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-09B ***Lab Sample ID:*** **552600649-0026**

Sample Description: Beige mastic associated with brown carpet - Room 060A (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Beige	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-09C ***Lab Sample ID:*** **552600649-0027**

Sample Description: Beige mastic associated with brown carpet - Room 060A (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Beige	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-10A - Canvas Wrap ***Lab Sample ID:*** **552600649-0028**

Sample Description: Black tar paper on straight fiber glass - Room 060C (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	70.0%	30.0%	None Detected	

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Summary Test Report for Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05

Client Sample ID: 26000265-ASB-10A - Tar Paper ***Lab Sample ID:*** **552600649-0028A**

Sample Description: Black tar paper on straight fiber glass - Room 060C (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Black	50.0%	50.0%	None Detected	

Client Sample ID: 26000265-ASB-10A - Insulation ***Lab Sample ID:*** **552600649-0028B**

Sample Description: Black tar paper on straight fiber glass - Room 060C (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Yellow	98.0%	2.0%	None Detected	

Client Sample ID: 26000265-ASB-10B - Tar Paper ***Lab Sample ID:*** **552600649-0029**

Sample Description: Black tar paper on straight fiber glass - Room 060C (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Black	50.0%	50.0%	None Detected	

Client Sample ID: 26000265-ASB-10B - Insulation ***Lab Sample ID:*** **552600649-0029A**

Sample Description: Black tar paper on straight fiber glass - Room 060C (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Yellow	98.0%	2.0%	None Detected	

Client Sample ID: 26000265-ASB-10C - Tar Paper ***Lab Sample ID:*** **552600649-0030**

Sample Description: Black tar paper on straight fiber glass - Room 060C (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Black	50.0%	50.0%	None Detected	

Client Sample ID: 26000265-ASB-10C - Canvas Wrap ***Lab Sample ID:*** **552600649-0030A**

Sample Description: Black tar paper on straight fiber glass - Room 060C (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Tan/White	75.0%	25.0%	None Detected	

Client Sample ID: 26000265-ASB-11A ***Lab Sample ID:*** **552600649-0031**

Sample Description: Mortar associated with glazed terracotta block wall - Room 050 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-11B ***Lab Sample ID:*** **552600649-0032**

Sample Description: Mortar associated with glazed terracotta block wall - Room 050 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

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Project ID:

Summary Test Report for Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05

Client Sample ID: 26000265-ASB-11C ***Lab Sample ID:*** **552600649-0033**

Sample Description: Mortar associated with glazed terracotta block wall - Room 050 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-12A ***Lab Sample ID:*** **552600649-0034**

Sample Description: Drywall Joint Compound on stairwell - Room 068 (Addition Era)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-12B ***Lab Sample ID:*** **552600649-0035**

Sample Description: Drywall Joint Compound on stairwell - Room 068 (Addition Era)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-12C ***Lab Sample ID:*** **552600649-0036**

Sample Description: Drywall Joint Compound on stairwell - Room 068 (Addition Era)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-13A ***Lab Sample ID:*** **552600649-0037**

Sample Description: Mortar associated with glazed blue concrete block wall - Room 040 (Addition 1966)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-13B - Block Filler ***Lab Sample ID:*** **552600649-0038**

Sample Description: Mortar associated with glazed blue concrete block wall - Room 040 (Addition 1966)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	98.0%	**2% Chrysotile**	

Client Sample ID: 26000265-ASB-13B - Mortar ***Lab Sample ID:*** **552600649-0038A**

Sample Description: Mortar associated with glazed blue concrete block wall - Room 040 (Addition 1966)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-13C ***Lab Sample ID:*** **552600649-0039**

Sample Description: Mortar associated with glazed blue concrete block wall - Room 040 (Addition 1966)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

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EMSL Canada Order 552600649
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Summary Test Report for Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05

Client Sample ID: 26000265-ASB-14A ***Lab Sample ID:*** **552600649-0040**

Sample Description: Mortar associated with glazed grey concrete block wall - Room 046A (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-14B ***Lab Sample ID:*** **552600649-0041**

Sample Description: Mortar associated with glazed grey concrete block wall - Room 046A (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-14C ***Lab Sample ID:*** **552600649-0042**

Sample Description: Mortar associated with glazed grey concrete block wall - Room 046A (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-15A ***Lab Sample ID:*** **552600649-0043**

Sample Description: Block filler on (wall) shoulder - Room 040 (Addition 1966)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	98.0%	**2% Chrysotile**	

Client Sample ID: 26000265-ASB-15B ***Lab Sample ID:*** **552600649-0044**

Sample Description: Block filler on block wall - Room 040 (Addition 1966)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026				Positive Stop (Not Analyzed)	

Client Sample ID: 26000265-ASB-15C ***Lab Sample ID:*** **552600649-0045**

Sample Description: Block filler on block wall - Room 040 (Addition 1966)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026				Positive Stop (Not Analyzed)	

Client Sample ID: 26000265-ASB-16A ***Lab Sample ID:*** **552600649-0046**

Sample Description: Mortar associated with concrete block wall - Room 040 (Addition 1966)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-16B ***Lab Sample ID:*** **552600649-0047**

Sample Description: Mortar associated with concrete block wall - Room 040 (Addition 1966)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

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EMSL Canada Order 552600649
Customer ID: 55ADEC69
Customer PO: LON-26000265-A0
Project ID:

Summary Test Report for Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05

Client Sample ID: 26000265-ASB-16C ***Lab Sample ID:*** **552600649-0048**

Sample Description: Mortar associated with concrete block wall - Room 040 (Addition 1966)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-17A ***Lab Sample ID:*** **552600649-0049**

Sample Description: White caulking associated with vertical beam - Room 040 (Addition 1966)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	98.0%	**2% Chrysotile**	

Client Sample ID: 26000265-ASB-17B ***Lab Sample ID:*** **552600649-0050**

Sample Description: White caulking associated with vertical beam - Room 040 (Addition 1966)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026				Positive Stop (Not Analyzed)	

Client Sample ID: 26000265-ASB-17C ***Lab Sample ID:*** **552600649-0051**

Sample Description: White caulking associated with vertical beam - Room 040 (Addition 1966)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026				Positive Stop (Not Analyzed)	

Client Sample ID: 26000265-ASB-18A ***Lab Sample ID:*** **552600649-0052**

Sample Description: 2'x4' Bumpy pinhole ceiling tile (no date) - Room 404 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White/Beige	60.0%	40.0%	None Detected	

Client Sample ID: 26000265-ASB-18B ***Lab Sample ID:*** **552600649-0053**

Sample Description: 2'x4' Bumpy pinhole ceiling tile (no date) - Room 404 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White/Beige	60.0%	40.0%	None Detected	

Client Sample ID: 26000265-ASB-18C ***Lab Sample ID:*** **552600649-0054**

Sample Description: 2'x4' Bumpy pinhole ceiling tile (no date) - Room 404 (Addition 1947)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	60.0%	40.0%	None Detected	

Client Sample ID: 26000265-ASB-19A - Skim Coat ***Lab Sample ID:*** **552600649-0055**

Sample Description: Plaster (Skim & Rough Coat, on wall) - Room 403 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	100.0%	None Detected	

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Client Sample ID: 26000265-ASB-19A - Rough Coat ***Lab Sample ID:*** **552600649-0055A**

Sample Description: Plaster (Skim & Rough Coat, on wall) - Room 403 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	2.0%	98.0%	None Detected	

Client Sample ID: 26000265-ASB-19B - Skim Coat ***Lab Sample ID:*** **552600649-0056**

Sample Description: Plaster (Skim & Rough Coat, on wall) - Room 403 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-19B - Rough Coat ***Lab Sample ID:*** **552600649-0056A**

Sample Description: Plaster (Skim & Rough Coat, on wall) - Room 403 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	2.0%	98.0%	None Detected	

Client Sample ID: 26000265-ASB-19C - Skim Coat ***Lab Sample ID:*** **552600649-0057**

Sample Description: Plaster (Skim & Rough Coat, on wall) - Room 403 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-19C - Rough Coat ***Lab Sample ID:*** **552600649-0057A**

Sample Description: Plaster (Skim & Rough Coat, on wall) - Room 403 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	2.0%	98.0%	None Detected	

Client Sample ID: 26000265-ASB-20A ***Lab Sample ID:*** **552600649-0058**

Sample Description: Plaster (Rough Coat, on ceiling) - Room 403 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-20B ***Lab Sample ID:*** **552600649-0059**

Sample Description: Plaster (Rough Coat, on ceiling) - Room 403 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-20C - Block Filler ***Lab Sample ID:*** **552600649-0060**

Sample Description: Plaster (Rough Coat, on ceiling) - Room 403 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	**<1% Chrysotile**	
400 PLM Pt Ct	1/20/2026	Gray	0.0%	100.0%	**<0.25% Chrysotile**	

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Summary Test Report for Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05

Client Sample ID: 26000265-ASB-20C - Rough Coat ***Lab Sample ID:*** **552600649-0060A**

Sample Description: Plaster (Rough Coat, on ceiling) - Room 403 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-21A - Block Filler ***Lab Sample ID:*** **552600649-0061**

Sample Description: Mortar associated with brick wall - Room 055 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	100.0%	None Detected	Sample split from sample 21b at client request.

Client Sample ID: 26000265-ASB-21A - Mortar ***Lab Sample ID:*** **552600649-0061A**

Sample Description: Mortar associated with brick wall - Room 055 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/21/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-21B - Block Filler ***Lab Sample ID:*** **552600649-0062**

Sample Description: Mortar associated with brick wall - Room 055 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-21B - Mortar ***Lab Sample ID:*** **552600649-0062A**

Sample Description: Mortar associated with brick wall - Room 055 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-21C - Block Filler ***Lab Sample ID:*** **552600649-0063**

Sample Description: Mortar associated with brick wall - Room 016 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	White	0.0%	100.0%	None Detected	Sample split from sample 21b at client request.

Client Sample ID: 26000265-ASB-21C - Mortar ***Lab Sample ID:*** **552600649-0063A**

Sample Description: Mortar associated with brick wall - Room 016 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/21/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-22A ***Lab Sample ID:*** **552600649-0064**

Sample Description: Mortar associated with concrete block wall - Room 403 Stairs (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

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Summary Test Report for Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05

Client Sample ID: 26000265-ASB-22B ***Lab Sample ID:*** **552600649-0065**

Sample Description: Mortar associated with concrete block wall - Room 403 Stairs (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-22C ***Lab Sample ID:*** **552600649-0066**

Sample Description: Mortar associated with concrete block wall - Room 403 Stairs (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	0.0%	100.0%	None Detected	

Client Sample ID: 26000265-ASB-23A ***Lab Sample ID:*** **552600649-0067**

Sample Description: 2'x4' Long fissure random pinhole ceiling tile - Room 015 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	75.0%	25.0%	None Detected	

Client Sample ID: 26000265-ASB-23B ***Lab Sample ID:*** **552600649-0068**

Sample Description: 2'x4' Long fissure random pinhole ceiling tile - Room 015 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	75.0%	25.0%	None Detected	

Client Sample ID: 26000265-ASB-23C ***Lab Sample ID:*** **552600649-0069**

Sample Description: 2'x4' Long fissure random pinhole ceiling tile - Room 015 (Addition 1922)

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	1/20/2026	Gray	75.0%	25.0%	None Detected	

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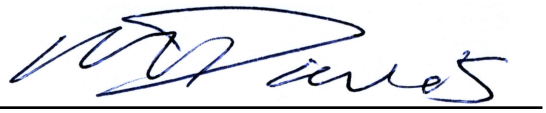
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Summary Test Report for Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05

Analyst(s):

Hazel Macaldo	PLM (41)
Jeremy Mildenberger	PLM (17)
Simran Kaur	PLM (28) 400 PLM Pt Ct (1)

Reviewed and approved by:



Matthew Davis or other approved signatory
or Other Approved Signatory

None Detected = <0.1%. EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This is a summary report; official reports are available on LabConnect or upon request and relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Canada Inc. Calgary, AB NVLAP Lab Code 500100-0

Initial report from: 01/20/202617:07:06

IATL International Asbestos Testing Laboratories

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CERTIFICATE OF ANALYSIS

Client: MTE Consultants
520 Bingemans Centre Dr
Kitchener ON N2B 3X9

Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865739 **Description / Location:** Brown/Tan Floor Tile; 12x12
Client No.: KCI-S01a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865740 **Description / Location:** Brown/Tan Floor Tile; 12x12
Client No.: KCI-S01b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865741 **Description / Location:** Brown/Tan Floor Tile; 12x12
Client No.: KCI-S01c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865742 **Description / Location:** Tan/Grey Floor Tile; 12x12
Client No.: KCI-S02a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 2.1	Chrysotile	None Detected	None Detected	PC 97.9

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Analysis Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC-Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: L. Solebello

Approved By:

Date: 2/22/2010

Frank E. Ehrenfeld, III
Laboratory Director

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Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865743 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S02b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865744 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S02c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865745 **Description / Location:** Tan Floor Tile; 12x12
Client No.: KCI-S03a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.8	Chrysotile	None Detected	None Detected	PC 98.2

Lab No.: 3865746 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S03b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

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Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC-Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: L. Solebello

Date: 2/22/2010

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Report Date: 2/23/2010
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Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865747 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S03c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865748 **Description / Location:** White Floor Tile; 12x12
Client No.: KCI-S04a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865749 **Description / Location:** White Floor Tile; 12x12
Client No.: KCI-S04b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865750 **Description / Location:** White Floor Tile; 12x12
Client No.: KCI-S04c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Analysis Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC-Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: L. Solebello

Date: 2/22/2010

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Report Date: 2/23/2010
Project: WRDSB; KitchenorCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865751 **Description / Location:** Lt.Tan Floor Tile; 12x12
Client No.: KCI-S05a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865752 **Description / Location:** Lt.Tan Floor Tile; 12x12
Client No.: KCI-S05b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865752 **Description / Location:** Black Mastic **Layer No.:** 2
Client No.: KCI-S05b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865753 **Description / Location:** Lt.Tan Floor Tile; 12x12
Client No.: KCI-S05c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Analysis Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC-Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: L. Solebello

Date: 2/22/2010

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CERTIFICATE OF ANALYSIS

Client: MTE Consultants
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Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865754 **Description / Location:** Lt.Tan Floor Tile; 12x12
Client No.: KCI-S06a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865755 **Description / Location:** Lt.Tan Floor Tile; 12x12
Client No.: KCI-S06b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865756 **Description / Location:** Lt.Tan Floor Tile; 12x12
Client No.: KCI-S06c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865756 **Description / Location:** Black Mastic **Layer No.:** 2
Client No.: KCI-S06c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Analysis Method: EPA 600/R-93/116

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Analysis Performed By: L. Solebello

Date: 2/22/2010

IATL International Asbestos Testing Laboratories

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: MTE Consultants
520 Bingemans Centre Dr
Kitchener ON N2B 3X9

Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865757 **Description / Location:** Dk.Red/Brown Floor Tile; 9x9
Client No.: KCI-S07a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 6.8	Chrysotile	None Detected	None Detected	PC 93.2

Lab No.: 3865757 **Description / Location:** Black Mastic **Layer No.:** 2
Client No.: KCI-S07a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865758 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S07b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865759 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S07c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865760 **Description / Location:** Dk.Red/Brown Floor Tile; 9x9
Client No.: KCI-S08a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 7.4	Chrysotile	None Detected	None Detected	PC 92.6

Lab No.: 3865761 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S08b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865762 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S08c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865763 **Description / Location:** Tan Floor Tile; 9x9
Client No.: KCI-S09a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 7.5	Chrysotile	None Detected	None Detected	PC 92.5

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Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865764 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S09b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865765 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S09c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865766 **Description / Location:** Black Floor Tile; 9x9
Client No.: KCI-S10a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 5.9	Chrysotile	None Detected	None Detected	PC 94.1

Lab No.: 3865767 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S10b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Analysis Method: EPA 600/R-93/116

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Kitchener ON N2B 3X9

Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865768 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S10c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865769 **Description / Location:** Grey Floor Tile: 9x9
Client No.: KCI-S11a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 7.8	Chrysotile	None Detected	None Detected	PC 92.2

Lab No.: 3865770 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S11b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865771 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S11c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Kitchener ON N2B 3X9

Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865772 **Description / Location:** Tan Vinyl Sheet Flooring
Client No.: KCI-S12a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	10	Cellulose	80
		5	Fibrous Glass	
		5	Synthetic	

Lab No.: 3865773 **Description / Location:** Tan Vinyl Sheet Flooring
Client No.: KCI-S12b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	10	Cellulose	80
		5	Fibrous Glass	
		5	Synthetic	

Lab No.: 3865774 **Description / Location:** Tan Vinyl Sheet Flooring
Client No.: KCI-S12c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	10	Cellulose	80
		5	Fibrous Glass	
		5	Synthetic	

Lab No.: 3865775 **Description / Location:** Brown Floor Tile: 9x9
Client No.: KCI-S13a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.3	Chrysotile	None Detected	None Detected	PC 98.7

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Kitchener ON N2B 3X9

Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KCI

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865776 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S13b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865777 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S13c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865778 **Description / Location:** Blue Floor Tile; 9x9
Client No.: KCI-S14a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.2	Chrysotile	None Detected	None Detected	PC 98.8

Lab No.: 3865779 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S14b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

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Kitchener ON N2B 3X9

Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865780 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S14c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865781 **Description / Location:** Tan Floor Tile; 9x9
Client No.: KCI-S15a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 6.3	Chrysotile	None Detected	None Detected	PC 93.7

Lab No.: 3865782 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S15b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865783 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S15c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865784 **Description / Location:** Brown Floor Tile; 9x9
Client No.: KCI-S16a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 6.1	Chrysotile	None Detected	None Detected	PC 93.9

Lab No.: 3865785 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S16b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865786 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S16c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865787 **Description / Location:** Grey Floor Tile; 12x12
Client No.: KCI-S17a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Report Date: 2/23/2010
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Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865788
Client No.: KCI-S17b
Description / Location: Grey Floor Tile; 12x12

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865788
Client No.: KCI-S17b
Description / Location: Black Mastic
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865789
Client No.: KCI-S17c
Description / Location: Grey Floor Tile: 12x12

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865790
Client No.: KCI-S18a
Description / Location: Tan Floor Tile; 12x12

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Report Date: 2/23/2010
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Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865791 **Description / Location:** Tan Floor Tile; 12x12
Client No.: KCI-S18b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865792 **Description / Location:** Tan Floor Tile; 12x12
Client No.: KCI-S18c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865793 **Description / Location:** Blue Floor Tile; 12x12
Client No.: KCI-S19a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865794 **Description / Location:** Blue Floor Tile; 12x12
Client No.: KCI-S19b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Report Date: 2/23/2010
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Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865795 **Description / Location:** Blue Floor Tile; 12x12
Client No.: KCI-S19c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865796 **Description / Location:** Tan Floor Tile; 12x12
Client No.: KCI-S20a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865797 **Description / Location:** Tan Floor Tile; 12x12
Client No.: KCI-S20b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865798 **Description / Location:** Tan Floor Tile; 12x12
Client No.: KCI-S20c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Analysis Method: EPA 600/R-93/116

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Analysis Performed By: L. Solebello

Date: 2/22/2010

IATL International Asbestos Testing Laboratories

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: MTE Consultants
520 Bingemans Centre Dr
Kitchener ON N2B 3X9

Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KCI

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865799 **Description / Location:** Green Floor Tile; 9x9
Client No.: KCI-S21a

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 0.75	Chrysotile	None Detected	None Detected	PC 99.25

Lab No.: 3865800 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S21b

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865801 **Description / Location:** Sample Not Analyzed
Client No.: KCI-S21c

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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CERTIFICATE OF ANALYSIS

Client: MTE Consultants
520 Bingemans Centre Dr
Kitchener ON N2B 3X9

Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865802
Client No.: KCI-S22a
Description / Location: Grey Plaster, Room 3045

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865802
Client No.: KCI-S22a
Description / Location: White Joint Compound, Room 3045
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865803
Client No.: KCI-S22b
Description / Location: White Plaster, Room 2005

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865804
Client No.: KCI-S22c
Description / Location: White Plaster, Room 3051

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Analysis Performed By: L. Solebello

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CERTIFICATE OF ANALYSIS

Client: MTE Consultants
520 Bingemans Centre Dr
Kitchener ON N2B 3X9

Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865805
Client No.: KCI-S22d
Description / Location: White/Grey Plaster, Room 3005

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865806
Client No.: KCI-S22e
Description / Location: Off-White Plaster, Room 3024

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865807
Client No.: KCI-S23a
Description / Location: White/Tan Ceiling Tile; 2x4, Room 3048

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	35	Cellulose	30
		35	Fibrous Glass	

Lab No.: 3865808
Client No.: KCI-S23b
Description / Location: White/Tan Ceiling Tile; 2x4, Room 3048

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	35	Cellulose	30
		35	Fibrous Glass	

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Kitchener ON N2B 3X9

Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865809
Client No.: KCI-S23c
Description / Location: White/Tan Ceiling Tile; 2x4
Room 3048

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	35	Cellulose	30
		35	Fibrous Glass	

Lab No.: 3865810
Client No.: KCI-S24a
Description / Location: Tan Insulation; Firespray
Room 3048

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	5	Cellulose	93
		2	Fibrous Glass	

Lab No.: 3865811
Client No.: KCI-S24b
Description / Location: Tan Insulation; Firespray
Room 3048

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	7	Cellulose	90
		3	Fibrous Glass	

Lab No.: 3865812
Client No.: KCI-S24c
Description / Location: Tan Insulation: Firespray
Room 3048

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	7	Cellulose	90
		3	Fibrous Glass	

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Kitchener ON N2B 3X9

Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865813
Client No.: KCI-S25a
Description / Location: White/Grey Plaster, Room 3019

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	Trace	Hair	100

Lab No.: 3865814
Client No.: KCI-S25b
Description / Location: White/Grey Plaster, Room 3019

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	Trace	Hair	100

Lab No.: 3865815
Client No.: KCI-S25c
Description / Location: White/Grey Plaster, Room 3019

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	Trace	Hair	100

Lab No.: 3865816
Client No.: KCI-S26a
Description / Location: Brown Mastic, Room 3019; Ceiling

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Kitchener ON N2B 3X9

Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865817
Client No.: KCI-S26b
Description / Location: Brown Mastic, Room 3019; Ceiling

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865818
Client No.: KCI-S26c
Description / Location: Brown Mastic, Room 3019; Ceiling

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865819
Client No.: KCI-S27a
Description / Location: White/Grey Plaster, Boy's Gym; On Concrete

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865820
Client No.: KCI-S27b
Description / Location: White/Grey Plaster, Boy's Gym; On Concrete

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Date: 2/22/2010

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Client: MTE Consultants
520 Bingemans Centre Dr
Kitchener ON N2B 3X9

Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865821
Client No.: KCI-S27c
Description / Location: White/Grey Plaster
Boy's Gym; On Concrete

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865822
Client No.: KCI-S28a
Description / Location: White Texture
Gym Stairwell

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.1	Chrysotile	None Detected	None Detected	PC 98.9

Lab No.: 3865823
Client No.: KCI-S28b
Description / Location: Sample Not Analyzed

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865824
Client No.: KCI-S28c
Description / Location: Sample Not Analyzed

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Kitchener ON N2B 3X9

Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865825
Client No.: KCI-S29a
Description / Location: Off-White Ceiling Tile; 1x1

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC Trace	Chrysotile	70	Fibrous Glass	PC 27.6
PC 2.4	Amosite			

Lab No.: 3865826
Client No.: KCI-S29b
Description / Location: Sample Not Analyzed

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865827
Client No.: KCI-S29c
Description / Location: Sample Not Analyzed

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3865828
Client No.: KCI-S30a
Description / Location: Black Tar

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Kitchener ON N2B 3X9

Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865829 **Client No.:** KCI-S30b **Description / Location:** Black Glass Foam

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865830 **Client No.:** KCI-S30c **Description / Location:** Black Glass Foam

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3865831 **Client No.:** KCI-S31a **Description / Location:** Tan Ceiling Tile; 1x1

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	25	Cellulose	50
		25	Fibrous Glass	

Lab No.: 3865832 **Client No.:** KCI-S31b **Description / Location:** Tan Ceiling Tile; 1x1

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	25	Cellulose	50
		25	Fibrous Glass	

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Date: 2/22/2010

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Kitchener ON N2B 3X9

Report Date: 2/23/2010
Project: WRDSB; KitchenerCollegiate
Project No.: 32523-800-KC1

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3865833
Client No.: KCI-S31c
Description / Location: White/Tan Ceiling Tile; 1x1

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	25	Cellulose	50
		25	Fibrous Glass	

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Analysis Performed By: L. Solebello

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Client: MTE Consultants
520 Bingemans Centre Dr
Kitchener ON N2B 3X9

Report Date: 2/22/2010
Project: WRDSB; KCI
Project No.: 32523-800

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3870482 **Description / Location:** White Insulation; Firespray
Client No.: KCI-S32a Art Building

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	90	Cellulose	10

Lab No.: 3870483 **Description / Location:** White Insulation; Firespray
Client No.: KCI-S32b Art Building

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	90	Cellulose	10

Lab No.: 3870484 **Description / Location:** White Insulation; Firespray
Client No.: KCI-S33c Art Building

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	90	Cellulose	10

Lab No.: 3870485 **Description / Location:** Tan/White Joint Compound
Client No.: KCI-S33a Art Building

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Analysis Performed By: L. Solebello

Approved By:

Date: 2/22/2010

Frank E. Ehrenfeld, III
Laboratory Director

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CERTIFICATE OF ANALYSIS

Client: MTE Consultants
520 Bingemans Centre Dr
Kitchener ON N2B 3X9

Report Date: 2/22/2010
Project: WRDSB; KCI
Project No.: 32523-800

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3870486 **Client No.:** KCI-S33b
Description / Location: Off-White Joint Compound, Art Building

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3870487 **Client No.:** KCI-S33c
Description / Location: Sample Not Analyzed

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 3870488 **Client No.:** KCI-S34a
Description / Location: Tan Ceiling Tile; 2x4, Art Building

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 0.5	Chrysotile	10	Cellulose	PC 26.8
PC 2.7	Amosite	70	Fibrous Glass	

Lab No.: 3870489 **Client No.:** KCI-S34b
Description / Location: Sample Not Analyzed

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Analysis Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC-Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: L. Solebello

Date: 2/22/2010

IATL International Asbestos Testing Laboratories

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: MTE Consultants
520 Bingemans Centre Dr
Kitchener ON N2B 3X9

Report Date: 2/22/2010
Project: WRDSB; KCI
Project No.: 32523-800

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3870490
Client No.: KCI-S34c
Description / Location: Sample Not Analyzed

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Analysis Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC-Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: L. Solebello

Date: 2/22/2010

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www.paracellabs.com

Certificate of Analysis

MTE Consultants Inc. (Kitchener)

520 Bingemans Centre Dr.
Kitchener, ON N2B 3X9
Attn: Greg Eller

Phone: (519) 743-6500
Fax: (519) 743-6513

Client PO: 34532-GSE
Project: KCI
Custody:

Report Date: 2-Sep-2015
Order Date: 1-Sep-2015

Order #: 1536158

This Certificate of Analysis contains analytical data applicable to the following samples as submitted :

Paracel ID	Client ID
1536158-01	S.01A (beige)
1536158-02	S.01B (beige)
1536158-03	S.01C (beige)
1536158-04	S.01A (grey)
1536158-05	S.01B (grey)
1536158-06	S.01C (grey)

Approved By:



Emma Diaz
Senior Analyst

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work

PARACEL LABORATORIES LTD.

Client: MTE Consultants Inc. (Kitchener)
520 Bingemans Centre Dr.
Kitchener, ON N2B 3X9

Attn: Greg Eller
Tel: (519) 743-6500
Fax: (519) 743-6513

Project: KCl
Paracel Report No.: 1536158

Received Date: 01-Sep-15
Report Date: 02-Sep-15

Asbestos, PLM Visual Estimation **MDL - 0.5%**

Paracel I.D.	Sample Date	Layers Analyzed	Colour	Description	Asbestos Detected:	Material Identification	% Content
1536158-01	01-Sep-15	sample homogenized	Beige	Plaster	No	Client ID: S.01A (beige)	
						Non-Fibers	100
1536158-02	01-Sep-15	sample homogenized	Beige	Plaster	No	Client ID: S.01B (beige)	
						Non-Fibers	100
1536158-03	01-Sep-15	sample homogenized	Beige	Plaster	No	Client ID: S.01C (beige)	
						Non-Fibers	100
1536158-04	01-Sep-15	sample homogenized	Grey	Plaster	No	Client ID: S.01A (grey)	
						Non-Fibers	100
1536158-05	01-Sep-15	sample homogenized	Grey	Plaster	No	Client ID: S.01B (grey)	
						Non-Fibers	100
1536158-06	01-Sep-15	sample homogenized	Grey	Plaster	No	Client ID: S.01C (grey)	
						Non-Fibers	100

MMVF: Man Made Vitreous Fibers: Fiberglass, Mineral Wool, Rockwool, Glasswool
Analytes in bold indicate asbestos content which may include:
Actinolite, Amosite, Anthophyllite, Chrysotile, Crocidolite and/or Tremolite.

Analysis Summary Table

Analysis	Method Reference/Description	Lab Location	NVLAP Lab Code *	Analysis Date
Asbestos, PLM Visual Estimation	by EPA 600/R-93/116	Mississauga	200863-0	2-Sep-15

** Reference to the NVLAP term does not permit the user of this report to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.*

Work Order Revisions / Comments

None

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Chain of Custody
(Lab Use Only)

Page 1 of 1

Client Name: MTE Consultants Inc.	Project Reference: KCI
Contact Name:Greg Eller	Quote #:
Address:	PO #: 34532-GSE
	Email Address:geller@mte85.com
Telephone:519-743-6500 ext.1326	

TAT: [ ] Regular [ ] 3 Day
[ ] 2 Day [*] 1 Day
[ ] Same Day
Date Required: Sept. 2 - 15 3pm

ASBESTOS ANALYSIS

Matrix: [ ] Air [ ] Other **Regulatory Guideline:** _____ **Required Analyses:** [ ]PCM [*]PLM [ ]PLM 400PC [ ]PLM 1000PC [ ]Chatfield [ ]TEM

Paracel Order Number: 1536158

	Sample ID	Matrix Description	Sampling Date	Air Volume (L)	Positive Stop? (Y / N)	Is the Sample Layered? (Y / N)	If layered, Describe Layer(s) to be Analyzed Separately* or Homogenize all **
1	S.01A	Ceiling Plaster	9/1/2015		Y	Y	analyze separately
2	S.01B	Ceiling Plaster	9/1/2015		Y	Y	analyze separately
3	S.01C	Ceiling Plaster	9/1/2015		Y	Y	analyze separately
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

* Each layer is charged as a separate analysis ** Homogenize = Sample is combined to a uniform mixture

Comments:

Method of Delivery: SPRINT

Relinquished By (Sign):	Received at Depot:	Received at Lab:	Verified By:
Relinquished By (Print): G. Eller			
Date/Time: Sept.1-15	Date/Time:	Date/Time: 01-SEP-15 1615	Date/Time: 01-SEP-15 16:29

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Certificate of Analysis

MTE Consultants Inc. (Kitchener)

520 Bingemans Centre Dr.
Kitchener, ON N2B 3X9
Attn: Aisling Dennett

Client PO:
Project: 34532-908 Oct-13-16-KCI
Custody:

Report Date: 17-Oct-2016
Order Date: 14-Oct-2016

Order #: 1642292

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1642292-01	S01A (Tile)
1642292-02	S01B (Tile)
1642292-03	S01C (Tile)
1642292-04	S01A (Mastic)
1642292-05	S01B (Mastic)
1642292-06	S01C (Mastic)
1642292-07	S02A (Tile)
1642292-08	S02B (Tile)
1642292-09	S02C (Tile)
1642292-10	S02A (Mastic)
1642292-11	S02B (Mastic)
1642292-12	S02C (Mastic)

Approved By:



Emma Diaz

Senior Analyst

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

PARACEL LABORATORIES LTD.

Order #: 1642292

Certificate of Analysis

Client: MTE Consultants Inc. (Kitchener)

Client PO:

Report Date: 17-Oct-2016

Order Date: 14-Oct-2016

Project Description: 34532-908 Oct-13-16-KCI

Asbestos, PLM Visual Estimation **MDL - 0.5%**

Paracel I.D.	Sample Date	Layers Analyzed	Colour	Description	Asbestos Detected:	Material Identification	% Content
1642292-01	13-Oct-16	sample homogenized	Brown	Vinyl Floor Tile	**Yes**	Client ID: S01A (Tile) [AS-PRE]	
						Chrysotile	4.05
						Non-Fibers	95.5
1642292-02	13-Oct-16					Client ID: S01B (Tile)	
						not analyzed	
1642292-03	13-Oct-16					Client ID: S01C (Tile)	
						not analyzed	
1642292-04	13-Oct-16	sample homogenized	Black	Mastic	No	Client ID: S01A (Mastic) [AS-PRE]	
						Non-Fibers	<MDL
1642292-05	13-Oct-16	sample homogenized	Black	Mastic	No	Client ID: S01B (Mastic) [AS-PRE]	
						MMVF	<MDL
						Non-Fibers	100
1642292-06	13-Oct-16	sample homogenized	Black	Mastic	No	Client ID: S01C (Mastic) [AS-PRE]	
						Non-Fibers	100
1642292-07	13-Oct-16	sample homogenized	Beige	Vinyl Floor Tile	**Yes**	Client ID: S02A (Tile) [AS-PRE]	
						Chrysotile	2.13
						Non-Fibers	97.87
1642292-08	13-Oct-16					Client ID: S02B (Tile)	
						not analyzed	
1642292-09	13-Oct-16					Client ID: S02C (Tile)	
						not analyzed	
1642292-10	13-Oct-16	sample homogenized	Black	Mastic	**Yes**	Client ID: S02A (Mastic) [AS-PRE]	
						[ASTrc] **Chrysotile**	<MDL
						Non-Fibers	100
1642292-11	13-Oct-16	sample homogenized	Black	Mastic	**Yes**	Client ID: S02B (Mastic) [AS-PRE]	
						[ASTrc] **Chrysotile**	<MDL
						Non-Fibers	100
1642292-12	13-Oct-16	sample homogenized	Black	Mastic	No	Client ID: S02C (Mastic) [AS-PRE]	
						Non-Fibers	100

** MMVF: Man Made Vitreous Fibers: Fiberglass, Mineral Wool, Rockwool, Glasswool*

**** Analytes in bold indicate asbestos mineral content.**

Certificate of Analysis

Report Date: 17-Oct-2016

Client: MTE Consultants Inc. (Kitchener)

Order Date: 14-Oct-2016

Client PO:

Project Description: 34532-908 Oct-13-16-KCI

Analysis Summary Table

Analysis	Method Reference/Description	Lab Location	NVLAP Lab Code *	Analysis Date
Asbestos, PLM Visual Estimation	by EPA 600/R-93/116	1 - Mississauga	200863-0	17-Oct-16

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Qualifier Notes

Sample Qualifiers :

AS-PRE: Due to the difficult nature of the bulk sample (interfering fibers/binders), additional NOB preparation was required prior to analysis

ASTrc: Trace asbestos was observed below the noted detection limit but could not be accurately quantified.

Work Order Revisions / Comments

None

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Page 1 of 1

Client Name: MTE Consultants Inc	Project Reference: 34532-908 Oct-13-16-KCI
Contact Name: Aisling Dennett	Quote #:
Address: 520 Bingemans Centre Drive, Kitchener, ON, N2B3X9	PO #:
	Email Address: mmielke@mte85.com adennett@mte85.com
Telephone: 519-743-6500	

TAT: [ ] Regular [ ] 3 Day
[ ] 2 Day [x] 1 Day
[ ] Same Day
Date Required: OCT 17 9 AM

ASBESTOS ANALYSIS

Matrix: [ ] Air [X] Other **Regulatory Guideline:** _____

Required Analyses: [ ]PCM [X]PLM [ ]PLM 400PC [ ]PLM 1000PC [ ]Chatfield [ ]TEM

Paracel Order Number: 1642292

	Sample ID	Matrix Description		Sampling Date	Air Volume (L)	Positive Stop? (Y / N)	Is the Sample Layered? (Y / N)	If layered, Describe Layer(s) to be Analyzed Separately* or Homogenize all **
1	S01A	KCI-2006	Floor Tile Brown	Oct-13-16	-	Y	Y	*Tile and Mastic
2	S01B	KCI-2006	Floor Tile Brown	Oct-13-16	-	Y	Y	*Tile and Mastic
3	S01C	KCI-2006	Floor Tile Brown	Oct-13-16	-	Y	Y	*Tile and Mastic
4	S02A	KCI-2006	Beige Floor Tile	Oct-13-16	-	Y	Y	*Tile and Mastic
5	S02B	KCI-2006	Beige Floor Tile	Oct-13-16	-	Y	Y	*Tile and Mastic
6	S02C	KCI-2006	Beige Floor Tile	Oct-13-16	-	Y	Y	*Tile and Mastic
7					-			
8					-			
9					-			
10					-			
11					-			
12					-			
13					-			
14					-			
15					-			

*** Each layer is charged as a separate analysis** **** Homogenize = Sample is combined to a uniform mixture**

Comments: Sampled by WRDSB - Results by Monday October 17 AM Please

Method of Delivery: Purolator

Relinquished By (Sign):	Received at Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Martin Mielke			
Date/Time: Oct-13-16 11:00 AM	Date/Time:	Date/Time: Oct.14/16 9:34	Date/Time: Oct.14/16 9:34

IATL **International Asbestos Testing Laboratories**

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: MTE Consultants
520 Bingemans Centre Dr
Kitchener ON N2B 3X9

Report Date: 3/28/2013
Report No.: 299697
Project: KWCI
Project No.: 32940-202

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4949763 **Description / Location:** Red/White Floor Tile; 9x9
Client No.: 32940-202-S01A Room 2086

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.1	Chrysotile	None Detected	None Detected	PC 98.9

Lab No.: 4949763 **Description / Location:** Black Mastic **Layer No.:** 2
Client No.: 32940-202-S01A Room 2086

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 2.3	Chrysotile	None Detected	None Detected	PC 97.7

Lab No.: 4949764 **Description / Location:** Sample Not Analyzed
Client No.: 32940-202-S01B

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
	Sample Not Analyzed		Sample Not Analyzed	

Lab No.: 4949765 **Description / Location:** Sample Not Analyzed
Client No.: 32940-202-S01C

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
	Sample Not Analyzed		Sample Not Analyzed	

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: L. Price

Approved By:

Date: 3/28/2013

Frank E. Ehrenfeld, III
Laboratory Director

IATL **International Asbestos Testing Laboratories**

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: MTE Consultants
520 Bingemans Centre Dr
Kitchener ON N2B 3X9

Report Date: 3/28/2013
Report No.: 299697
Project: KWCI
Project No.: 32940-202

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4949766 **Description / Location:** Grey Interior Caulk
Client No.: 32940-202-S02A Room 2086

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4949767 **Description / Location:** Grey Interior Caulk
Client No.: 32940-202-S02B Room 2086

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4949768 **Description / Location:** Grey Interior Caulk
Client No.: 32940-202-S02C Room 2086

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4949769 **Description / Location:** White ExteriorBrick/Window Caulk/Glazing
Client No.: 32940-202-S03A Room 2086

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.3	Chrysotile	None Detected	None Detected	PC 98.7

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: L. Price

Date: 3/28/2013

IATL **International Asbestos Testing Laboratories**

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: MTE Consultants
520 Bingemans Centre Dr
Kitchener ON N2B 3X9

Report Date: 3/28/2013
Report No.: 299697
Project: KWCI
Project No.: 32940-202

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4949770 **Description / Location:** Sample Not Analyzed
Client No.: 32940-202-S03B

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Lab No.: 4949771 **Description / Location:** Sample Not Analyzed
Client No.: 32940-202-S03C

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
Sample Not Analyzed		Sample Not Analyzed		

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: L. Price

Date: 3/28/2013

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Certificate of Analysis

MTE Consultants Inc. (Kitchener)

520 Bingemans Centre Dr.
Kitchener, ON N2B 3X9
Attn: Aisling Dennett

Client PO:
Project: 34532-909-KWCI
Custody:

Report Date: 19-Jan-2017
Order Date: 16-Jan-2017

Order #: 1703030

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1703030-01	S01A - 1088
1703030-02	S01B - 1088
1703030-03	S01C - 1088
1703030-04	S02A - 1047 (VFT)
1703030-05	S02B - 1047 (VFT)
1703030-06	S02C - 1047 (VFT)
1703030-07	S02A - 1047 (Mastic)
1703030-08	S02B - 1047 (Mastic)
1703030-09	S02C - 1047 (Mastic)
1703030-10	S03A - 2035 (VFT)
1703030-11	S03B - 2035 (VFT)
1703030-12	S03C - 2035 (VFT)
1703030-13	S03C - 2035 (Mastic)
1703030-14	S03A - 2035 (Mastic)
1703030-15	S03B - 2035 (Mastic)
1703030-16	S04A - 2034 (VFT)
1703030-17	S04B - 2034 (VFT)
1703030-18	S04C - 2034 (VFT)
1703030-19	S04A - 2034 (Mastic)
1703030-20	S04B - 2034 (Mastic)
1703030-21	S04C - 2034 (Mastic)

Approved By:



Emma Diaz

Senior Analyst

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

PARACEL LABORATORIES LTD.

Order #: 1703030

Certificate of Analysis

Client: MTE Consultants Inc. (Kitchener)

Client PO:

Report Date: 19-Jan-2017

Order Date: 16-Jan-2017

Project Description: 34532-909-KWCI

Asbestos, PLM Visual Estimation **MDL - 0.5%**

Paracel I.D.	Sample Date	Layers Analyzed	Colour	Description	Asbestos Detected:	Material Identification	% Content
1703030-01	02-Jan-17	sample homogenized	White	Texture Coat	No	Client ID: S01A - 1088	
						Non-Fibers	100
1703030-02	02-Jan-17	sample homogenized	White	Texture Coat	No	Client ID: S01B - 1088	
						Non-Fibers	100
1703030-03	02-Jan-17	sample homogenized	White	Texture Coat	No	Client ID: S01C - 1088	
						Non-Fibers	100
1703030-04	02-Jan-17	sample homogenized	Grey/White	Vinyl Floor Tile	**Yes**	Client ID: S02A - 1047 (VFT) [AS-PRE]	
						Chrysotile	2.08
						Non-Fibers	97.92
1703030-05	02-Jan-17					Client ID: S02B - 1047 (VFT)	
						not analyzed	
1703030-06	02-Jan-17					Client ID: S02C - 1047 (VFT)	
						not analyzed	
1703030-07	02-Jan-17	sample homogenized	Black	Mastic	**Yes**	Client ID: S02A - 1047 (Mastic) [AS-PRE]	
						Chrysotile	1.33
						Non-Fibers	98.67
1703030-08	02-Jan-17					Client ID: S02B - 1047 (Mastic)	
						not analyzed	
1703030-09	02-Jan-17					Client ID: S02C - 1047 (Mastic)	
						not analyzed	
1703030-10	02-Jan-17	sample homogenized	Black	Vinyl Floor Tile	**Yes**	Client ID: S03A - 2035 (VFT) [AS-PRE]	
						Chrysotile	9.94
						Non-Fibers	90.06
1703030-11	02-Jan-17					Client ID: S03B - 2035 (VFT)	
						not analyzed	
1703030-12	02-Jan-17					Client ID: S03C - 2035 (VFT)	
						not analyzed	
1703030-13	02-Jan-17	sample homogenized	Black	Mastic	**Yes**	Client ID: S03C - 2035 (Mastic) [AS-PRE]	
						Chrysotile	0.75
						Non-Fibers	99.25
1703030-14	02-Jan-17					Client ID: S03A - 2035 (Mastic)	
						not analyzed	
1703030-15	02-Jan-17					Client ID: S03B - 2035 (Mastic)	
						not analyzed	

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Order #: 1703030

Certificate of Analysis

Client: MTE Consultants Inc. (Kitchener)

Client PO:

Report Date: 19-Jan-2017

Order Date: 16-Jan-2017

Project Description: 34532-909-KWCI

Asbestos, PLM Visual Estimation **MDL - 0.5%**

Paracel I.D.	*Sample Date*	*Layers Analyzed*	*Colour*	*Description*	*Asbestos Detected:*	*Material Identification*	*% Content*
1703030-16	02-Jan-17	sample homogenized	Black	Vinyl Floor Tile	**Yes**	Client ID: S04A - 2034 (VFT) [AS-PRE]	
						Chrysotile	9.65
						Non-Fibers	90.35
1703030-17	02-Jan-17					Client ID: S04B - 2034 (VFT)	
						not analyzed	
1703030-18	02-Jan-17					Client ID: S04C - 2034 (VFT)	
						not analyzed	
1703030-19	02-Jan-17	sample homogenized	Black	Mastic	**Yes**	Client ID: S04A - 2034 (Mastic) [AS-PRE]	
						[ASTrc] **Chrysotile**	<MDL
						Non-Fibers	100
1703030-20	02-Jan-17	sample homogenized	Black	Mastic	**Yes**	Client ID: S04B - 2034 (Mastic) [AS-PRE]	
						[ASTrc] **Chrysotile**	<MDL
						Non-Fibers	100
1703030-21	02-Jan-17	sample homogenized	Black	Mastic	**Yes**	Client ID: S04C - 2034 (Mastic) [AS-PRE]	
						[ASTrc] **Chrysotile**	<MDL
						Non-Fibers	100

**** Analytes in bold indicate asbestos mineral content.**

Analysis Summary Table

Analysis	Method Reference/Description	Lab Location	NVLAP Lab Code *	Analysis Date
Asbestos, PLM Visual Estimation	by EPA 600/R-93/116	1 - Mississauga	200863-0	18-Jan-17

** Reference to the NVLAP term does not permit the user of this report to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.*

Qualifier Notes

Sample Qualifiers :

AS-PRE: Due to the difficult nature of the bulk sample (interfering fibers/binders), additional NOB preparation was required prior to analysis

ASTrc: Trace asbestos was observed below the noted detection limit but could not be accurately quantified.

Work Order Revisions / Comments

None

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Chain of Custody
(Lab Use Only)

Page 1 of 1

Client Name:	MTE Consultants Inc	Project Reference:	34532-909 - KWCI
Contact Name:	Aisling Dennett	Quote #	
Address:	520 Bingemans Centre Drive Kitchener, ON, N2B 3X9	PO #	
Telephone:	519-743-6500	Email Address:	adennett@mte85.com psemeniuk@mte85.com

TAT: ☑ Regular ☐ 3 Day ☐ 2 Day ☐ 1 Day

Date Required: _____

ASBESTOS ANALYSIS

Matrix Type: A (Air) O (Other) Regulatory/Guideline Requirements: 278/05 **Required Analyses:** ☐ PCM ☑ PLM ☐ PLM 400PC ☐ PLM 1000PC ☐ Chatfield

Paracel Order Number: 1703030

	Sample ID	Matrix	Matrix Description	Sampling Date	Air Volume (L)	Positive Stop?	Is the Sample Layered?	If Yes, Describe Sample Layer(s) to be Analysed Separately
1	S01ABC - 1088		Hard Texture Coat Ceiling	January 2, 2016	-	☑	No	-
2	S02ABC - 1047		9x9 Grey with White Streak VFT	January 2, 2016	-	☑	Yes	VFT and Mastic
3	S03ABC - 2035		9x9 Black with Red Blotch VFT	January 2, 2016	-	☑	Yes	VFT and Mastic
4	S04ABC - 2034		9x9 Black VFT	January 2, 2016	-	☑	Yes	VFT and Mastic
5						☐		
6						☐		
7						☐		
8						☐		
9						☐		
10						☐		
11						☐		
12						☐		
13						☐		
14						☐		
15						☐		

Comments:

Method of Delivery: Purolator

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Paul Semeniuk			
Date/Time: January 13, 2017 10am	Date/Time:	Date/Time: Jan 16/17 9:00	Date/Time: Jan 16/17

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Certificate of Analysis

MTE Consultants Inc. (Kitchener)

520 Bingemans Centre Dr.
Kitchener, ON N2B 3X9
Attn: Aisling Dennett

Client PO:
Project: 34532-915 - KWC1
Custody:

Report Date: 11-Feb-2019
Order Date: 8-Feb-2019

Order #: 1906465

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1906465-01	S01a
1906465-02	S01b
1906465-03	S01c
1906465-04	S02a
1906465-05	S02b
1906465-06	S02c
1906465-07	S03a
1906465-08	S03b
1906465-09	S03c
1906465-10	S04a
1906465-11	S04b
1906465-12	S04c

Approved By:

Emma Diaz

Senior Analyst

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

PARACEL LABORATORIES LTD.

Order #: 1906465

Certificate of Analysis

Client: MTE Consultants Inc. (Kitchener)

Client PO:

Report Date: 11-Feb-2019

Order Date: 8-Feb-2019

Project Description: 34532-915 - KWC1

Asbestos, PLM Visual Estimation **MDL - 0.5%**

Paracel ID	Sample Date	Colour	Description	Asbestos Detected	Material Identification	% Content
1906465-01	07-Feb-19	Grey	Window Caulking	No	**Client ID: S01a**	
					Non-Fibers	100
1906465-02	07-Feb-19	Grey	Window Caulking	**Yes**	**Client ID: S01b**	[AS-PT, Z-01]
					Chrysotile	0.5
					Non-Fibers	99.5
1906465-03	07-Feb-19				**Client ID: S01c**	
					not analyzed	
1906465-04	07-Feb-19	Grey	Window Caulking	No	**Client ID: S02a**	
					Non-Fibers	100
1906465-05	07-Feb-19	Grey	Window Caulking	No	**Client ID: S02b**	
					Non-Fibers	100
1906465-06	07-Feb-19	Grey	Window Caulking	**Yes**	**Client ID: S02c**	
					Chrysotile	2
					Cellulose	5
					Non-Fibers	93
1906465-07	07-Feb-19	Grey	Window Caulking	No	**Client ID: S03a**	
					Non-Fibers	100
1906465-08	07-Feb-19	Grey	Window Caulking	No	**Client ID: S03b**	
					Non-Fibers	100
1906465-09	07-Feb-19	Grey	Window Caulking	No	**Client ID: S03c**	
					Non-Fibers	100
1906465-10	07-Feb-19	Beige	Window Caulking	No	**Client ID: S04a**	
					Non-Fibers	100
1906465-11	07-Feb-19	Beige	Window Caulking	No	**Client ID: S04b**	
					Non-Fibers	100

PARACEL LABORATORIES LTD.

Order #: 1906465

Certificate of Analysis

Report Date: 11-Feb-2019

Client: MTE Consultants Inc. (Kitchener)

Order Date: 8-Feb-2019

Client PO:

Project Description: 34532-915 - KWC1

Asbestos, PLM Visual Estimation **MDL - 0.5%**

Paracel ID	Sample Date	Colour	Description	Asbestos Detected	Material Identification	% Content
1906465-12	07-Feb-19	Beige	Window Caulking	No	**Client ID: S04c**	
					Non-Fibers	100

** Analytes in bold indicate asbestos mineral content.

Analysis Summary Table

Analysis	Method Reference/Description	Lab Location	NVLAP Lab Code *	Analysis Date
Asbestos, PLM Visual Estimation	by EPA 600/R-93/116	1 - Mississauga	200863-0	8-Feb-19

* Reference to the NVLAP term does not permit the user of this report to claim product certification , approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Qualifier Notes

Sample Qualifiers :

AS-PT: Asbestos quantitation by PLM Point Count method.

Z-01: Two types of caulking present, inseperable layers

Work Order Revisions | Comments

None

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Paracel ID: 1906465

Chain of Custody
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Page 1 of 1

Client Name: MTE Consultants Inc	Project Reference: 34532-915 - KWCI
Contact Name: Aisling Dennett	Quote #: 19-226 MTE Waterloo Region DSB
Address: 520 Bingemans Centre Drive, Kitchener, ON, N2B3X9	PO #:
	Email Address: adennett@mte85.com
Telephone: 519-743-6500	

TAT: [ ] Regular [ ] 3 Day
[ ] 2 Day [X] 1 Day
[ ] Same Day
Date Required: _____

ASBESTOS ANALYSIS

Matrix: [ ] Air [X] Other **Regulatory Guideline:** _____

Required Analyses: [ ]PCM [X]PLM [ ]PLM 400PC [ ]PLM 1000PC [ ]Chatfield [ ]TEM

	Paracel Order Number: 1906465 / Sample ID	Matrix Description	Sampling Date	Air Volume (L)	Positive Stop? (Y/N)	Is the Sample Layered? (Y/N)	If layered, Describe Layer(s) to be Analyzed Separately* or Homogenize all **
1	S01abc	1958 add. Window caulking - exterior	7-Feb	-	y	n	
2	S02abc	1958 Add. Window Caulking Interior	7-Feb	-	y	n	
3	S03abc	1947 Addition - Window Caulking Exterior	7-Feb	-	y	n	
4	S04abc	1947 Addition - Window Caulking Interior	7-Feb	-	y	n	
5				-			
6				-			
7				-			
8				-			
9				-			
10				-			
11				-			
12				-			
13				-			
14				-			
15				-			

* Each layer is charged as a separate analysis ** Homogenize = Sample is combined to a uniform mixture

Comments: Sampled by WRDSB

Method of Delivery: Purolator

Relinquished By (Sign):	Received at Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Jason Scarrafiera			
Date/Time: Feb 7/19 - 4:30	Date/Time:	Date/Time: Feb 8-19 8:50	Date/Time: Feb 8-19 9:23

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Certificate of Analysis

MTE Consultants Inc. (Kitchener)

520 Bingemans Centre Dr.
Kitchener, ON N2B 3X9
Attn: Steven Nieboer

Client PO:
Project: 34532 - 915 (Kitchener Collegiate Institute)
Custody:

Report Date: 13-Sep-2019
Order Date: 13-Sep-2019

Order #: 1937501

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1937501-01	S01A
1937501-02	S01B
1937501-03	S01C

Approved By:



Emma Diaz

Senior Analyst

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

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Order #: 1937501

Certificate of Analysis

Report Date: 13-Sep-2019

Client: MTE Consultants Inc. (Kitchener)

Order Date: 13-Sep-2019

Client PO:

Project Description: 34532 - 915 (Kitchener Collegiate Institute)

Asbestos, PLM Visual Estimation **MDL - 0.5%**

Paracel ID	Sample Date	Colour	Description	Asbestos Detected	Material Identification	% Content
1937501-01	12-Sep-19	White	Porcelain	No	**Client ID: S01A**	
					Non-Fibers	100
1937501-02	12-Sep-19	White	Porcelain	No	**Client ID: S01B** [Z-01]	
					Non-Fibers	100
1937501-03	12-Sep-19	White	Porcelain	No	**Client ID: S01C** [Z-01]	
					Non-Fibers	100

Analysis Summary Table

Analysis	Method Reference/Description	Lab Location	NVLAP Lab Code *	Analysis Date
Asbestos, PLM Visual Estimation	by EPA 600/R-93/116	1 - Mississauga	200863-0	13-Sep-19

* Reference to the NVLAP term does not permit the user of this report to claim product certification , approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Mississauga Lab: 15 - 6800 Kitimat Rd Mississauga, Ontario, L5N 5M1

Qualifier Notes

Sample Qualifiers :

Z-01: Subsample from sample 1.

Work Order Revisions | Comments

None

1937501

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Chain of Custody
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Page of

Turnaround Time:

Client Name: MTE Consultants Inc.	Project Reference: 34532-915 (Kitchner Collegiate Institute)
Contact Name: Steven Nieboer	Quote #: 19-226 19-046
Address: 520 Bingemans Centre Drive	PO #: N/A
Kitchener, ON, N2B 3X9	Email Address:
Telephone: 519-743-6500	snieboer@mte85.com, DDharsandia@mte85.com

Immediate 1 Day
x 4HR 2 Day
8HR 3 Day
4 Day
Date Required: 13:15

ASBESTOS & MOLD ANALYSIS

Matrix: Air X | Bulk | Tape Lift | Swab | Other Regulatory Guideline | ON | QC | AB | SK | Other

Analyses: Microscopic Mold | Culturable Mold | Bacteria GRAM | PCM Asbestos | X PLM Asbestos | Chatfield Asbestos | TEM Asbestos

Paracel Order Number: 1937501

	Sample ID	Sampling Date	Air Volume (L)	Analysis Required	Asbestos - Bulk: Identify Distinct Building Materials to Be Analyzed (if not specified, all materials identified will be analyzed)*	Positive Stop?
1	S01	12th Sept		PLM	Porcelin	Y
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

*If left blank, all distinct materials identified in the samples will be analyzed and reported separately as per EPA 600/R-93/116. Additional charges may apply.

Comments: We need Results by end of day Friday the 13th . We are sending one Piece. Is it Possible to Separate it into Three Sample

Method of Delivery: PUROLATOR

Relinquished By (Sign):	Received at Depot:	Received at Lab:	Verified By:
D. H. Dharsandia			
Relinquished By (Print): DHARMADEEP DHARSANDIA			
Date/Time: 9/12/2019	Date/Time:	Date/Time: Sept 13/19 09:15	Date/Time: Sept 13/19 09:15

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Certificate of Analysis

MTE Consultants Inc. (Kitchener)

520 Bingemans Centre Dr.
Kitchener, ON N2B 3X9
Attn: Martin Mielke

Client PO: 34532-943
Project: 34532-943 KCI Room 256
Custody:

Report Date: 23-Jan-2024
Order Date: 17-Jan-2024

Order #: 2403137

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2403137-01	SA101A - KCI FR#256 - 1x1 ACT
2403137-02	SA101B - KCI FR#256 - 1x1 ACT
2403137-03	SA101C - KCI FR#256 - 1x1 ACT
2403137-04	SA102A - KCI FR#256 - ACT Mastic
2403137-05	SA102B - KCI FR#256 - ACT Mastic
2403137-06	SA102C - KCI FR#256 - ACT Mastic

Approved By:

Emma Diaz

Senior Analyst

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

PARACEL LABORATORIES LTD.

Order #: 2403137

Certificate of Analysis

Report Date: 23-Jan-2024

Client: MTE Consultants Inc. (Kitchener)

Order Date: 17-Jan-2024

Client PO: 34532-943

Project Description: 34532-943 KCI Room 256

Asbestos, PLM Visual Estimation **MDL - 0.5%**

Paracel ID	Sample Date	Colour	Description	Asbestos Detected	Material Identification	% Content
2403137-01	15-Jan-24	Brown	Ceiling Tile	**Yes**	**Client ID: SA101A - KCI FR#256 - 1x1 ACT** [AS-PRE, AS-PT]	
				[ASTrc]	**Chrysotile**	<MDL
					Cellulose	90
					Non-Fibers	10
2403137-02	15-Jan-24	Brown	Ceiling Tile	**Yes**	**Client ID: SA101B - KCI FR#256 - 1x1 ACT** [AS-PRE, AS-PT]	
				[ASTrc]	**Chrysotile**	<MDL
					Cellulose	90
					Non-Fibers	10
2403137-03	15-Jan-24	Brown	Ceiling Tile	**Yes**	**Client ID: SA101C - KCI FR#256 - 1x1 ACT** [AS-PRE, AS-PT]	
				[ASTrc]	**Chrysotile**	<MDL
					Cellulose	90
					Non-Fibers	10
2403137-04	15-Jan-24	Brown	Mastic	**Yes**	**Client ID: SA102A - KCI FR#256 - ACT Mastic** [AS-PRE]	
					Chrysotile	2.5
					Cellulose	20
					Non-Fibers	77.5
2403137-05	15-Jan-24	Brown	Mastic		**Client ID: SA102B - KCI FR#256 - ACT Mastic**	
					not analyzed, positive stop	
2403137-06	15-Jan-24	Brown	Mastic		**Client ID: SA102C - KCI FR#256 - ACT Mastic**	
					not analyzed, positive stop	

**** Analytes in bold indicate asbestos mineral content.**

Analysis Summary Table

Analysis	Method Reference/Description	Lab Location	Lab Accreditation	Analysis Date
Asbestos, PLM Visual Estimation	AppE to SubE of 40CFR Part763 and EPA/600/R-93/116	1 - Mississauga	CALA 3762	17-Jan-24

Mississauga Lab: 15 - 6800 Kitimat Rd Mississauga, Ontario, L5N 5M1

Certificate of Analysis

Report Date: 23-Jan-2024

Client: MTE Consultants Inc. (Kitchener)

Order Date: 17-Jan-2024

Client PO: 34532-943

Project Description: 34532-943 KCI Room 256

Qualifier Notes

Sample Qualifiers :

AS-PRE:	Due to the difficult nature of the bulk sample (interfering fibers/binders), additional NOB preparation was required prior to analysis
AS-PT:	Asbestos quantitation by PLM Point Count method.
ASTrc:	Trace asbestos was observed below the noted detection limit but could not be accurately quantified.

Work Order Revisions | Comments

None

PARACEL LABORATORIES LTD.

2403137

ad Office
0-2319 St. Laurent Blvd.
awa, Ontario K1G 4J8
1-800-749-1947
paracel@paracellabs.com

Chain of Custody
(Lab Use Only)

Client Name:	MTE Consultants Inc.	Project Reference:	P#34532-943 KCI Room 256
Contact Name:	Martin Mielke, Paul Semeniuk	Quote #:	22-084 MTE Standing Offer
Address:	520 Bingemans Centre Drive, Kitchener ON N2B 3X9	PO #:	
		Email Address:	mmielke@mte85.com, psemeniuk@mte85.com
Telephone:	519-743-6500 ext 1318		

Turnaround Time:

- ☐ Immediate
- ☐ 4 Hour
- ☐ 8 Hour
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☒ Regular

Date Required: _____

ASBESTOS & MOLD ANALYSIS

Matrix: ☐ Air ☒ Bulk ☐ Tape Lift ☐ Swab ☐ Other **Regulatory Guideline:** ☒ ON ☐ QC ☐ AB ☐ SK ☐ Other:

Analyses: ☐ Microscopic Mold ☐ Culturable Mold ☐ Bacteria GRAM ☐ PCM Asbestos ☒ PLM Asbestos ☐ Chatfield Asbestos ☐ TEM Asbestos

Paracel Order Number: 2403137

	Sample ID	Sampling Date	Air Volume (L)	Analysis Required	Asbestos - Bulk: Identify Distinct Building Materials to Be Analyzed (if not specified, all materials identified will be analyzed) *	Positive Stop?
1	SA101A - KCI FR#256 - 1x1 ACT	Jan-15-24		PLM		☑
2	SA101B - KCI FR#256 - 1x1 ACT	Jan-15-24		PLM		☑
3	SA101C - KCI FR#256 - 1x1 ACT	Jan-15-24		PLM		☑
4	SA102A - KCI FR#256 - ACT Mastic	Jan-15-24		PLM		☑
5	SA102B - KCI FR#256 - ACT Mastic	Jan-15-24		PLM		☑
6	SA102C - KCI FR#256 - ACT Mastic	Jan-15-24		PLM		☑
7						☐
8						☐
9						☐
10						☐
11						☐
12						☐

* If left blank, all distinct materials identified in the samples will be analyzed and reported separately as per EPA 600/R-93/116. Additional charges will apply.

Comments:

Method of Delivery: Purolator

Relinquished By (Sign):	Received at Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Martin Mielke			
Date/Time: Jan-15-24 12:55 PM	Date/Time:	Date/Time: Jan 17/24 8:45	Date/Time: Jan 17/24 9-23

APPENDIX B
LEAD PAINT ANALYSIS RESULTS

EMSL Canada Inc.
2756 Slough Street, Mississauga, ON L4T 1G3
Phone/Fax: (289) 997-4602 / (289) 997-4607
http://www.EMSL.com torontolab@emsl.com

EMSL Canada Or	552600621
CustomerID:	55ADEC69
CustomerPO:	LON-26000265-A0
ProjectID:	

Attn: **Sarah Kruis**
EXP Services Inc.
15701 Robin's Hill Rd
London, ON N5V 0A5

Phone:	(519) 652-6105
Fax:	(519) 652-1709
Received:	1/14/2026 09:45 AM
Collected:	1/11/2026

Project: **LON-26000265-A0 KCI DSS**

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

Client SampleDescription	*Collected*	*Analyzed*	*Weight*	*RDL*	*Lead Concentration*
26000265-Pb-01	1/11/2026	1/15/2026	0.2000 g	0.0080 % wt	<0.0080 % wt
552600621-0001	Site: White paint on concrete block wall - Room 069E (Addition 1947)				
26000265-Pb-02	1/11/2026	1/15/2026	0.2588 g	0.0064 % wt	0.050 % wt
552600621-0002	Site: Beige paint on concrete block wall - Room 069B (Addition 1947)				
26000265-Pb-03	1/11/2026	1/15/2026	0.2551 g	0.0064 % wt	0.098 % wt
552600621-0003	Site: Beige paint on concrete block wall - Room 040 (Addition 1966)				
26000265-Pb-04	1/11/2026	1/15/2026	0.2583 g	0.032 % wt	0.65 % wt
552600621-0004	Site: Grey/red paint on concrete floor - Room 015 (Addition 1922)				
26000265-Pb-05	1/11/2026	1/15/2026	0.2539 g	0.0064 % wt	0.29 % wt
552600621-0005	Site: Beige paint on plaster wall - Room 402 (Addiiton 1922)				

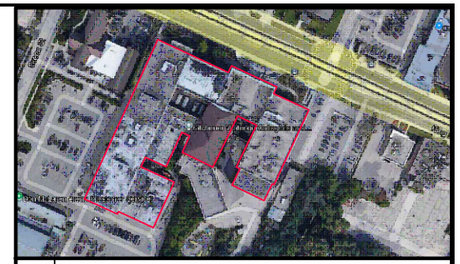
Rowena Fanto, Lead Supervisor
or other approved signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. * Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.0064% wt based on the minimum sample weight per our SOP. "<" (less than) result signifies the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. Definitions of modifications are available upon request.

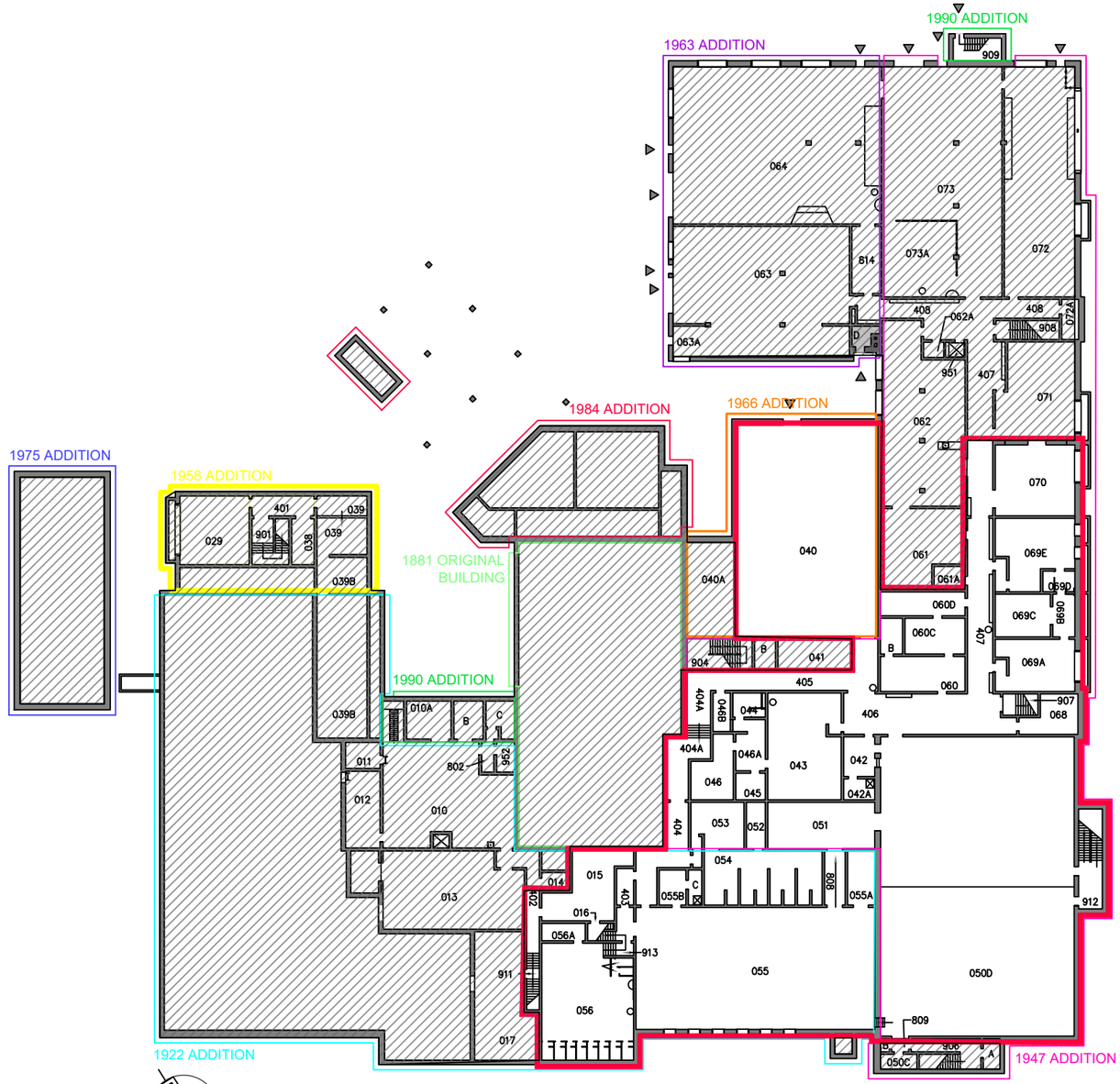
Samples analyzed by EMSL Canada Inc. Mississauga, ON AIHA LAP, LLC-ELLAP Accredited #196142

Initial report from 01/20/2026 08:48:34

APPENDIX C
DRAWINGS



KEY PLAN - PROJECT AREA



NORTH

KITCHENER-WATERLOO COLLEGIATE INSTITUTE - PROJECT AREA

SCALE - NTS

LEGEND

- PROJECT AREA
- NO ACCESS
- NOT IN PROJECT SCOPE

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WITHOUT THE WRITTEN CONSENT OF exp SERVICES INC.
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EXP Services Inc.
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Cambridge, Ontario N3E 1B6
Canada

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» BUILDINGS » ENERGY » EARTH & ENVIRONMENT
» INFRASTRUCTURE » SUSTAINABILITY »

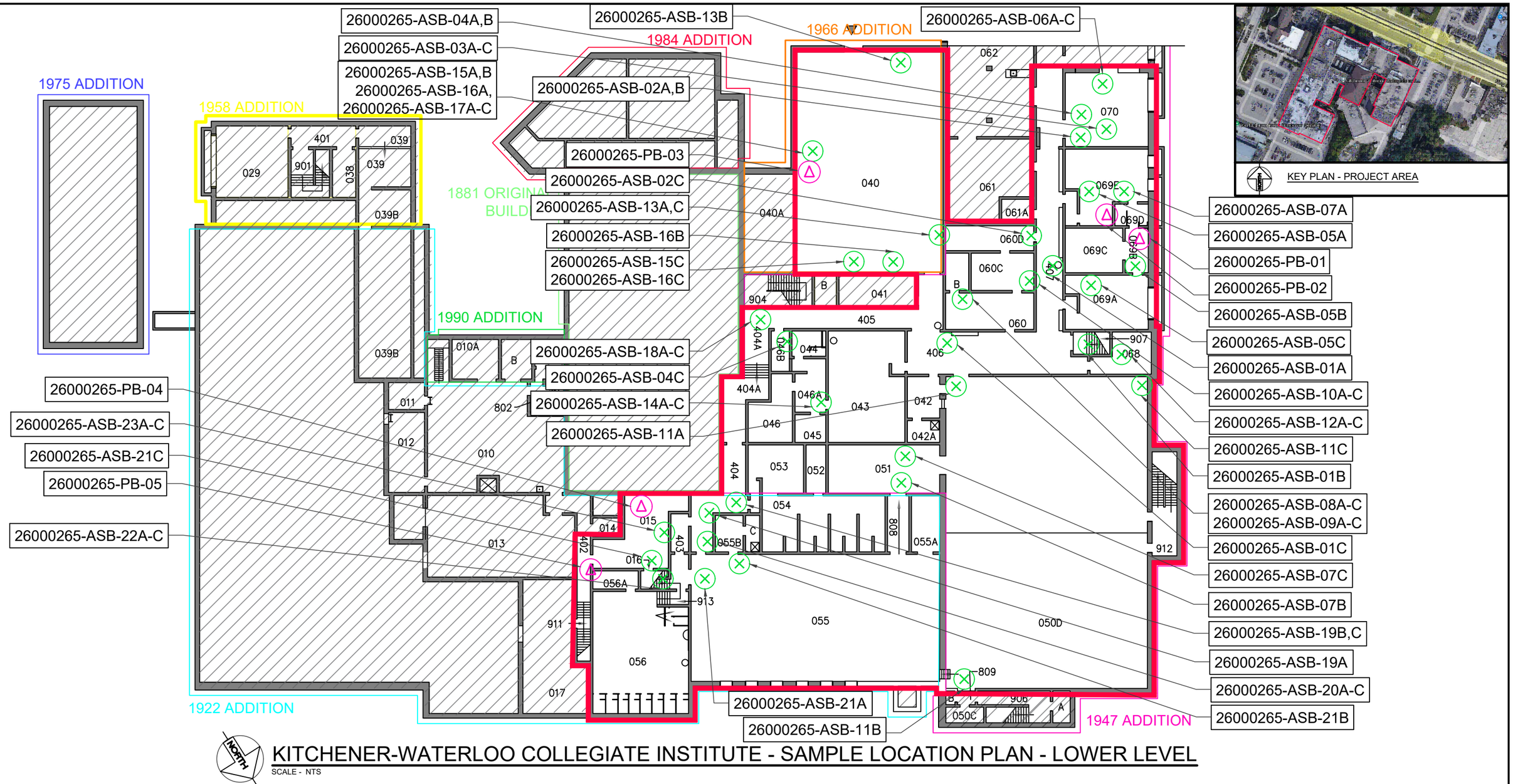
NOTE:
1. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING EXISTING ASSEMBLIES SITE CONDITIONS AND ALL DIMENSIONS.
2. DO NOT SCALE DRAWINGS.
3. ANY DEFICIENCY LOCATIONS SHOWN ON DRAWINGS ARE APPROXIMATE.

CLIENT
Waterloo Region District School Board
51 Ardelt Avenue, Kitchener, Ontario

PROJECT
Limited Designated Substances Survey
Kitchener-Waterloo Collegiate Institute
787 King Street West, Kitchener, ON Ontario

TITLE
Project Area

DESIGN	N/A	PROJECT NO.
DRAWN BY	K.C.	LON-26000265-A0
CHECKED	K.H.	DRAWING NO.
DATE	JAN 2026	1.0
SCALE	N/A	



KITCHENER-WATERLOO COLLEGIATE INSTITUTE - SAMPLE LOCATION PLAN - LOWER LEVEL

SCALE - NTS

LEGEND

- SAMPLE LOCATION (ASBESTOS)
- SAMPLE LOCATION (LEAD)
- NO ACCESS
- NOT IN PROJECT SCOPE

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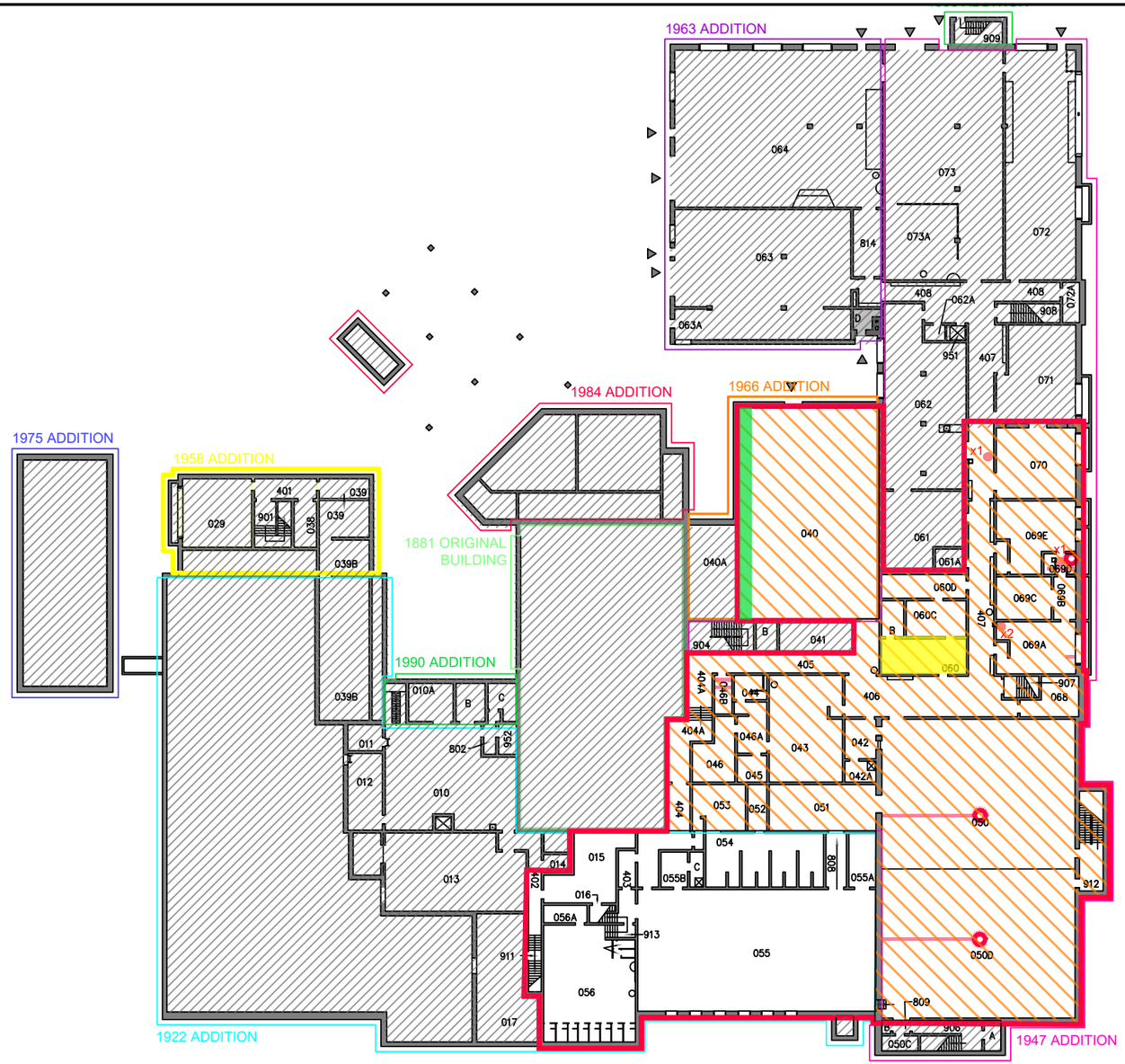
NOTE:
1. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING EXISTING ASSEMBLIES SITE CONDITIONS AND ALL DIMENSIONS.
2. DO NOT SCALE DRAWINGS.
3. ANY DEFICIENCY LOCATIONS SHOWN ON DRAWINGS ARE APPROXIMATE.

CLIENT
Waterloo Region District School Board
51 Ardelt Avenue, Kitchener, Ontario

PROJECT
Limited Designated Substances Survey
Kitchener-Waterloo Collegiate Institute
787 King Street West, Kitchener, ON Ontario

TITLE
Sample Location Plan
Lower Level

DESIGN	N/A	PROJECT NO.
DRAWN BY	K.C.	LON-26000265-A0
CHECKED	K.H.	DRAWING NO.
DATE	JAN 2026	2.0
SCALE	N/A	



KEY PLAN - PROJECT AREA

NORTH

KITCHENER-WATERLOO COLLEGIATE INSTITUTE - DISTRIBUTION PLAN - LOWER LEVEL

SCALE - NTS

LEGEND

- ASBESTOS-CONTAINING CONCRETE BLOCK FILLER COMPOUND ON CONCRETE BLOCK, GLAZED BLOCK AND PLASTER WALL
- ASBESTOS-CONTAINING WHITE CAULKING ON VERTICAL BEAMS
- x2 ASBESTOS-CONTAINING PARGING CEMENT PIPE INSULATIONS WITH QUANTITY
- ASBESTOS- CONTAINING PIPE INSULATION STRAIGHT RUNS (HORIZONTAL AND VERTICAL)
- ASBESTOS- CONTAINING VINYL FLOOR TILE

NOTE

FRIABLE AND NON-FRIABLE ASBESTOS - CONTAINING MATERIALS ARE PRESUMED TO BE PRESENT IN CONCEALED LOCATIONS.

NOT IN PROJECT SCOPE

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NOTE:
1. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING EXISTING ASSEMBLIES SITE CONDITIONS AND ALL DIMENSIONS.
2. DO NOT SCALE DRAWINGS.
3. ANY DEFICIENCY LOCATIONS SHOWN ON DRAWINGS ARE APPROXIMATE.

CLIENT
Waterloo Region District School Board
51 Ardelt Avenue, Kitchener, Ontario

PROJECT
Limited Designated Substances Survey
Kitchener-Waterloo Collegiate Institute
787 King Street West, Kitchener, ON Ontario

TITLE
Distribution Plan
Lower Level

DESIGN	N/A	PROJECT NO.
DRAWN BY	K.C.	LON-26000265-A0
CHECKED	K.H.	DRAWING NO.
DATE	JAN 2026	3.0
SCALE	N/A	

Appendix 01 35 34B– Lead Report – Not Applicable

01 42 00 – References

1.0 GENERAL

1.1. SECTION INCLUDES

.1 References and standards.

.2 Standards producing industry organizations and their addresses.

1.2. RELATED SECTIONS

.1 Section 01 61 00 – Product Requirements.

.2 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3. REFERENCES

.1 For Products or quality specified by association, trade, or other references or consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

.2 Conform to reference standard by Ontario Building Code except where a specific date is established or required by code.

.3 Obtain copies of standards where required by product specification sections.

.4 Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Consultant shall be altered from the Contract Documents by mention or inference otherwise, in any reference document.

1.4. STANDARDS

.1 The following associations and organizations are cited in specification sections. Acronym, name, address, and Internet URL addresses are as follows:

.2 Canadian Organizations:

.1 Street, Suite 616, Ottawa, ON K1P 5G4; URL: http://www.acec.ca.

.2 **AWMAC** - Architectural Woodwork Manufacturers Association of Canada, 516-4 Street West, High River, AB T1V 1B6; URL: http://www.awmac.com.

.3 **Canada Green Building Council**, 330 - 55 rue Murray Street, Ottawa, ON. K1N5M3; Tel: 613-241-1184, Fax: 613-241-5750; URL: http://www.cagbc.org.

.4 **CCA** - Canadian Construction Association, 75 Albert St., Suite 400, Ottawa, ON K1P 5E7; URL: http://www.cca-acc.com.

.5 **CCDC** – Canadian Construction Documents Committee, Refer to ACEC, CCA, CSC or RAIC; URL: http://www.CCDC.org.

.6 **CGA** - Canadian Gas Association, 20 Eglinton Avenue West, Suite 1305, Toronto, ON M4R 1K8; URL: http://www.cga.ca..

.7 **CGSB** - Canadian General Standards Board, Place du Portage, Phase III, 6B1, 11 Laurier Street, Hull, QC K1A 0S5; URL: http://w3.pwgsc.gc.ca/cgsb.

.8 **CISC** - Canadian Institute of Steel Construction, 201 Consumers Road, Suite 300, Willowdale, ON M2J 4G8; URL: http://www.cisc-icca.ca.

.9 **CLA** - Canadian Lumbermen's Association, 27 Goulburn Avenue, Ottawa, ON K1N 8C7; URL: http://www.cla-ca.ca.

.10 **CNLA** - Canadian Nursery Landscape Association, RR #4, Stn. Main,7856 Fifth Street, Milton, ON L9T 2X8; URL: http://www.canadanursery.com.

.11 **CRCA** - Canadian Roofing Contractors Association, 155 Queen Street,Suite 1300, Ottawa, ON K1P 6L1; URL: http://www.roofingcanada.com.

.12 **CSA** - Canadian Standards Association International, 178 Rexdale Blvd., Toronto, ON M9W 1R3; URL: http://www.csa-international.org.

.13 **CSC** - Construction Specifications Canada, 120 Carlton Street, Suite 312, Toronto, ON M5A 4K2; URL: http://www.csc-dcc.ca.

.14 **CSDMA** - Canadian Steel Door Manufacturers Association, One Yonge Street, Suite 1801, Toronto, ON M5E 1W7; URL: http://www.csdma.org.

.15 **CSPI** - Corrugated Steel Pipe Institute, 652 Bishop Street N, Unit 2A, Cambridge, ON N3H 4V6; URL: http://www.cspi.ca.

.16 **CSSBI** - Canadian Sheet Steel Building Institute, 652 Bishop St. N., Unit 2A, Cambridge, ON N3H 4V6; URL: http://www.cssbi.ca.

.17 **CUFCA** - Canadian Urethane Foam Contractor's Association, Box 3214, Winnipeg, MB R3C 4E7; URL: http://www.cufca.ca.

.18 **CWC** - Canadian Wood Council, 1400 Blair Place, Suite 210, Ottawa, ON. K1J 9B8; URL: http://www.cwc.ca.

.19 **EC** - Environment Canada, Conservation and Protection, Inquiry Centre, 351 St. Joseph Blvd, Hull, QC KIA 0H3; URL: http://www.ec.gc.ca.

.20 **EFC** - Electro Federation of Canada, 5800 Explorer Drive, Suite 200, Mississauga, ON L4W 5K9; URL: http://www.electrofed.com.

.21 **MPI** - The Master Painters Institute, 4090 Graveley Street, Burnaby, BC V5C 3T6; URL: http://www.paintinfo.com.

.22 **NABA** - National Air Barrier Association, PO Box 2747, Winnipeg, MB R3C 4E7; URL: http://www.naba.ca.

.23 **NLGA** - National Lumber Grades Authority, 406-First Capital Place, 960 Quayside Drive, New Westminster, BC V3M 6G2; URL: http://www.nlga.org.

.24 **NRC** - National Research Council, Building M-58, 1200 Montreal Road, Ottawa, ON K1A 0R6; URL: http://www.nrc.gc.ca.

.25 **QPL** - Qualification Program List, c/o Canadian General Standards Board, Place du Portage, Phase III, 6B1, 11 Laurier Street, Hull, QC K1A 1G6; URL: http://www.pwgsc.gc.ca/cgsb.

.26 **RAIC** - Royal Architectural Institute of Canada, 55 Murray Street, Suite 330, Ottawa, ON K1N 5M3; URL: http://www.raic.org.

.27 **SCC** - Standards Council of Canada, 270 Albert Street, Suite 2000, Ottawa, ON K1P 6N7; URL: http://www.scc.ca.

.28 **TTMAC** - Terrazzo, Tile and Marble Association of Canada, 30 Capston Gate, Unit 5 Concord, ON L4K 3E8; URL: http://www.ttmac.com.

.29 **ULC** - Underwriters' Laboratories of Canada, 7 Crouse Road, Toronto, ON M1R 3A9; URL: http://www.ulc.ca.

.3 USA Organizations:

.1 **AA** - Aluminum Association, 900 19th Street N.W., Washington, DC 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, DC 20001; URL: http://www.aashto.org.

.3 **AHA** - American Hardboard Association, 1210W Northwest Hwy, Palatine, IL 60067; URL: http://www.hardboard.org.

.4 **AITC** - American Institute of Timber Construction, 7012 S. Revere Parkway, Suite 140, Englewood, CO 80112; URL: http://www.aitc-glulam.org.

.5 **AMCA** - Air Movement and Control Association Inc., 30 West University Drive, Arlington Heights, IL 60004-1893; URL: http://www.amca.org.

.6 **ANSI** - American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036; URL: http://www.ansi.org.

.7 **APA** - The Engineered Wood Association, P.O. Box 11700, Tacoma, WA 98411-0700; URL: http://www.apawood.org.

.8 **API** - American Petroleum Institute, 1220 L St. Northwest, Washington, DC 20005-4070; URL: http://www.api.org.

.9 **ARI** - Air Conditioning and Refrigeration Institute, 4100 N Fairfax Drive, Suite 200, Arlington, VA 22203; URL: http://www.ari.org.

.10 **ASHRAE** - American Society of Heating, Refrigeration and Air-Conditioning Engineers, 1791 Tullie Circle NE, Atlanta, GA 30329; URL: http://www.ashrae.org.

.11 **ASME** - American Society of Mechanical Engineers, ASME Headquarters, 3 Park Avenue, New York, NY 10016-5990; URL: http://www.asme.org.

.12 **ASTM International**, 100 Barr Harbor Drive West, Conshohocken, PA 19428-2959; URL: http://www.astm.org.

.13 **AWCI** - Association of the Wall and Ceiling Industries International, 803 West Broad Street, Suite 600 , Falls Church, UA 22046; URL: http://www.awci.org.

.14 **AWPA** - American Wire Producer's Association, 801 N Fairfax Street, Suite 211, Alexandria, VA 22314-1757; URL: http://www.awpa.org.

.15 **AWPA** - American Wood Preservers' Association, P.O. Box 5690, Granbury TX 76049-0690; URL: http://www.awpa.com

.16 **AWS** - American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126; URL: http://www.amweld.org.

.17 **AWWA** - American Water Works Association, 6666 W. Quincy Avenue, Denver, CO 80235; URL: http://www.awwa.org.

.18 **EIMA** - EIFS Industry Manufacturer's Association, 3000 Corporate Center Drive, Suite 270, Morrow, GA 30260; URL: http://www.eima.com.

.19 **ISAP** - International Society for Asphalt Paving, 400 Selby Avenuse, Suite 1, St. Paul, MN 55102; URL: http://www.asphalt.org.

.20 **IEEE** - Institute of Electrical and Electronics Engineers, IEE Corporate Office, 3 Park Avenue, 17th Floor, New York, NY 10016-5997;URL: http://www.ieee.org

.21 **MSS** - Manufacturers Standardization Society of the Valve and Fittings Industry, 127 Park Street, N.E., Vienna, VA 22180-4602; URL: http://www.mss-hq.com.

.22 **NAAMM** - National Association of Architectural Metal Manufacturers, 8 South Michigan Avenue, Suite 1000, Chicago, IL 60603;URL: http://www.naamm.org.

.23 **NEMA** - National Electrical Manufacturers Association, 1300 N 17th Street, Suite 1847, Rosslyn, VA 22209; URL: http://www.nema.org.

.24 **NFPA** - National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101Quincy, MA 02269-9101; URL: http://www.nfpa.org.

.25 **NFSA** - National Fire Sprinkler Association, P.O. Box 1000, Patterson, NY 12563; URL: http://www.nfsa.org.

.26 **NHLA** - National Hardwood Lumber Association, 6830 Raleigh-La Grange Road, Memphis, TN 38184-0518; URL: http://www.natlhardwood.org.

.27 **NSPE** - National Society of Professional Engineers, 1420 King Street, Alexandria, VA 22314-2794; URL: http://www.nspe.org.

.28 **PCI** - Prestressed Concrete Institute, 209 W. Jackson Blvd., Suite 500, Chicago, IL 60606-6938; URL: http://www.pci.org.

.29 **PEI** - Porcelain Enamel Institute, PO Box 920220, Norcross, GA 30010; URL: http://www.porecelainenamel.com.

.30 **SSPC** - The Society for Protective Coatings, 40 24th Street, 6th Floor, Pittsburgh, PA 15222-4656;URL: http://www.sspc.org.

.31 **TPI** - Truss Plate Institute, 583 D'Onofrio Drive, Suite 200, Madison, WI 53719; URL: http://www.tpinst.org.

.32 **UL** - Underwriters' Laboratories, 333 Pfingsten Road, Northbrook, IL60062-2096; URL: http://www.ul.com.

END OF SECTION

01 45 00 – Quality Control

1.0 GENERAL

1.1. RELATED SECTIONS

.1 Section 01 21 00 - Allowances.

.2 Section 01 78 10 – Closeout Submittals and Requirements

.3 Section 01 79 00 – Demonstration and Training

.4 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. REFERENCES

.1 **ISO/IEC** 17025-2005 - General Requirements for the Competence of Testing and Calibration Laboratories.

.2 **SCC** (Standards Council of Canada).

1.3. INSPECTION BY AUTHORITY

.1 Allow Authorities Having Jurisdiction access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection whenever portions of the Work are designated for special tests, inspections or approvals, either when described in the Contract Documents or when required by law in the Place of the Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

1.4. REVIEW BY CONSULTANT

.1 Consultant may order any part of the Work to be reviewed or inspected if Work is suspected to be not in accordance with Contract Documents.

.2 If, upon review such work is found not in accordance with Contract Documents, correct such Work and pay the cost of additional review and correction.

.3 If such Work is found in accordance with Contract Documents, The owner will pay the cost of review and replacement.

1.5. INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection and Testing Agencies will be engaged by Contractor for the purpose of inspecting and testing portions of Work.

.2 The Board may, at their discretion, request that the Consultant direct the Contractor to engage independent inspecting and or testing agencies to review or test the Work.

.3 Allocate Costs for inspections and testing to Section 01 21 00.

.4 Provide equipment required for executing inspection and testing by appointed agencies.

.5 Employment of inspection and testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.6 If defects are revealed during inspection and/or testing, the appointed agency will request additional inspection and testing to ascertain the full degree of defect. Correct defects and irregularities as advised by the Consultant at no cost to the Owner. Contractor shall pay costs directly to the inspection agency for retesting and re-inspection.

1.6. ACCESS TO WORK

.1 Allow inspection and testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Cooperate to provide reasonable access and facilities for such access.

1.7. CONTRACTOR RESPONSIBILITIES

.1 Notify appropriate agency minimum 48 hours in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.8. DUTIES & AUTHORITY OF TESTING AGENCY

.1 Testing agency is expected to do the following:

.1 Act in a professional and unprejudiced basis and carry out inspection and testing functions to establish compliance with requirements of Contract Documents.

.2 Check work as it progresses and prepare reports stating results of tests and conditions of work and state in each report whether specimens tested conform to requirements of Contract Documents, specifically noting deviations.

.3 Distribute reports as follows

.1 Consultant

.2 Owner

.3 Contractor

.2 Testing agency is not authorized to amend or release any requirements of Contract Documents, nor to approve or accept any portion of work.

1.9. REJECTED WORK

.1 The Contractor shall remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by the Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If, it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the Owner may choose to accept the condition. The difference in value between Work performed and that called for by Contract Documents shall be deducted from the Contract value via Change Order. The amount of this change shall be determined by the Consultant. The Contractor shall warrant the work performed for the time period specified as if it were performed in accordance with the Contract Documents.

1.10. TESTING OF EXCAVATION & BACKFILL

.1 The Consultant must approve all Sample and fill tests prior to purchase.

.2 In coordination with the Consultant and Contractor, inspect and test backfill and fill to ensure the degree of compaction specified has been obtained.

.3 Inspect excavation at required levels in regard to bearing values for footings, foundations and floor slabs.

.4 Authorization and calculation of extra excavation work, if required, due to unsatisfactory bearing shall be adjusted by Unit Price.

1.11. CONCRETE STRENGTH TESTS

.1 Review the proposed concrete mix design and check test if considered necessary.

.2 Obtain representative samples of fresh concrete for each mix design of concrete placed in any one day as directed by the Consultant.

.3 Make standard slump tests.

.4 Mould three (3) standard 150mm diameter cylindrical test specimens from each sampling of fresh concrete. Store specimens as per best practice while they are on the site. Cure all cylinders in the laboratory under standard moisture and temperature conditions. Compression test one of the cylinders at 7 days and the remaining two at 28 days after sampling. Each concrete cylinder test report shall contain the specific location of concrete represented by sample, design strength, aggregate size, admixtures used, date, hour and temperature at time of sampling, percentage air content, unit weight and test strength of cylinder.

.5 When concrete is placed under the conditions of "Cold Weather Requirements" make one additional cylinder; store it in a heated enclosure for 24 hours and then store it on the job site in a place protected from disturbance and off the ground. Compressive test this cylinder 7 days after sampling.

.6 Determine the air content of air entrained standard weight concrete.

.7 Determine the air content and unit weight of light weight concrete by the volumetric method.

.8 Additional testing required because of changes in materials or proportions of the mix requested by the Contractor as well as any extra testing of concrete or materials occasioned by their failure to meet specification requirements or testing of the structure or performance of the structure, including load testing, shall be carried out at the Contractor's expense.

1.12. INSPECTION OF STRUCTURAL STEEL

.1 Ensure all steel has mill test reports that comply with the Specification prior to purchase.

.2 Inspect fabrication of steel in the plant.

.3 Inspect erection work at site including fit-up, placing, plumbing, levelling, temporary bracing, field cutting and alterations.

.4 Shop and field inspect welded and bolted connections and painting.

.5 High strength bolts - the installation and testing of bolts shall conform to the requirements of CSA S16-1969. Check one representative connection in ten by torque testing every bolt, and check each bolt in every connection with a tap of hammer for soundness. Enforce requirements of connection type.

.6 Examine visually all welded joints for inclusions, porosity, lack of fusion penetration or even contour, undercuts and cracks. Root passes shall be checked for penetration

and cracks from the back of the joint. Any suspect welds shall be checked ultrasonically.

1.13. INSPECTION OF METAL DECK

.1 Check deck for gauge, type and protective coating thickness to ensure compliance with Specification.

.2 Inspect erection work at the site including anchorage.

1.14. INSPECTION AND TESTING OF PAVING

.1 Testing shall be carried out in three stages as described below by means of sufficient site visits to ensure satisfactory results but in no case less than three site visits.

.2 Test within 16 hours from time called to do so by the Contractor, since paving is a critical item at the end of the project.

.3 Stage One:

.1 Visual inspection and compaction tests of subsoil.

.4 Stage Two:

.1 Inspection of granular sub-base (after each layer is placed or after the last layer is placed and compacted).

.2 On site density tests.

.3 Verify thickness of various levels. (Minimum of 4 checks shall be done on thickness in a paved area of 250m2 or less, and 1 additional check for each additional 250m2 or part thereof).

.4 Laboratory tests: moisture content and grading of materials.

.5 Stage Three:

.1 Inspection of asphalt installation.

.2 Checking of thickness and density of material and checking suitability of equipment used.

.6 Standard Proctor Test shall be carried out for all projects.

.7 Further, grain size analysis and Marshall test shall be carried out if visual inspection is not satisfactory or, if there is reason to suspect materials supplied are not acceptable.

.8 All laboratory tests shall be performed according to A.S.T.M. methods, latest revisions

.9 Paving Contractor shall obtain from their supplier grading tables of materials used and submit them to the testing laboratory for approval. The paving contractor shall ensure material delivered complies with grading tables.

.10 Be responsible for all approvals given to the Paving Contractor. At completion of the paving project, inform the Consultant all tests were performed according to the Specifications and the Contractor's performance has been approved.

.11 The Consultant will not entertain any credits for work either not performed or incorrectly performed by the contractor. If thicknesses or consistencies of sub-base are not as specified, or if asphaltic material is not as specified, then the Contractor shall remove the same at their expense and provide proper specified materials.

1.15. BUILDING THERMOGRAPHIC SCAN

.1 Upon completion of the Work, the Consultant and/or Owner may arrange for an independent agency to carry out a thermographic scan of the building to determine acceptability of thermal performance of the building envelope.

.2 Consultant, prior to start of construction work, will designate a sample area of the building to include a portion of exterior wall and roof.

.3 Consultant will implement a special inspection program for this sample area to be carried out as construction progresses. Contractor shall not cover any completed work until notifying the Consultant and receiving acceptance of completed work. Contractor shall remove and replace any work which is installed in contravention of this requirement.

.4 Results of a thermographic scan of the entire building will be evaluated and compared to those of the sample area to determine acceptance or rejection of any part of the building envelope.

.5 Contractor shall carry out remedial work as required to bring the quality of any rejected portion of the building envelope to that of the sample area. Contractor shall pay for costs of any follow-up thermographic scans required to determine acceptability of remedial work. This procedure shall be repeated until all parts of the building envelope have been accepted.

1.16. TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as may be requested.

.2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work shall be appraised by Consultant and may be authorized as recoverable.

1.17. MOCK-UP

.1 Prepare mock-up for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.

.2 Prepare mock-ups for Consultants review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.

.3 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.4 If requested, Consultant will assist in preparing a schedule fixing dates for preparation.

.5 Remove mock-up at conclusion of Work or when acceptable to the Consultant. Repair any damage and clean-up at place of mock-up.

.6 Approved mock-up may remain as part of Work.

1.18. EQUIPMENT AND SYSTEMS

.1 Submit adjustment and balancing reports for mechanical and electrical systems to the consultant.

.2 Refer to Sections 01.78.10 and 01.79.00 for definitive requirements.

END OF SECTION

01 51 00 – Temporary Utilities

1.0 GENERAL

1.1. RELATED SECTIONS

.1 Section 01 52 00 - Construction Facilities.

.2 Section 01 53 00 - Temporary Construction.

.3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. INSTALLATION AND REMOVAL

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Location of temporary facilities shall be subject to the Consultant's approval.

.3 Salvage and assist in recycling products for potential reuse wherever possible.

.4 Remove temporary facilities from the site when directed by the Consultant.

1.3. DEWATERING

.1 Provide temporary drainage and pumping facilities to keep excavations and the site free from standing water. Provide necessary pumps (including spare pumps) and temporary drainage for keeping the Work free of water throughout the construction period. Locate sumps away from foundation elements. Control grading around excavation to prevent surface water from draining into excavation and from damaging adjoining property.

1.4. WATER SUPPLY

.1 Provide continuous supply of potable water for construction use until such time as permanent municipal water supply is available.

.2 Hose extensions to be provided by subcontractors requiring them.

.3 For New Builds, arrange for connection with the appropriate utility company and pay all costs for installation, maintenance, removal, and usage costs until occupancy has been achieved.

.4 For Additions and renovations the contractor can use existing Board service unless noted otherwise.

1.5. TEMPORARY HEATING AND VENTILATION

.1 Provide temporary heating required during construction period, including unit rental costs, maintenance.

.2 Provide temporary heating fuel, if not already available on site, until such time as a permanent natural gas line is installed, and thereafter fuel costs shall be borne by the Board. The Contractor shall provide all connections and piping between the permanent fuel source and the heating appliance(s).

.3 Provide temporary heat and ventilation in enclosed areas as required to:

.1 Facilitate progress of Work.

.2 Protect Work and products against dampness and cold.

.3 Prevent moisture condensation on surfaces.

.4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.

.5 Provide adequate ventilation to meet health regulations for a safe working environment.

.4 Maintain temperatures of minimum:

.1 10 degrees C in areas where construction is in progress, until takeover by the Board. Contractor to ensure temporary enclosures remain sealed and penetrations are repaired or closed in a timely fashion.

.2 16 degrees C in areas where finishes are in progress.

.3 16 degrees C in building once it is enclosed.

.4 Refer to other Sections for intermittent heating requirements up to 21 degrees C. Provide insulated tarp enclosures for openings as required to enclose the building after completion of main building shell components and roof.

.5 If the Contractor fails to ensure the temporary enclosures remained sealed (including temp doors when not in use) the Consultant and or the Board shall require the contractor to pay 40% of that months usage charge

.5 Use forced hot air heaters. Open-flame type heaters or salamanders are not permitted. Ventilate direct fired heating units to the outside.

.6 Uniformly distribute heat to avoid hot and cold areas and to prevent excessive drying.

.7 Early heating of the building shell will be required to expedite interior finishing to meet the project schedule.

.8 Ventilating:

.1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.

.2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into the atmosphere of occupied areas.

.3 Dispose of exhaust materials in a manner that will not result in harmful exposure to persons.

.4 Ventilate storage spaces containing hazardous or volatile materials.

.5 Ventilate temporary sanitary facilities.

.6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.7 Provide minimum 1 air change per hour for enclosed areas receiving architectural finishes.

.8 Do not allow excessive build-up of moisture inside the building.

.9 The permanent mechanical systems for the new building, when installed in safe operating conditions, may be used for temporary heating or cooling if approved in writing by the Consultant, without penalty to the warranty.

.10 Follow the requirements of "Temporary Use of New Permanent Services and Equipment" if the permanent heating system installed under the contract is intended to be used for temporary heating during the construction.

.11 Provide competent persons to operate and maintain permanent systems for the duration of temporary use period.

.12 Perform required repairs and maintenance immediately after each inspection. Pay for operating costs. Upon termination of temporary use period, services and equipment shall be inspected, tested, adjusted, fitters replaced, balanced, cleaned and lubricated.

.13 Permanent services and equipment shall be turned over to the Owner in new and perfect operating condition.

.14 Use of permanent systems and equipment as temporary facilities shall not affect the guarantee conditions and guarantee period for such systems and equipment. Make due allowance to ensure Owner will receive full benefits of the equipment manufacturer's warranty from the date of Substantial Performance.

.15 Ensure date of Substantial Performance of the Work and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Consultant.

.16 Maintain strict supervision of operation of temporary heating and ventilating equipment to:

.1 Conform with applicable codes and standards.

.2 Enforce safe practices.

.3 Prevent abuse of services.

.4 Prevent damage to finishes.

.5 Vent direct-fired combustion units to outside.

.17 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.6. TEMPORARY POWER AND LIGHT

.1 Provide temporary electrical service and system including lighting and power system for use by all Sections.

.2 Contractor will provide a source for, and pay the costs of temporary power during construction for temporary lighting and operating of power tools until such time as a permanent source is available.

.3 Contractor to ensure that the use of power from a source provided by the Board shall not exceed the capacity of the current use required for the operation of any existing facility.

.4 Install and maintain temporary electrical service and systems in accordance with Construction Safety Association's "Temporary Wiring Standards on Construction Sites", the Ontario Electrical Code and other authorities having jurisdiction.

.5 Provide at least one temporary panel on each floor with service capacity suitable for construction requirements and to authorities and utilities approval.

.6 Provide temporary wiring with lighting to all areas of each floor to provide adequate lighting.

- .1 Lighting levels must be maintained at a minimum of 10 foot candles, or to suit the particular location or operation, whichever is greater.
- .2 Do not use materials of the temporary service in permanent installation.
- .3 Increase lighting levels equivalent to the final requirements when finishing operations are underway.

.7 Extension cords, lights, etc., required by various subcontractors and run from above outlet positions will be supplied and maintained by the party or parties requiring the same.

.8 Follow requirements of "Temporary Use of New Permanent Services and Equipment" if electrical power and lighting systems installed under the contract are intended to be used for temporary electricity and lighting during the construction.

.9 Electrical power and lighting systems installed under this contract can be used for construction provided damages are made good and all lamps that have been used for more than two months are replaced with new lamps.

.10 For New Builds, arrange for connection with the appropriate utility company and pay all costs for installation, maintenance, removal and usage costs until occupancy has been achieved.

.11 For Additions and renovations the contractor can use existing Board service unless noted otherwise.

.12 Provide and pay for temporary power for electric cranes and other equipment requiring temporary power in excess of above noted requirements.

1.7. TEMPORARY COMMUNICATION FACILITIES

.1 Contractor to provide and pay for temporary Phone, e-mail and printer hook up, for the duration of contract until completion for use by the contractor.

.2 The site superintendent is to have email access and a printer on site.

END OF SECTION

01 53 00 – Temporary Construction Facilities

1.0 GENERAL

1.1. RELATED SECTIONS

.1 Section 01 51 00 - Temporary Utilities.

.2 Section 01 35 23 – Health and Safety

.3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. INSTALLATION AND REMOVAL

.1 Provide temporary construction facilities in order to execute work expeditiously.

.2 Remove temporary facilities from the site when directed by the Consultant.

1.3. PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.4. PROTECTION OF SURROUNDING WORK

.1 Provide protection for finished and partially finished Work from damage.

.2 Provide necessary cover and protection.

.3 Be responsible for damage incurred due to lack of or improper or inappropriate protection.

1.5. ROOF AND STRUCTURE PROTECTION

.1 Ensure no part of Work or existing structures are subjected to a load, which will endanger its safety or will cause permanent deformation.

.2 The Contractor when indicated by the Board Contact or Consultant shall provide roof protection. Ensure all precautions are taken to avoid liability for roof damage.

.3 Typical roof protection shall consist of a layer of 1 inch rigid foam insulation set directly on the roof surface and a layer of 19 mm (3/4 inch) plywood in all places under scaffold legs, ladder legs and in areas of foot traffic or falling debris.

1.6. WORK SITE ENCLOSURE & SAFETY BARRIERS

.1 Erect and maintain for the duration of the work:

.1 a minimum 1800 mm high chain link fence or self-supporting, heavy duty, interconnected fence panels (commonly referred to as Insta-fence)for a temporary site enclosure (hoarding) completely around perimeter of work site,
.2 any temporary posts shall be completely removed by the contractor prior to occupancy,
.3 under no circumstance shall t-bar posts be used on board property
.4 any additional safety devices including full hoarding as required and noted on the drawings, to protect the students, staff, public and private property from injury and damage,
.5 any additional requirements as regulated by authorities having jurisdiction, local by-laws and zoning.

.2 The Contractor is to assume full responsibility for any injury or damage caused due to failure to comply with Paragraph 1 above.
.3 Any hazardous conditions identified outside of the main fenced area will be barricaded with a fence complying to the above.
.4 Provide lockable truck entrance gate/gates and at least one (1) pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys with restricted availability, in the project office.
.5 Erect and maintain pedestrian walkways including roof and side covers, complete with signs and electrical lighting as required by law.
.6 Provide barriers around trees and plants designated to remain.
.7 Protect from damage by equipment and construction procedures.

1.7. TREE PROTECTION

.1 Protect all existing trees to remain from damage during construction period. Make good, at Contractor's expense, trees damaged during construction.
.2 Confine movement of heavy equipment, storage of same, and storage of materials to a predetermined area. Do not store materials or place equipment over root systems of any existing trees to remain.
.3 Install fencing or approved equal at limits of drip line of existing trees to remain unless directed otherwise. Where this case is not practical, and only if approved by the Consultant, the trunks shall be protected with an approved tree guard.
.4 No rigging cables shall be wrapped around or installed in trees. Do not flush concrete trucks or cement mixing machines over root systems or near trees. Flush concrete trucks or cement mixing machines in areas approved by the Consultant.
.5 Areas where root systems of trees are exposed directly adjacent to a structure will be backfilled with good loam only.

.6 Whenever excavating is required within branch spread of trees that are to remain, the contractor shall contact the consultant for direction prior to the start of work.

.7 If any existing tree to remain is injured and does not survive the following year, it will, as determined by the Board, be removed in its entirety and be replaced with a tree of similar size and value, as directed by the Consultant.

.8 Should the destroyed tree be of such a size or shape that it cannot be feasibly replaced, the Contractor shall compensate the Owner for the minimum sum of five thousand dollars ($5,000.00) per destroyed tree.

1.8. GUARD RAILS AND BARRIERS

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stairwells, open edges of floors and roofs.

.2 Erect and maintain for the duration of the Work, safety devices and barricades including hoarding, as required, to protect the staff, students, public and private property, from injury and damage.

.3 The Contractor is to ensure that all requirements from authorities having jurisdiction and all requirements from the Owner are met.

.4 The Contractor is to assume full responsibility for any damage caused due to his failure to comply with paragraph 2 above.

.5 Hazardous conditions on the exterior shall be fenced.

1.9. WEATHER ENCLOSURES

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

.2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.

.3 Design enclosures to withstand wind pressure.

1.10. DUST TIGHT BARRIERS

.1 Provide dust tight barriers and screens or partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.

.2 Maintain and relocate protection until such work is complete.

.3 Where required, adjust air handling units to eliminate migration of dust.

1.11. SCAFFOLDING

.1 Erect scaffolding independent of walls and use in such a manner limiting interference with other work. When not in use, move scaffolding as necessary to permit installation of other work. Construct and maintain scaffolding in a rigid, secure and safe manner. Remove it promptly when no longer required. Protect the surface on which scaffolding is bearing.

1.12. SHORING, BRACING, PILING

.1 Provide shoring, bracing, piling, sheeting and sheet piling and underpinning required to support soil banks, existing work and property in accordance with Construction Safety Act and other applicable regulations. Maintain shoring until the building is strong enough and sufficiently braced to withstand pressure of backfilling. Make construction aids free of permanent work so they may be removed entirely when no longer required, without damaging the Work. Locate construction aids so adequate room is left for damp-proofing foundation walls, laying substructure drainage and other work.

.2 Shoring and false work over one tier in height shall be designed and shall bear the stamp of a registered professional engineer, having experience in this field.

1.13. HOISTING

.1 Provide, operate and maintain services required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.

.2 Machinery shall be operated by qualified operator.

1.14. OVERHEAD LIFTING

.1 Any condition requiring the use of a crane or lifting device over a Board structure must follow the requirements of Health and Safety Section 01 35 23, Paragraph 1.15 Overhead Lifting.

1.15. ELEVATORS/LIFTS

.1 When elevators/lifts are to be used by construction personnel, provide protective coverings for finish surfaces of elevator cabs and entrances.

.2 Co-ordinate use of elevator cabs with Consultant and the Board.

1.16. USE OF THE WORK

.1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with Products.

.2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.17. CONSTRUCTION PARKING

.1 Construction personnel vehicle parking, to be confined to the work site enclosure, or.

.2 Parking will be permitted on site only where and if it does not disrupt the employees of the place of work as directed by the Board

.3 Permission to park vehicles on site does not imply any liability or responsibility for safe keeping of vehicles and contents thereof by the School Board.

1.18. ACCESS TO SITE

.1 Provide and maintain adequate access to the project site.

.2 Build and maintain temporary roads where necessary and provide snow removal within the area of work, and access to the work, during the period of Work. The area shall be restored to the satisfaction of the Board at the completion of the project.

.3 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.

.4 Clean roadways and taxi areas where used by Contractor's equipment.

1.19. SECURITY

.1 The Contractor shall ensure the security of the work site, contents, and built structures for the duration of the project.

.2 The Contractor shall be responsible to provide and pay for security personnel to guard the site and contents of the site after working hours and during holidays as required.

.3 Notify the Board of the use of security guards or systems.

.4 The Board shall not be responsible for the loss, theft, or vandalism.

1.20. OFFICES

.1 Provide and maintain, until completion of Contract, for Contractor's use, a temporary office, large enough to accommodate site administrative activities and site meetings, complete with light, heat, air conditioning, ventilation, table and chairs. Do not store materials in the office area; keep clean and tidy.

.2 Provide a clearly marked and fully stocked first-aid case in a readily available location.

.3 Subcontractors may provide their own offices as necessary. Direct location of these offices.

1.21. EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds and platforms for storage of tools, equipment and materials.

.2 Review storage areas on site with the Consultant. Store materials and equipment to ensure preservation of quality of product and fitness for the Work. Store materials and equipment on wooden platforms or other hard, clean surfaces, raised above the ground or in water tight storage sheds of sufficient size for storage of materials and equipment which might be damaged by storage in the open. Locate stored materials and equipment to facilitate prompt inspection.

.3 Store packaged materials and equipment undamaged, in their original wrappings or containers, with manufacturer's labels and seals intact.

.4 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

.5 Storage sheds required by subcontractors shall be provided by them.

1.22. SANITARY FACILITIES

.1 Provide weatherproof temporary toilet/sanitary facilities for the work force in accordance with governing regulations and ordinances.

.2 Service temporary toilet/sanitary facilities as required by authorities but not less than weekly.

.3 Post notices and take such precautions as required by local health authorities.

.4 The use of existing washroom facilities is not allowed unless specifically approved by the Board. The Contractor will be required to clean and maintain the existing washrooms to Board standards.

.5 Except where connected to the municipal sewer system, periodically remove wastes from Site.

.6 Keep toilet/sanitary facilities clean and sanitary and protect from freezing.

.7 Keep sanitary facilities clean and fully stocked with the necessary supplies at all times.

END OF SECTION

01 54 00 – Materials and Equipment

1.0 GENERAL

1.1. RELATED SECTIONS

.1 This section describes requirements applicable to all Sections within Divisions 02 to 49

1.2. PRODUCT AND MATERIAL QUALITY

.1 Products, materials, equipment and articles referred to as “Products”; throughout the specifications incorporated in the Work, shall be new, not damaged or defective, and of the best quality, compatible with specifications for the purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Defective products will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is a precaution against oversight or error. Remove and replace defective products at own expense, and be responsible for delays and expenses caused by rejections.

.3 Should any dispute arise as to the quality or fitness of products, the decision rests strictly with the Board contact, based upon requirements of the Contract Documents.

.4 Current Material Safety Data Sheets shall be on file with the successful Contractor and shall be provided to the Board contact upon request, within twenty-four (24) hours.

.5 Material safety data sheets are not required for products currently WHMIS exempt.

1.3. EQUIPMENT/TOOL MATERIALS STORAGE, HANDLING, AND PROTECTION

.1 Handle and store products in a manner to prevent damage, adulterations, deterioration, and soiling, and in accordance with manufacturer’s instructions.

.2 Store packaged or bundled products in original and undamaged condition, with manufacturer’s seals and labels intact.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Provide and maintain tools, equipment and materials in a clean and orderly condition. Board tools, ladders, lifts, power cords, flashlights etc. are not to be used.

.5 Materials are to be stored in a manner to cause the least interference with WorK activities.

.6 The Contractor shall determine with the Board contact, prior to ordering materials, those locations that are suitable for receiving and storage of materials and equipment.

.7 All materials and equipment shall be kept in a secure area, at Contractor's expense, or removed from the job site when Work is not actually in progress.

.8 Vehicles, trailers or other similar apparatus may not be stored or parked overnight at site without written authorization from Board contact. Written requests are to be forwarded directly to the Board contact.

.9 Approval for parking does not imply any liability or responsibility for safe keeping by the Board.

.10 The Contractor may use the existing electrical and water services, as required, for the Work, and the costs of these services shall be borne by the Board.

1.4. WORKMANSHIP

.1 Workmanship shall be the best quality, executed by Workers experienced and skilled in the respective duties for which they are employed. Immediately notify the Consultant if required Work is such as to make it impractical to produce required results.

.2 Do not employ any unfit persons or anyone unskilled in their required duties.

.3 Decisions as to the quality or fitness of Workmanship in cases of dispute rest solely with the Board contact, whose decision is final.

.4 All Contractor personnel are restricted to the job site and necessary access routes. No personnel shall visit other areas or buildings without specific authorization.

.5 The Contractor shall make their own arrangements for emergency treatment of accidents.

.6 Any accidents shall be reported immediately to the Board contact.

.7 The Contractor agrees to hold the Board harmless of any and all liability of every nature and description, which may be suffered through bodily injuries, involving deaths of any persons, by reasons of negligence of the Contractor, his agents, employees, or his Subcontractors.

.8 The Contractor shall supply constant on-site supervision in the form of a Project Superintendent. The Project Superintendent shall have within their authority to negotiate minor changes regarding scheduling, manpower and equipment.

1.5. MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in the specifications, install, apply 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.

1.6. TOOLS OF THE TRADE

.1 The Board will not pay the Awarded Bidder a fee for tools and equipment that are considered "tools of the trade" that are required to perform the work in this Tender or any change orders.

1.7. EXISTING EQUIPMENT

.1 Contractor shall demolish and dispose of all existing equipment specified to be removed and or replaced including obsolete services not being reused. The Board shall have first rights of refusal on all demolished equipment and or parts and the Contractor shall provide a minimum of (5) working days notice prior to disposal of the equipment, parts, or equipment and set aside same in a suitable location to be recovered by Board technicians.

END OF SECTION

01 61 00 – Product Requirements

1.0 GENERAL

1.1. RELATED SECTIONS

.1 This section describes requirements applicable to all Sections within Divisions 02 to 49.

.2 Section 01 31 00 – Project Managing and Coordination

1.2. TERMINOLOGY

.1 New: Produced from new materials.

.2 Renewed: Produced or rejuvenated from an existing material to like-new condition to serve a new or existing service.

.3 Defective: A condition determined exclusively by the Consultant.

1.3. PRODUCT QUALITY

.1 The term 'new' in the following paragraph does not exclude re-manufactured products that have some or all of the materials recycled from other sources. Preference in recycling is for post-consumer recycled materials.

.2 Products, materials, equipment, parts or assemblies (referred to as Products) incorporated in Work:

.3 New Product, not damaged or defective, of best quality (compatible with specification requirements) for purpose intended. If requested, provide evidence as to type, source and quality of Products provided.

.4 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.

.5 Should any dispute arise as to the quality or fitness of Products, decision rests strictly with Consultant.

.6 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout the building.

1.4. AVAILABILITY

.1 Immediately upon receipt of the Board's Purchase Order, review Product delivery requirements and anticipate foreseeable supply delays for any items.

.2 Immediately upon receipt of the Board's Purchase Order the Contractor shall issue Purchase Orders and or Contracts to all Sub-trades. Provide proof to the Consultant and the Board within 3 days. The Subcontractors shall identify in writing any delivery issues within 14 days of receiving the Contractor's purchase order or contract. The Schedule noted in 01-31 00 1.7.1 shall incorporate all deliveries and installation.

.3 If delays in supply of Products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.4 In the event of failure to notify Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant reserves the right to substitute more readily available Products of similar character, at no increase in Contract Price or Contract Time.

1.5. STORAGE AND PROTECTION

.1 Store and protect Products in accordance with manufacturers' written instructions.

.2 Store with seals and labels intact and legible.

.3 Store sensitive Products in weather tight, climate controlled, enclosures in an environment favourable to Product.

.4 For exterior storage of fabricated Products, place on sloped supports above ground.

.5 Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of Products.

.6 Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

.7 Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.

.8 Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

1.6. TRANSPORTATION AND HANDLING

.1 Transport and handle Products in accordance with manufacturer's written instructions.

.2 Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.

.3 Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

.4 Suitably pack, crate and protect products during transportation to site to preserve their quality and fitness for the purpose intended.

.5 Store products in original, undamaged condition with manufacturer's labels and seals intact until they are being incorporated into completed work.

.6 Protect materials from damage by extreme temperatures or exposure to the weather.

1.7. EXISTING UTILITIES

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum disturbance to the owner.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in a manner approved by authority having jurisdiction. Stake and record location of capped service.

1.8. MANUFACTURER'S WRITTEN INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect Products to manufacturer's written instructions. Do not rely on labels or enclosures provided with Products. Obtain written instructions directly from manufacturers.

.2 Notify Consultant in writing, of conflicts between specifications and manufacturer's instructions, so that Consultant may establish course of action.

.3 Improper installation or erection of Products, due to failure in complying with these requirements, authorizes Consultant to require removal and reinstallation at no increase in Contract Price or Contract Time.

1.9. QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Consultant if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Consultant and or Board reserves right to require dismissal from site any workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Consultant, whose decision is final.

.4 Products, materials, systems and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the applicable manufacturer's printed directions.

.5 Where specified requirements are in conflict with manufacturer's written directions, follow manufacturer's directions. Where specified requirements are more stringent than manufacturer's directions, comply with specified requirements.

1.10. COORDINATION

.1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

.3 Contractor is responsible to ensure suppliers or distributors of materials specified or alternatives accepted, which he intends to use, have materials with original schedule, and similarly it shall be the responsibility of all subcontractors and suppliers to so inform the Contractor.

.4 Contractor shall contact Consultant immediately upon receipt of information indicating materials or items, will not be available on time, in accordance with the latest approved schedule, and similarly it shall be the responsibility of all subcontractors and suppliers to so inform the Contractor.

.5 The above, in no way releases the Contractor, or their subcontractors and suppliers of their responsibility for ensuring timely ordering of materials and items required, including the necessary expediting, to complete the Work as scheduled in accordance with the Contract Documents including temp accommodations and or materials to ensure occupancy date is achieved.

1.11. CONCEALMENT

.1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation, inform the Consultant if there is interference. Install as directed by the Consultant at no additional cost to the Board.

1.12. REMEDIAL WORK

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.13. LOCATION OF FIXTURES

.1 Inform Consultant of conflicting installation. Install as directed.

1.14. FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use Type 304 or 316 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.15. PROTECTION OF WORK IN PROGRESS

.1 Prevent overloading of any part of the Project.

.2 Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated, without written approval of the Consultant.

END OF SECTION

01 70 00 – Examination and Preparation

1.0 GENERAL

1.1. RELATED SECTIONS

.1 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. REFERENCES

.1 Owner's identification of existing survey control points and property limits.

1.3. SUBMITTALS

.1 Submit name and address of Surveyor to Consultant.

.2 On request of Consultant, submit documentation to verify accuracy of field engineering work.

.3 Submit certificate signed by surveyor certifying that elevations and locations of completed Work conforms with Contract Documents.

1.4. QUALIFICATIONS OF SURVEYOR

.1 Qualified registered land surveyor, licensed to practice in the Place of the Work.

1.5. SURVEY REFERENCE POINTS

.1 Existing base horizontal and vertical control points are designated on Drawings.

.2 Locate, confirm and protect control points prior to starting site Work. Preserve permanent reference points during construction.

.3 Make no changes or relocations without prior written notice to the Consultant.

.4 Report to Consultant when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

.5 Require the surveyor to replace control points in accordance with original survey control.

1.6. SURVEY REQUIREMENTS

.1 Establish existing and new permanent bench marks on site, referenced to established benchmarks by survey control points.

.2 Record locations, with horizontal and vertical data in Project Record Documents.

.3 Establish lines and levels, locate and lay out, by instrumentation.

.4 Establish pipe invert elevations.

.5 Stake batter boards

.6 Establish foundation and floor elevations.

.7 Establish lines and levels for mechanical and electrical work.

1.7. SUBSURFACE CONDITIONS

.1 Promptly notify Consultant in writing if discovered surface or subsurface conditions at Place of Work differ materially from those indicated in Contract Documents.

.2 Advise the Consultant of a reasonable assumption of probable conditions when determined.

.3 After prompt investigation, should Consultant determine that conditions do differ materially, instructions will be issued for changes in Work.

1.8. EXAMINATION

.1 The Contractor is expected to be totally familiar with site conditions and shall assume full responsibility for the cost involved in repairing any damage to the building, site and services, city property, adjacent buildings, etc., during general construction, regardless of the extent of the damage.

.2 Inspect existing conditions, including elements or adjacent Work subject to irregularities, damage, movement, including Work during cutting and patching.

.3 The Contractor shall provide all equipment necessary to make a full and detailed site evaluation. This shall include but not be limited to ladders, flashlights and hand tools.

.4 The Contractor expressly agrees that conditions above existing suspended acoustic ceilings, but below fixed structure, unless obscured by an additional ceiling above, shall be considered exposed conditions for the purposes of making findings under the provisions of the Contract. There shall be no claims for extra costs for extra Work in these areas.

.5 After uncovering, inspect conditions affecting performance of the Work.

.6 Beginning of cutting or patching means acceptance of existing conditions.

1.9. PREPARATION

.1 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of the project from damage.

.2 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

1.10. EXISTING SERVICES

.1 Before commencing work, establish location and extent of service lines in the area of Work and notify the Consultant of findings.

.2 Remove abandoned service lines running through existing and new structures. Cap or seal lines at cut-off points as directed by the Consultant.

1.11. LOCATION OF EQUIPMENT AND FIXTURES

.1 Inform Consultant of conflicting installations, install as directed.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform Consultant of impending installation and obtain approval for actual location.

.4 Submit field drawings to indicate relative position of various services and equipment when required by Consultant.

1.12. SURVEY RECORD

.1 Maintain a complete, accurate log of control and survey work as it progresses.

.2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.

.3 Record locations of maintained, re-routed and abandoned service lines.

END OF SECTION

01 73 30 – Execution and Cutting and Patching

1.0 GENERAL

1.1. RELATED SECTIONS

.4 Section 01 32 00 - Construction Progress Documentation: Submittals and scheduling.

.5 Section 01 61 00 - Product Requirements.

.6 Section 01 70 00 – Examination and Preparation

.7 Individual Product Specification Sections:

.1 Cutting and patching incidental to work of the section.

.2 Advance notification to other sections of openings required in Work of those sections.

1.2. SUBMITTALS

.8 Submit written request in advance of cutting or alteration which affects:

.1 Structural integrity of any element of Project.

.2 Integrity of weather exposed or moisture resistant element.

.3 Efficiency, maintenance, or safety of any operational element.

.4 Visual qualities of sight exposed elements.

.5 Work of Owner or separate contractor.

.9 Include in request:

.1 Identification of Project.

.2 Location and description of affected Work.

.3 Necessity for cutting or alteration.

.4 Description of proposed Work and Products to be used.

.5 Alternatives to cutting and patching.

.6 Effect on work of Owner or separate contractor.

.7 Written permission of affected separate contractor.

.8 Date and time work will be executed.

1.3. TOLERANCES

.10 Monitor fabrication and installation tolerance control of Products to produce acceptable Work.

.11 Do not permit tolerances to accumulate beyond effective or practical limits.

.12 Comply with manufacturers' tolerances. In case of conflict between manufacturers' tolerances and Contract Documents, request clarification from the Consultant before proceeding.

.13 Adjust Products to appropriate dimensions; position and confirm tolerance acceptability, before permanently securing Products in place.

2.0 PRODUCTS

2.1. MATERIALS

.1 Primary Products: Those required for original installation.

.2 Product Substitution: For any proposed change in materials, submit a request for substitution described in Section 01 33 00.

3.0 EXECUTION

3.1. EXAMINATION

.1 Examine existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.

.2 After uncovering existing Work, assess conditions affecting performance of work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

3.2. PREPARATION

.1 Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of the Project from damage.

.2 Provide protection from elements for areas which may be exposed by uncovering work.

.3 Maintain excavations free of water.

3.3. CUTTING

.1 Execute cutting and fitting as needed to complete the Work. Prior to any cutting and or coring of concrete floors the contractor shall confirm the area is free of services or rebar. Notify the Consultant of any interferences.

.2 Uncover work to install improperly sequenced work.

.3 Remove and replace defective or non-conforming work.

.4 Remove samples of installed work for testing for Hazardous materials.

.5 Provide openings in the Work for penetration of mechanical and electrical work.

.6 Employ experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

.7 Cut rigid materials using a masonry saw or core drill. Pneumatic tools are not allowed without prior approval.

.8 Do all cutting, patching, and making good, to leave a finished condition and to make the several parts of the work come together properly. Coordinate work to keep cutting and patching to a minimum.

.9 Make cuts with clean, true, smooth edges. Fit unit to tolerance established by test standard practice for applicable work. Make patches invisible in the final assembly.

.10 Cutting shall be done in a manner to keep patching to minimum. Obtain Consultant's approval of method to be used to conceal new mechanical and electrical services before beginning cutting. Chasing of concrete surfaces is not permitted.

.11 Cutting or coring of any structural concrete is to be reviewed and approved by the Consultant.

.12 Do not endanger any work by cutting, digging or otherwise altering, and do not cut nor alter any load bearing element without written authorization by Consultant. Provide bracing, shoring and temporary supports as required to keep construction safely supported at all times

.13 Any cost caused by omission or ill-timed work shall be borne by the party responsible thereof.

.14 Regardless of which Section of work is responsible for any portion of cutting and patching, in each case tradesmen qualified in work being cut and patched shall be employed to ensure it is correctly done.

3.4. PATCHING

.1 Execute patching to complement adjacent Work.

.2 Fit Products together to integrate with other Work.

.3 Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.

.4 Employ original installer to perform patching for weather exposed and moisture resistant elements, and sight-exposed surfaces.

.5 Restore work with new Products in accordance with requirements of Contract Documents.

.6 Fit work with adequate support to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.7 At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with firestop material.

.8 Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to the nearest intersection or natural break. For an assembly, refinish the entire unit.

.9 Complete and tightly fit all construction to pipes, ducts and conduits which pass through construction to completely prevent the passage of air.

.10 Patching and making good shall be done by trade specialists in material to be treated, and shall be made undetectable in finished work when viewed from a distance of 1.5m under normal lighting.

END OF SECTION

01 74 00 – Cleaning and Waste Management

1.0 GENERAL

1.1. RELATED SECTIONS

.1 Common Work by All Trades

.2 This section describes requirements applicable to all Sections within Divisions 02 to 49.

.3 Conduct cleaning and disposal operations to comply with local ordinances and environmental protection legislation.

.4 Store volatile wastes in covered metal containers, and remove them from premises at the end of each working day.

.5 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

2.0 PRODUCTS

2.1. CLEANING PRODUCTS

.1 Cleaning Agents and Materials: Low VOC content wherever possible. The Consultant and the Board shall be notified prior to use of any exception.

3.0 EXECUTION

3.1. CLEANING DURING CONSTRUCTION

.1 Maintain the Work in tidy condition, free from accumulation of waste products and debris, other than that caused by the Owner or other Contractors.

.2 Remove waste material and debris from the work areas and deposit in a waste container at the end of each working day.

.3 Vacuum clean interior areas prior to the start of finishing work. Maintain areas free of dust and other contaminants during finishing operations.

.4 Individual Subcontractors are responsible for the daily clean-up and removal of debris related to, or generated by, their own work. The overall responsibility for project cleanliness rests with the Contractor.

.5 The Contractor shall be responsible for snow removal within the construction area.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Wherever possible recycle materials

.8 Containers:

.1 Provide adequate number and sizes of on-site garbage and recycling containers within designated work site as required for collection of waste materials and debris on a daily basis.
.2 Provide additional waste containers when the extent of work warrants.
.3 Provide and use clearly marked, separate bins for recycling.

.9 Dispose of waste materials and debris at registered waste disposal and recycling facility.

.10 Remove oily rags, waste and other hazardous substances from premises at close of each day, or more often when required.

.11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

3.2. WASTE MANAGEMENT

.1 Audit, separate and dispose of construction waste generated by new construction or by demolition of existing structures in whole or in part, in accordance with Ontario Regulations 102/94 and 103/94 made under the Environmental Protection Act.

.2 Containers:
.1 Provide adequate number and sizes of on-site garbage and recycling containers within designated work site as required for collection of waste materials and debris on a daily basis.
.2 Provide additional waste containers when the extent of work warrants.
.3 Provide and use clearly marked, separate bins for recycling.

.3 Fires, and burning of rubbish or waste on site is strictly prohibited.

.4 Burying of rubbish or waste materials on site is strictly prohibited.

.5 Disposal of waste or volatile materials such as mineral spirits, oil, gasoline or paint thinner into ground, waterways, or sewer systems is prohibited.

.6 Empty waste containers on a regular basis to prevent contamination of site and adjacent properties by wind-blown dust or debris

3.3. PREPARATION FOR FINAL CLEANING

.1 Prior to final cleaning the General Contractor shall:
.1 remove all surplus products, tools, construction machinery and equipment not required for the performance of remaining work, and thereafter remove any remaining materials, equipment, waste and debris,
.2 replace all filters installed on any equipment in operation in the area of work,
.3 remove all paint spots or overspray from all affected surfaces, and

3.4. FINAL CLEANING PRIOR TO ACCEPTANCE: INTERIOR

.1 Prior to applying for Substantial Performance of the Work, or, prior to Owner occupancy of the building or portion of the building affected by the Work, whichever comes first, conduct full and complete final cleaning operations for the areas to be occupied.

.2 Final cleaning operations shall be performed by an experienced professional cleaning company, possessing equipment and personnel sufficient to perform full building cleaning operations. Contractors “broom cleaning” is not acceptable as a “Final Clean”. The cleaning contractor shall:

.1 clean interiors of all millwork and surfaces of any furniture and equipment present,

.2 use only cleaning materials recommended by the manufacturer of the surface to be cleaned,

.3 remove all stains, spots, scuff marks, dirt, dust, remaining labels, adhesives or other surface imperfections,

.4 clean and polish all glass and mirrors and remove remaining manufacturer's and safety "X" labels,

.5 clean and polish all finished metal surfaces such as enamelled or stainless steel, chrome, aluminum, brass, and bronze,

.6 clean and polish all vitreous surfaces such as plumbing fixtures, ceramic tile, porcelain enamel, or other such materials,

.7 clean all ceramic tile surfaces in accordance with the manufacturer's instructions,

.8 vacuum, clean and dust behind grilles, louvres and screens,

.9 steam clean all unprotected carpets immediately prior occupancy by Owner, and

.10 clean all equipment and fixtures to a sanitary condition.

.3 For any areas to be occupied after the owner’s initial occupancy, provide full cleaning operations as outlined above prior to turning over to owner,

.4 The Board’s supplies and equipment must not be used for any cleaning operations including, but not limited to: garbage cans, mops, brooms, rags, ladders, chemicals etc.

3.5. FINAL CLEANING PRIOR TO ACCEPTANCE: EXTERIOR

.1 For areas affected by construction final exterior cleaning operations shall be performed by the General Contractor or competent Subontractor. Contractor's "broom cleaning" only is not acceptable.

.2 Final exterior cleaning shall include:

.1 broom clean and wash exterior walkways, steps, and surfaces; rake clean other surfaces of grounds,

.2 remove dirt and other disfiguration from exterior surfaces,

.3 sweep and wash clean paved areas,

.4 replace filters of mechanical equipment for all equipment that was in use during construction,

.5 clean all roofs, gutters, downspouts, areaways, drywells, and drainage systems,

.6 remove debris and surplus materials from crawl areas and other accessible concealed spaces.

.7 remove overspray

END OF SECTION

01 78 10 – Closeout Submittals and Requirements

1.0 GENERAL

1.1. RELATED SECTIONS

.1 Section 01 78 10 – WRDSB Warranty Card, Appendix 00 41 13A

1.2. TAKE-OVER PROCEDURES

.1 Take over procedures will be in strict accordance with the requirements as set out in this Section.

1.3. SUBSTANTIAL PERFORMANCE

.1 Prior to requesting a Substantial Performance deficiency inspection submit 2 hard copies, 1 digital copy of the Operating and Maintenance Manuals for Consultants approval.

.2 Application for Substantial Performance must include.

.1 One (1) electronic copy of inspection and acceptance certificates required from regulatory agencies, including but not limited to.

.1 Certificates of Approval of the Work by the local Building Department.

.2 Electrical Inspection Certificate of Inspection.

.3 Fire Alarm Verification Certificate.

.3 Advise Consultant in writing, when the project has been substantially completed. If Consultant agrees this stage has been reached, the Consultant shall prepare a complete list of deficiencies and submit copies of this list to Contractor and the Board.

1.4. COMMENCEMENT OF LIEN PERIODS

.1 The date of publication of the Certificate of Substantial Performance of the Work, provided to the contractor by the Consultant, shall be the date for commencement of the lien period.

1.5. TOTAL PERFORMANCE

.1 Prior to requesting a final inspection submit written certificate that the following have been performed:

.1 Work has been completed and inspected for compliance with Contract Documents and is ready for final inspection

.2 Defects have been corrected and deficiencies have been completed.

.3 Equipment and systems have been tested and are fully operational. Submit two copies of the balancing reports
.4 Certificates required by the contractor have been submitted.
.5 Operation of systems have been demonstrated to Owner's personnel.
.6 Submit Record drawings.
.7 Submit maintenance materials.
.8 Provide certified site survey

.2 When items noted above are completed, request final inspection of Work by consultant, and building inspector. If Work is deemed incomplete by Consultant, complete outstanding items and request re-inspection.

1.6. PAYMENT OF SUBSTANTIAL PERFORMANCE HOLDBACK

.1 Prior to the release of lien holdback provide one copy of the following by the Contractor and each subcontractor:
.1 Statutory Declaration or Declaration of Last supply
.2 Workplace Safety and Insurance Board “Certificate of Clearance”.

.2 The Contractor shall submit an application for payment of the holdback amount.

.3 After the receipt of an application for payment which will include a Statutory Declaration and WSIB Clearance from the, the Consultant will issue a certificate for payment of the holdback amount.

1.7. FINAL PAYMENT

.1 When the Contractor considers final deficiencies and defects have been corrected and it appears requirements of Contract have been completed, make application for final payment.

.2 When the Consultant finds the Contractor's application for final payment valid, the Consultant will issue a final certificate of payment

.3 The Board reserves the right to charge the Contractor for school access card(s) that have not been returned.

.4 The cost to reprogram or replace the card(s) access system is estimated at $50.00 (fifty dollars) for each card issued, $30.00 (thirty dollars) for each keybox key, plus $35.00 (thirty five dollars) administration fee.

1.8. CLOSEOUT SUBMITTALS

.1 Prepare instructions and data using personnel experienced in maintenance and operation of described products and submit them to the Consultant for review.

.2 Copy will be returned to the contractor with the Consultant's comments.

.3 Revise content of documents as required prior to final submission.

.4 Two (2) weeks prior to Substantial Performance of the Work, submit to the Consultant, the final copies of operating and maintenance manuals.

.5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.

.6 If requested, furnish evidence as to type, source and quality of products provided.

.7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.8 Pay costs of transportation.

1.9. OPERATION AND MAINTENANCE MANUAL FORMAT

.1 Provide two copies of operating and maintenance data, prepared on 215 X 280mm sheets in printed or typewritten form, contained in 3-ring binders with soft vinyl covers for materials and equipment which require special maintenance or operating procedures.

.2 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder at the front of each volume.

.3 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.4 Arrange content by the divisions of the specifications under Section numbers and sequence of Table of Contents.

.5 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.6 Include the following in each manual:

- .1 Complete list of subcontractors and suppliers, their addresses and telephone numbers. Provide 24 hour emergency telephone numbers for such subcontractors as Plumbing, Electrical, Sprinklers, Fire System, Heating, etc.
- .2 Specified warranties for contractor, each subcontractor and supplier.
- .3 WRDSB Project Asset and Warranty Card, Appendix 00 41 13A
- .4 Copy of finish hardware list, complete with all amendments and revisions and lock manufacturer's descriptive and service literature.
- .5 Schedule of paints and coatings. Include sufficient explanation to fully identify each surface with the applicable paint or coating used. Enclose a copy of the colour schedule.
- .6 Maintenance instructions for finished surfaces.
- .7 Brochures, cuts of equipment and fixtures.

.8 Operating and maintenance instructions for equipment.

.9 Submit copies of letters from manufacturers of equipment and systems indicating their technical representatives have inspected and tested systems and are satisfied with methods of installation, connection and operations. These letters shall state names of persons present at testing, methods used and list of functions performed.

.10 Submit one complete set of reviewed shop drawings of architectural, structural, mechanical and electrical items, folded to 215 x 280mm size, contained in heavy duty manila envelopes, numbered and labelled. Follow specification format with no more than one Section per envelope, hard copy and PDF.

.11 Relevant certificates issued by authorities having jurisdiction

.12 Computer disc or flash drive with all the above documentation in PDF format

1.10. RECORDING ACTUAL SITE CONDITIONS

.1 Record information on a set of black line opaque drawings, and within the Project Manual.

.2 Annotate with coloured felt tip marking pens, maintaining separate colours for each major system, for recording changed information.

.3 Record information concurrently with construction progress. Do not conceal Work of the Project until required information is accurately recorded.

.4 Contract drawings and shop drawings: legibly mark each item to record actual construction, including:

.1 Measured depths of elements of foundation in relation to finish first floor datum.

.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.4 Field changes of dimension and detail.

.5 Changes made by change orders.

.6 Details not on original Contract Drawings.

.7 References to related shop drawings and modifications.

.5 Specifications: legibly mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.6 Other Documents: Maintain warranties, test reports and samples required by individual specifications sections.

1.11. RECORD (AS-BUILT) DOCUMENTS AND SAMPLES

.1 Store AS-BUILT documents and samples in the field office apart from documents used for construction. Provide files, racks, and secure storage.

.2 Label AS-BUILT documents and file in accordance with section number listings in List of Contents of the Project Manual. Label each document AS-BUILT DOCUMENTS in neat, large, printed letters.

.3 Maintain AS-BUILT documents in clean, dry and legible condition. Do not use as-built documents for construction purposes.

.4 Keep as-built documents and samples available for inspection by the Consultant.

1.12. RECORD DRAWINGS

.1 Prior to Substantial Performance of the Work, update the marked up information from the AS-BUILT documents to a master set of drawing.

.2 Submit one set of completed AS-BUILT documents to the Consultant for review.

.3 Documents will be returned to the contractor with the Consultant's comments.

.4 Revise content of documents as required prior to final submission.

.5 After the review is completed resubmit to the Consultant for Consultant to produce electronic record drawings for the owner to use.

1.13. SPARE PARTS

.1 Provide spare parts, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in the Maintenance Manual.

.4 Obtain receipt for delivered products and submit prior to final payment.

1.14. REPLACEMENT (MAINTENANCE) MATERIALS

.1 Deliver to site, unload and store where directed, replacement (maintenance) materials as required elsewhere in these Specifications. Obtain a signed receipt from the Owner's Representative for delivered materials and include a copy of receipt in Operation and Maintenance manuals.

.2 Package materials so they are protected from damage and loss of essential properties.

.3 Label packaged materials for proper identification of contents.

1.15. SPECIAL TOOLS

.1 Provide special tools, in quantities specified in the individual specification section.

.2 Provide items with tags identifying their associated function and equipment.

.3 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual

1.16. FINAL SITE SURVEY

.1 Submit final site survey certificate in accordance with Section 01 70 00, certifying that elevations and locations of completed Work are in conformance Contract Documents.

1.17. WARRANTIES AND BONDS

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Except for items put into use with Owner's permission, leave the date of beginning of time of warranty until the Date of Substantial Performance is determined. The date of Substantial Performance of the Work shall be the date for commencement of the warranty period.

.4 Verify that documents are in proper form, contain full information, and are notarized.

.5 Co-execute submittals when required.

.6 Retain warranties and bonds until time specified for submittals.

END OF SECTION

01 78 40 – Maintenance Requirements

1.0 GENERAL

1.1. SECTION INCLUDES

.1 Equipment and systems.
.2 Materials and finishes.
.3 Spare parts
.4 Maintenance manuals.
.5 Special tools.
.6 Storage, handling and protection.
.7 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. RELATED SECTIONS

.1 Section 01 45 00 - Quality Control.
.2 Section 01 78 40 – Maintenance Requirements.
.3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3. EQUIPMENT AND SYSTEMS

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete
.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
.3 Include installed colour coded wiring diagrams.
.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
.6 Provide servicing and lubrication schedule, and list of lubricants required.
.7 Include manufacturer's printed operation and maintenance instructions.
.8 Include sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide coordination Drawings, with installed colour coded piping diagrams.

.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

.13 Provide a list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.14 Include test and balancing reports as specified in Section 01 45 00.

.15 Additional requirements: As specified in individual specification sections.

2.0 PRODUCTS

2.1. MATERIALS AND FINISH

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Building Envelope: include copies of drawings of building envelope components, illustrating the interface with similar or dissimilar items to provide an effective air, vapour and thermal barrier between indoor and outdoor environments. Include an outline of requirements for regular inspections and for regular maintenance to ensure that on-going performance of the building envelope will meet the initial building envelope criteria.

.5 Additional Requirements: as specified in individual specifications sections.

2.2. SPARE PARTS

.1 Provide spare parts, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in the Maintenance Manual.

.4 Obtain receipt for delivered products and submit prior to final payment.

2.3. MAINTENANCE MATERIALS

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
.2 Provide items of same manufacture and quality as items in Work.
.3 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in the Maintenance Manual.
.4 Obtain receipt for delivered products and submit prior to final payment.

2.4. SPECIAL TOOLS

.1 Provide special tools, in quantities specified in the individual specification section.
.2 Provide items with tags identifying their associated function and equipment.
.3 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in the Maintenance Manual.

3.0 EXECUTION

3.1. DELIVERY TO SITE

.1 Deliver to place of work and store.
.2 General Contractor to receive and acknowledge delivery from contractors and subcontractors of all parts and materials assembled for maintenance requirements. Provide a summary inventory list to the Consultant and/or the Board after all materials are gathered and verification of location. Signatures of receipt will not be accepted from anyone except the General Contractor’s representative.

3.2. STORAGE, HANDLING AND PROTECTION

.1 Consult with the Board to determine location for storage.
.2 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
.3 Store in original and undamaged condition with manufacturer's seal and labels intact.
.4 Store components subject to damage from weather in weatherproof enclosures.
.5 Store paints and freezable materials in a heated and ventilated room.
.6 Remove and replace damaged products at own expense and to the satisfaction of the Consultant.

END OF SECTION

01 79 00 – Demonstration and Training

1.0 GENERAL

1.1. SECTION INCLUDES

.1 Procedures for demonstration and instruction of Products, equipment and systems to Owner's personnel.

.2 Seminars and demonstrations.

1.2. RELATED SECTIONS

.1 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3. DESCRIPTION

.1 At Substantial Performance, at a time acceptable to Owner and Consultant, but not before operations and maintenance manual have been reviewed and accepted by the consultant; contractor shall give a complete demonstration in the presence of consultant; Sub-consultants, Owner and Owner's personnel of operation and maintenance of systems and equipment once they are 100% complete.

.2 Owner will provide a list of personnel to receive instructions and will coordinate their attendance at agreed-upon times.

1.4. COMPONENT DEMONSTRATION

.1 Manufacturer to provide authorized representative to demonstrate operation of equipment and systems.

.2 Instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.

1.5. SUBMITTALS

.1 Submit schedule of time and date for demonstration of each item of equipment and each system one (1) week prior to designated dates, for Consultant's approval.

.2 Submit reports within forty eight (48) after completion of demonstration, that demonstration and instructions have been satisfactorily completed.

.3 Give time and date of each demonstration, with a list of persons present.

1.6. CONDITIONS FOR DEMONSTRATIONS

.1 Equipment has been inspected and put into operation in accordance with manufacturer’s instructions and contract requirements.

.2 Testing, adjusting, and balancing have been performed in accordance with manufacturer's instructions and contract requirements, and equipment and systems are fully operational.

.3 Provide information packages as required for use in demonstrations and instructions.

2.0 PRODUCTS

2.1. NOT USED

.1 Not used.

3.0 EXECUTION

3.1. PREPARATION

.1 Verify that suitable conditions for demonstration and instructions are available.

.2 Verify that designated personnel are present.

.3 Prepare agendas and outlines.

.4 Establish seminar organization.

.5 Explain component design and operational philosophy and strategy.

.6 Develop equipment presentations.

.7 Present system demonstrations.

.8 Accept and respond to seminar and demonstration questions with appropriate answers.

3.2. PREPARATION OF AGENDAS AND OUTLINES

.1 Prepare agendas and outlines including the following:

.1 Equipment and systems to be included in seminar presentations.

.2 Name of companies and representatives presenting at seminars.

.3 Outline of each seminar's content.

.4 Time and date allocated to each system and item of equipment.

.5 Provide a separate agenda for each system.

3.3. SEMINAR ORGANIZATION

.1 Coordinate content and presentations for seminars.

.2 Coordinate individual presentations and ensure representatives scheduled to present at seminars are in attendance.

.3 Arrange for presentation leaders familiar with the design, operation, maintenance and troubleshooting of the equipment and systems. Where a single person is not familiar with all aspects of the equipment or system, arrange for specialists familiar with each aspect.

.4 Coordinate proposed dates for seminars with Owner and select mutually agreeable dates.

3.4. EXPLANATION OF DESIGN STRATEGY

.1 Explain design philosophy of each system. Include following information:

.1 An overview of how the system is intended to operate.

.2 Description of design parameters, constraints and operational requirements.

.3 Description of system operation strategies.

.4 Information to help in identifying and troubleshooting system problems.

3.5. DEMONSTRATION AND INSTRUCTIONS

.1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment.

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

.3 Instruct personnel on control and maintenance of sensory equipment and operational equipment associated with maintaining energy efficiency and longevity of service.

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

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

END OF SECTION

1.1 DEFINITIONS

.1 Available Project Information: Means only information of any type and in any form related to the project and identified in this section as such and only as specifically referenced in this section.

.2 Contract Documents: All documents and information of any type and in any form specifically prepared for use of Contract by Consultant and as defined in Construction Manager's Agreement.

1.2 STATUS OF AVAILABLE PROJECT INFORMATION

.1 Available Project Information identified in this section, or any part thereof, are not part of Contract unless specifically incorporated into Contract Documents by means of copying, transcribing or referencing.

1.3 USE OF AND RELIANCE UPON AVAILABLE PROJECT INFORMATION

.1 Available Project Information are made available to bidders for the purpose of providing bidders with access to information available to Owner and Consultant.

.2 Available Project Information will not be considered a representation or warranty that information contained therein is accurate, complete, or appropriate.

.3 Bidders shall interpret and draw own conclusions about Available Project Information and are encouraged to obtain specialist advice regarding this information.

.4 Owner and Consultant assume no responsibility for any such interpretations and/or conclusions.

.5 Information contained in Available Project Information may be time-sensitive and dates should be considered when interpreting Available Project Information.

.6 Bidders may rely upon data contained in Available Project Information, or parts thereof, which are specifically incorporated into the Contract Documents by means of copying, transcribing or referencing, but will draw their own conclusions from such data and shall not rely on any opinions or interpretations contained therein.

1.4 AVAILABLE PROJECT INFORMATION

.1 The following Available Project Information is available for review related to work of this contract. Documents may be obtained in digital format by emailing the Contractor or Consultant and asking for a pdf copy.

1. Kitchener Waterloo Collegiate Institute 2023 Asbestos Audit Update Report, prepared by MTE Consultants, File No.: C34532-941, dated March 22, 2023.
2. Limited Pre-Renovation Designated Substance Survey Health and Physical Education Renovation Project Kitchener-Waterloo Collegiate Institute 787 King Street West, Kitchener, ON, prepared by EXP Services Inc., project number LON-26000265-A0, dated January 28, 2026.

END OF SECTION

1.1 SUMMARY

.1 Delegated Design Submittals shall account for professional engineering responsibility for design, review and acceptance of components of Work forming a part of permanent Work in accordance with the Ontario Building Code, including amendments, and that has been assigned to a design entity other than Consultant including, but not limited to, the following:

.1 Design requiring structural analysis of load bearing components and connections.

.2 Design requiring compliance with fire safety regulations.

.3 Design requiring compliance with life or health safety regulations.

.3 The requirements of this section are in general conformance with the *Guideline on the Professional Engineering Practice in Canada,* published by Canadian Council of Professional Engineers, the Engineering Profession Act of Newfoundland and Labrador and related Bylaws concerning the duties of engineering professionals appointed during construction period by *Contractor* and/or *Subcontractor*.

.4 Provide submittals for Delegated Design services or certifications by a professional engineer (P.Eng.), whose signature and seal shall appear on all drawings, calculations, specifications, certifications, *Shop Drawings*, field review reports and other submittals prepared by them.

.5 Shop Drawings and other submittals related to the Work, designed or certified by the professional responsible for the Delegated Design, if prepared by others, shall bear such professional's written approval when submitted.

.6 The *Consultant* will review Delegated Design submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the *Contract Documents*.

1.2 DELEGATED DESIGN

.1 Performance and Design Criteria: Provide products and systems complying with specific performance and design criteria indicated where professional design services or certifications by a design professional are specifically required of Contractor by Contract Documents.

.2 If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Consultant.

.3 Delegated design will be required for elements designed by a specialty professional, which may include:

.1 Elements normally fabricated offsite

.2 Elements that require specialized fabrication equipment or a proprietary fabrication process not usually available at job site.

.3 Elements requiring civil engineering, not normally a part of scope of services performed by architectural, structural, mechanical, or electrical disciplines of Consultant.

.4 Specification Sections requiring engineered *Shop Drawings* , which include but are not necessarily limited to the following:

.1 Section 04 22 00 - Concrete Masonry Units.

.2 Section 05 41 00 - Structural Metal Stud Framing.

.3 Section 05 50 00 - Metal Fabrications.

.4 Section 09 22 00 - Non-Structural Metal Framing.

.5 Consultants' Documents: Coordinate with disciplines for items requiring delegated design submittals.

.6 Other Sections specifying submission of engineered *Shop Drawings*.

1.3 LETTER OF COMMITMENT

.1 Submit a signed and sealed Letter of Commitment on company letterhead addressed to Consultant in accordance with format in Appendix A attached to the end of this Section prior to starting Work requiring design and seal of a professional engineer.

1.4 LETTER OF COMPLIANCE

.1 Submit a signed and sealed Letter of Compliance on company letterhead addressed to Contractor in accordance with format in Appendix B attached to the end of this Section on completion of Work requiring design and seal of a professional engineer.

1.5 IMPLEMENTATION

.1 Include summary of Work described in relevant technical specification section as a part of the required Letter of Commitment.

.2 Prepare required submittals and present to Consultant within sufficient time to allow for Consultant's detailed review and acceptance.

END OF SECTION

APPENDIX A (SAMPLE)

LETTER OF COMMITMENT

Submit a signed and sealed letter of commitment on company letterhead in the form as follows:

[Date]

[Consultant]
[Consultant's Address]

Attention: [Consultant's Registered Professional of Record]

Re: Letter of Commitment for Delegated Design of [insert System of Component of Work]
O'Neill Car Dealership
Shoal Harbour Dr. & Thompson St.
Clarenville, NL A5A 0C2
VA Project Number: 2025-008
[Date of applicable tender package]

As the retained registered professional Engineer for design and field review of the above-named component of Work and project, I hereby give assurance I am qualified to perform the following Work as required by Contract Documents:

1. [List appropriate design services for System or Component of Work];
2. Preparation of shop and erection documents;
3. Review fabrication of [structural] [fire rated] [life and health safety] components;
4. Review erection of [structural] [fire rated] [life and health safety] components.
5. [Modify list to suit System of Component of Work.]

I hereby give assurance that I will be responsible for above noted Work as described in Section [?????] – [Name of Section] of Project Manual, including requirements of addenda, change orders and change directives.

I also undertake to be responsible for field review of fabrication and erection of [structural] [fire rated] [life and health safety] components as required to ascertain substantial compliance with the National Building Code and Contract Documents.

I will notify you within two (2) business days in writing if my responsibility is terminated at any time during the course of Work covered by this Letter of Commitment.

Retained Professional Engineer

_____
Signature

_____
Date

(Apply seal)

APPENDIX B (SAMPLE)

LETTER OF COMPLIANCE

[Date]

[Consultant]
[Consultant's Address]

Attention: [Consultant's Registered Professional of Record]

Re: Letter of Compliance for Delegated Design of [System of Component of Work]
O'Neill Car Dealership
Shoal Harbour Dr. & Thompson St.
Clarenville, NL A5A 0C2
VA Project Number: 2025-008
[Date of applicable tender package]

I hereby give assurance that I have fulfilled my obligations for field review as outlined by previously submitted Letter of Commitment.

I hereby give assurance that aspects of [structural] [life and health safety] Work as defined by previously submitted Letter of Commitment substantially comply with Contract Documents and Building Code.

Retained Professional Engineer

_____
Signature

_____
Date

(Apply seal)

1.1 DEFINITIONS

.1 Cutting: Means removal of existing construction necessary to permit installation or performance of other Work.

.2 Make Good/Patch/Repair: Means to identify defective or damaged locations, properly prepare identified locations for repairs, and repair (including substrates) using new materials to match construction and finish of adjacent sound locations; blend repaired area smoothly with adjacent construction so that it is not distinguishable from untreated areas in performance or appearance.

1.2 QUALITY ASSURANCE

.1 Conform to the Ontario Building Code, the Ontario Occupational Health and Safety Act, Regulation and Code, and other applicable standards and regulations.

.2 Comply with the requirements of the Contract Drawings.

.3 Electrical equipment and fixtures shall be CSA approved and carry appropriate CSA label.

.4 Work performed and materials used in existing building shall be of same standard of quality as that of existing finished building as a minimum, and as otherwise specified (refer to the technical Specification Sections) or indicated on the Drawings.

.5 Any welding shall be performed by Welders certified in accordance with CSA W47, and shall conform to CSA W59. Provide strict safety measures for welding in existing building. Provide and maintain a fully charged 9.4 kg (20 lbs.) CO_2 fire extinguisher within view and easy access of welding Work at all times.

1.3 BUILDING SECURITY

.1 The Contractor's forces shall comply with the security requirements of the Owner. Maintain security in a manner acceptable to the Owner throughout the duration of the Contract.

.2 The Contractor shall engage services of security personnel if at any time the Owner’s security system is compromised by the Work.

1.4 ACCESS

.1 Coordinate access with the Owner.

.2 Public and Owner’s access to other areas must be maintained at all times.

.3 Provide and maintain temporary fire exit routing and maintain clear of obstructions during full extent of Contract.

.4 Contractor's access to Work shall be as agreed by Owner, Contractor, and Consultant.

.5 Contractor, and construction forces, shall not use any facilities in existing building (washrooms, cafeteria, etc.) without Owner's approval.

.6 Required exits and exit corridors shall be maintained at all times.

.7 Protect access ways from damage during Construction. Cover surfaces with polyethylene film and cover with plywood or matting to prevent staining and scaring of existing finishes. Restore damage to condition equal to that prior to damage.

.8 Where required, provide temporary partitioning or enclosures to maintain or extend emergency and fire exits, and protect areas outside of work areas from dust, fumes and noise.

1.5 SCHEDULING

.1 Schedule Work and sequence operations in cooperation with Owner and Consultant. Work shall proceed in accordance with agreed upon and approved schedule.

.2 Utility and service interruptions shall be kept to a minimum and will be permitted only with written permission of Owner. Make requests for service interruptions at least seven (7) days before proposed date. State in request number of hours of interruption. Confirm date and time forty eight hours in advance of interruption.

.3 Provide two (2) weeks advance notice of entering existing area of Work. Confirm forty-eight (48) hours in advance of starting date.

.4 Contractor shall request written confirmation from Owner that scheduled areas of Work do not contain any equipment or furnishings that Owner intends to salvage, prior to demolition. The Owner reserves the right of first refusal for all items identified for removal or are otherwise salvageable during demolition operations.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 The Contractor shall provide insulated, air-tight, non-combustible temporary partitioning as required between work and public or occupied areas that ensure contaminants do not spread outside of work areas. Clean corridors daily and use floor mats as required to reduce dust migration into corridors.

.2 Seal off ducts, louvers, vents, openings, or ceiling spaces between construction area and remainder of building to prevent dust, dirt, contamination, or debris from entering remainder of building.

.3 Suppress dust and dirt.

.4 Prevent occurrence of unsanitary conditions, flooding or leaking.

.5 Do not allow dirt, debris or discarded materials to accumulate on site. Remove promptly each day.

.6 Keep clean, at all times, those areas adjacent to Work area to prevent dust from entering occupied areas.

.7 Maintain and keep free of debris, materials and equipment, emergency and fire exits and routes.

.8 Provide illumination for safe demolition and working conditions, but in any case, not less than 275 lx (25 f.c.) in areas where Work is being done.

.9 Obtain written confirmation from Owner that services to be abandoned, removed or cut have been properly and safely shut off, capped or sealed.

.10 Take precautions to keep noise and vibration producing activities at a minimum when working within (or on) existing building.

.11 Dispose of removed material legally. Do not burn on site. Do not allow debris to enter sewers.

.12 The building is a smoke-free environment. The Contractor will not be allowed to smoke anywhere within the building.

1.7 WORK AREAS

.1 Limits of Work are as indicated on drawings. Work and operation of machinery, storage of equipment, and materials and/or supplies, must be contained within areas under construction.

.2 Contractor shall post boundaries of working areas with suitable signs, warning own forces that areas outside of designated Work areas are out of bounds to construction personnel and equipment. These signs are to remain in place at all times during construction.

.3 Existing protected areas and other areas outside limits of Work area are out of bounds to personnel and equipment. These areas are not to be used for any other purpose.

.4 If revision to limits of working area becomes necessary for any compelling reason, contact Consultant immediately and do not disturb additional area without authorization from Consultant

1.8 EQUIPMENT

.1 Provide equipment required for safe and proper work.

1.9 PREPARATION

.1 Confirm that Owner has removed equipment and furnishings to be salvaged in accordance with agreed schedule.

.2 Provide shoring and bracing as needed to keep building structurally secure and free of deflection in all its parts, and as needed for installation of new structural members.

1.10 PROTECTION

.1 Protect remaining finishes, equipment, and adjacent Work from damage caused by cutting, moving, removal, and patching operations. Protect surfaces that will remain a part of finished Work.

.2 Protect existing and new Work from weather during cutting, moving, removal, and construction. Provide weather protection and other facilities and protection as needed to prevent damage to new Work and to remaining old Work.

.3 When using a cutting torch to remove existing framing provide flameproof screening around area of Work and cover floor area with minimum 6 mm (¼") plywood having joints taped. Allow no sparks or welding or cutting spatter to fall or hit any material or finish that may be damaged or marred.

.4 Provide protection to existing fans, motors and equipment from construction materials, dirt, dust, debris, moisture, and weld spatter.

1.11 SELECTIVE DEMOLITION

.1 Refer to Section 02 41 19 - Selective Demolition for additional requirements.

.2 Cutting, removing and demolition shall be performed to avoid cutting or removing more than is necessary and avoid damaging adjacent construction.

.3 Do not let piled material or unsanitary conditions create or endanger a structure or persons at any time.

.4 Where any material, component, assembly or item is indicated for re-use, removal shall be by a trade that normally provides or installs such an item. Items being re-used are to be carefully stored in a protected area until they are to be re installed.

.5 Items indicated for salvage are to be turned over to the Owner at a location on site as directed by the Owner and will remain property of the Owner.

.6 Where demolition Work involves cutting into any part of building structure, and materials or finishes that are to be extended, modified or joined to new Work, cutting shall be performed by the trades whose Work is encountered.

.7 Cut out and remove those assemblies, materials, items indicated for removal on the Drawings and remove from site.

.8 Coordinate with Division 02 and Drawings for more detailed requirements.

1.12 PATCHING, EXTENDING AND MATCHING

.1 Patch and extend existing Work using skilled mechanics that are capable of matching existing quality of workmanship. The quality of patched or extended Work shall not be less than that specified in the technical specification Sections.

.2 In areas where any portion of an existing finished surface is damaged, lifted, stained or otherwise made or found to be imperfect, patch or replace imperfect portion of surface with material matching adjacent sound surfaces.

.3 Do not incorporate salvaged or used material in new construction except where specified or where small quantities of finish materials that are difficult to match or duplicate are approved for patching or extending purposes by the Consultant.

.4 Provide adequate support or substrate for patching of finishes.

.5 If surface found to be imperfect was painted or coated, repaint or recoat complete room. Confirm with Consultant.

.6 If surrounding surface cannot be matched, repaint or recoat entire surface.

.7 Patch and repair existing wall junctions where one wall is removed and others remain.

.8 Where new gypsum board on metal stud construction is to align with existing construction (either plaster on concrete block or gypsum lath or existing gypsum board partitions) align construction to so there is no discontinuity between surfaces.

.9 Skim coating:

.1 Apply skim coating to new and existing gypsum board to areas scheduled for eggshell, semi-gloss or high gloss paints and to corridor walls and any other walls over five metres in length.

.2 After normal drywall finishing, but prior to priming or sealing, joints and fastener heads should be lightly sanded using a 220 mesh open weave silicon carbide sanding cloth, or wiped lightly with a damp sponge, to leave a smooth even surface covering joints and fastener heads. Caution must be taken not to raise nap of paper if sanding.

.3 Mix joint compound slightly thinner than for joint taping, and apply a thin coating to entire surface with a trowel or drywall broad knife. Immediately wipe back to remove compound that is in excess of amount needed to fill texture differences and minor imperfections, and to eliminate laps or tool marks.

.4 When skim coat is completely dry, any minor ridges shall be removed by light sanding or by wiping lightly with a damp sponge.

.10 Where existing floor-mounted plumbing fixtures are to be removed, remove piping and fill in existing concrete slab to match existing as specified in Division 03.

.11 Where new finishes are called for and existing finishes are other than paint, remove existing finishes. If in doubt, verify with Consultant prior to removal. This shall include removal of existing corner guards. Repair and make good substrate prior to installing new finishes.

1.13 REPAIR

.1 Repair Work damaged in course of renovations, except at areas accepted otherwise by Consultant for other remedial action.

.2 Where full removal of extensive amounts of almost suitable Work would be needed to replace damaged portions, then filling, straightening, spackling and similar repair techniques, followed by full painting or other finishing, may be permitted by Consultant.

.3 Examples of Work that may frequently be approved by Consultant for repair, rather than replacement: slightly bent ceiling runners, hairline cracks in gypsum board.

.4 If repaired Work is not brought up to standard for new Work, Consultant will direct that it be cut out and replaced with new Work.

1.14 RELOCATION OF EXISTING EQUIPMENT AND FURNITURE

.1 At the Owner's discretion, selected existing furniture and equipment items shall be temporarily removed, stored, and then relocated and reinstalled where directed by the Consultant, including fastening to floor and wall substrates as required to ensure that they safely and properly function and operate as intended, including any utility hook-ups and connections that may be required.

.2 Coordinate as required to ensure that salvaged equipment and furniture is protected during the work and relocated where required by the Owner, fully functioning, clean, and in same or better condition as found at commencement of the project.

.3 This item shall be paid through Change Directive and Change Order means, pursuant to the terms and conditions of the Contract.

END OF SECTION

1.1 SUMMARY

.1 Section specifies requirements for incidental cutting, fitting, and patching required to complete the Work and make its many parts fit together properly.

1.2 REQUEST FOR CUTTING, PATCHING AND REMEDIAL WORK

.1 Submit written request in advance of cutting, coring, or alteration which affects or is likely to affect:

- .1 Structural integrity of any element of the Work.
- .2 Integrity of weather exposed or moisture resistant elements.
- .3 Efficiency, maintenance, or safety of any operational element.
- .4 Visual qualities of sight exposed elements.
- .5 Work of Owner or other contractors.
- .6 Warranty of Products affected.

.2 Include in request:

- .1 Identification of Project.
- .2 Location and description of affected work, including drawings or sketches as required.
- .3 Statement on necessity for cutting or alteration.
- .4 Description of proposed work, and Products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on work of Owner or other contractors.
- .7 Written permission of affected other contractors.
- .8 Date and time work will be executed.

1.3 PRODUCTS

.1 Unless otherwise specified, when replacing existing or previously installed Products in the course of cutting and patching work, use replacement Products of the same character and quality as those being replaced.

.2 If an existing or previously installed Product must be replaced with a different Product, submit request for substitution in accordance with Section 01 25 00 - Substitution Procedures.

1.4 PREPARATION

.1 Inspect existing conditions in accordance with Section 01 71 00 - Examination and Preparation.

.2 Provide supports to ensure structural integrity of surroundings; provide devices and methods to protect other portions of the Work from damage.

.3 Provide protection from elements for areas that may be exposed by uncovering work.

1.5 CUTTING, PATCHING, AND REMEDIAL WORK

.1 Coordinate and perform the Work to ensure that cutting and patching work is kept to a minimum.

.2 Perform cutting, fitting, patching, and remedial work, including excavation and fill if applicable, to make the affected parts of the Work come together properly and complete the Work.

.3 Provide openings in non structural elements of the Work for penetrations of mechanical and electrical work.

.4 Perform cutting by methods to avoid damage to other work

.5 Provide proper surfaces to receive patching, remedial work, and finishing.

.6 Perform cutting, patching, and remedial work using competent and qualified specialists familiar with the Products affected, in a manner that neither damages nor endangers the Work.

.7 Do not use pneumatic or impact tools without Consultant's prior approval.

.8 Ensure that cutting, patching, and remedial work does not jeopardize manufacturers' warranties.

.9 Refinish surfaces to match adjacent finishes. For continuous surfaces refinish to nearest intersection. For an assembly, refinish entire unit.

.10 Fit work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces with suitable allowance for deflection, expansion, contraction, acoustic isolation, and firestopping.

.11 Maintain fire ratings of fire rated assemblies where cutting, patching, or remedial work is performed. Completely seal voids or penetrations of assembly with firestopping material to full depth or with suitably rated devices.

END OF SECTION

Part 1 General

1.1 INTENT

.1 This Section includes, but not limited to, the following:

.1 Demolition, removal completely from site, and disposal of all identified components, materials, equipment and debris.

.2 Selective demolition to allow new walls, bulkheads, ceilings and other materials to meet existing construction as indicated.

.3 Repair procedures for selective demolition operations.

.2 This Section does not include the following:

.1 Removal of hazardous materials or asbestos abatement.

.2 Demolition of exterior building components or structural elements.

.3 Mechanical or electrical equipment, except as required to make minor modifications to allow the work to be completed.

1.2 RELATED REQUIREMENTS

.1 Section 01 74 00 - Cleaning and Waste Management.

.2 Section 09 21 16 - Gypsum Board Assemblies.

.3 Section 09 30 13 - Tiling.

.4 Section 09 51 13 - Acoustical Panel Ceilings.

.5 Section 09 65 00 - Resilient Flooring.

.6 Division 20 - Mechanical.

.7 Division 26 - Electrical.

1.3 REFERENCES

.1 American Society of Safety Professionals (ASSP):

.1 ASSP A10.8-2019, Scaffolding Safety Requirements.

.2 Canadian Federal Legislation:

.1 Motor Vehicle Safety Act (MVSA), 1993, c.16.

.2 Hazardous Materials Information Review Act, 1985, c.24.

.3 Canadian Standards Association (CSA):

.1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

.4 National Fire Protection Association (NFPA):

.1 NFPA (Fire) 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations, 2022 Edition.

.5 Provincial Legislation

.1 Legislation specific to Authority Having Jurisdiction for work governed by this Section.

.6 Definitions

.1 Demolish: 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.

.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.

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Demolition Meeting: Conduct a pre-demolition meeting at Project site in accordance with requirements listed in Section 01 31 19 – Project Meetings, to confirm extent of salvaged and demolished materials; and to review Contractor's demolition plan prepared by a professional engineer.

.2 Coordination:

.1 Coordinate selective demolition work so that work of this Section adheres to aesthetic criteria established by the Drawings and specified dimensions with all elements in planes as drawn, maintaining their relationships with all other building elements.

.2 Coordinate with Owner's building manager and ongoing site operations, and limit the number of interruptions during regular business hours.

.3 Coordination with Owner's continuing occupancy of portions of existing building.

.4 Coordination for shutoff, capping, and continuation of utility services.

1.5 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Qualification Data: For firms and persons specified below to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses and other information specified.

.3 Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Owner reserves the right to make modifications where proposed methods interfere with the Owner's ongoing operations.

.4 Inventory: Submit a list of items that have been removed and salvaged after selective demolition is complete.

.5 Pre-demolition Digital Photographs or Video: Submit photographs or video indicating existing conditions of adjoining construction and site improvements prior to starting Work. Include finish surfaces that may be misconstrued as damage caused by selective demolition operations.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements: Perform work as follows; use most restrictive requirements where differences occur between the municipal, provincial and federal jurisdictions:

.1 Provincial and Federal Requirements: Perform work in accordance with governing environmental notification requirements and regulations of the Authority Having Jurisdiction.

.2 Municipal Requirements: Perform hauling and disposal operations in accordance with regulations of Authority Having Jurisdiction.

.2 Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project:

.1 Conform to the Workers Compensation Act and the Occupational Health and Safety Regulations under the Act.

.2 Conform to City of Waterloo bylaws and regulations governing this type of work.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Except where otherwise specified, all materials indicated or specified to be permanently removed from the Place of the Work shall become Contractor's property. Maximize to the fullest extent possible, salvage, and recycling of such materials, consistent with proper economy and expeditious performance of the Work.

.2 To reduce the quantity of material otherwise destined for disposal at a landfill, the Contractor is encouraged to consider utilizing the services of businesses and non-profit organizations that specialize in salvage and recycling of used building materials, but does so at his own option and risk.

.3 A current listing of drop-off facilities and recyclers specializing in specific categories of materials may be obtained during normal office hours from:

Region of Waterloo Waste Management
Business/Commercial Waste - Region of Waterloo
Cambridge site: 519-740-0822 or Waterloo site: 519-883-1145

.4 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

1.8 SITE CONDITIONS

.1 Visit and examine the site and note all characteristics and irregularities affecting the work of this Section.

.2 Owner will occupy portions of building immediately adjacent to selective demolition area:

.1 Conduct selective demolition so that Owner's operations will not be disrupted.

.3 Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities:

.1 Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.

.4 Should material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous as defined in the Hazardous Product Act be encountered, stop work, take preventative measures, and notify Consultant and Owner immediately.

Part 2 Products

2.1 DEBRIS

.1 Make all arrangements for transport and disposal of all demolished materials from the site.

2.2 EQUIPMENT

.1 Provide all equipment required for safe and proper demolition of the building.

2.3 REPAIR MATERIALS

.1 Use repair materials identical to existing materials:

.1 If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.

.2 Use material whose installed performance equals or surpasses that of existing materials.

.3 Comply with material and installation requirements specified in individual Specification Sections.

.2 Floor Patching and Levelling Compounds: Cement based, trowelable, self-levelling compounds compatible with specified floor finishes. Gypsum based products are not acceptable for work of this Section.

.3 Gypsum Board Patching Compounds: Joint compound to ASTM C475, bedding and finishing types thinned to provide skim coat consistency to patch and prepare existing gypsum board walls ready for new finishes in accordance with Section 09 21 16 - Gypsum Board Assemblies.

.4 Hoarding and Dust Screens: Refer to Section 01 53 00 -Temporary Construction Facilities.

Part 3 Execution

3.1 EXAMINATION

.1 Inspect building with Consultant and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Verify that utilities have been disconnected and capped as required.

.3 Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

.4 Notify the Consultant where existing mechanical, electrical, or structural elements conflict with intended function or design:

.1 Investigate and measure the nature and extent of conflict and submit a written report to Consultant.

.2 Consultant will issue additional instructions or revise drawings as required to correct conflict.

.5 Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 PREPARATION

.1 Identify and mark all equipment and materials identified to be retained by Owner or to be re-used in subsequent construction. Separate and store items to be retained in an area away from area of demolition and protect from accidental disposal.

.2 Post warning signs on electrical lines and equipment that must remain energized to serve other areas during period of demolition.

.3 Confirm that all electrical and telephone service lines entering building are not disconnected.

.4 Do not disrupt active or energized utilities crossing the demolition site.

.5 Provide and maintain barricades, warning signs, protection for workmen and the public during the full extent of the Work. Read drawings carefully to ascertain extent of protection required.

.6 Mark all materials required to be re-used, store in a safe place until ready for re-installation.

.7 Adjust all junction boxes, receptacles and switch boxes flush with new wall construction where additional layers to existing construction are indicated.

.8 Protection of In-Place Conditions

.1 Take precautions to guard against damage to adjacent work. Be liable for any damage or injury caused.

.2 Cease operations and notify Consultant if safety or any adjacent work appears to be endangered. Do not resume operations until reviewed with Consultant.

.3 Ensure safe passage of building occupants around and through area of demolition.

.4 Keep noise, dust, and inconvenience to occupants to minimum.

.5 Protect building systems, services and equipment.

.6 Provide temporary dust screens, covers, railings, supports and other protection as required.

.7 Provide and maintain fire prevention equipment and alarms accessible during demolition.

.9 Utility Services

.1 Coordinate existing services indicated to remain and protect them against damage during selective demolition operations.

.2 Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.

.1 Arrange to shut off affected utilities with utility companies.

.2 If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition and that maintain continuity of service 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.

.4 Cut off pipe or conduit to a minimum of 25 mm below slab, and remove concrete mound.

.3 Coordinate with mechanical and electrical sections for shutting off, disconnecting, removing, and sealing or capping utilities.

.4 Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.3 CONCRETE SLAB REINFORCING

.1 Locate location of reinforcing steel in concrete slabs prior to cutting or coring using non-destructive, non-ionizing radio frequency locators.

.2 Core concrete slabs to avoid reinforcing steel, electrical conduit or water pipes; adjust core location and coordinate with Engineer where slab features interfere with core drilling.

.3 Notify the Engineer immediately for further instructions where coring or cutting will damage existing slab features.

3.4 SELECTIVE DEMOLITION

.1 Demolish and dismantle work in a neat and orderly manner and in strict accordance with all regulations.

.2 At end of each day's work, leave Work in safe condition so that no part is in danger of toppling or falling.

.3 Demolish in a manner to minimize dusting and to prevent migration of dust.

.4 Selling or burning of materials on the site is not permitted.

.5 Fill all openings in concrete block walls with concrete masonry units, coursing to match existing, prepare ready to receive new finishes to match existing.

.1 Provide bond beams in new openings cut into existing concrete masonry unit walls.

.2 Provide finished end masonry units to patch and repair for new jamb sections in existing concrete masonry unit walls.

.6 Fill all openings in gypsum board walls with gypsum board and steel framing to match existing, skim coat to make wall smooth and even.

.7 Demolish existing flooring and adhesive remnants as follows:

.1 Vacuum existing flooring thoroughly, prior to removal, using vacuum equipped with power head/sweeper.

.2 Apply fine mist water spray to floors to minimize dust generation during removal. Avoid spraying near electrical outlets.

.3 Demolish existing residual floor finishes, remove and dispose of off site.

.4 Remove adhesive to the greatest extent possible using scrapping tools and as follows:

.1 Do not use solvent based cleaners to remove adhesive remnants.

.2 Lightly shot blast or grind floor using machine designed for purpose to remove adhesive remnants.

.3 Vacuum floor ready for application of skim coating.

.4 Repair all slab depressions and damage with cementitious patching compound.

.5 Skim coat floor with minimum 1 mm thick cementitious floor underlayment compatible with new flooring materials.

.5 Floor substrate shall be smooth, free from ridges and depressions, and adhesive remnants that could telegraph through flooring materials.

.8 Demolish existing tile finishes. Remove setting bed or adhesive to the greatest extent possible using mechanical scrapping tools and as follows:

.1 Saw cut edge of tile for clean and even transition joint between existing tile to remain and new flooring materials.

.2 Lightly shot blast or grind floor to remove remnants of setting materials.

.3 Vacuum floor ready for application of skim coating.

.4 Repair all slab depressions and damage with cementitious patching compound. Skim coat floor with minimum 1 mm thick cementitious floor underlayment compatible with new flooring materials.

.9 Demolish ceiling finishes as indicated on drawings.

.10 Remove all wall coverings scheduled for demolition. Patch and repair wall surfaces with skim coat of gypsum board joint compound leaving wall surfaces smooth and even ready for new wall finishes.

.11 Patch and repair all walls, floor and ceilings damaged during demolition with material matching adjacent walls, prepare ready for new finishes.

.12 Patch and repair all mechanical equipment and electrical fixtures damaged or exposed during demolition to match adjacent finished surfaces.

3.5 CORING, DRILLING AND SAW-CUTTING CONCRETE

.1 Complete an ultrasound inspection of affected concrete area before coring. Employ the services of an experienced inspector in accordance with Delegated Design requirements. Confirm with Owner before coring or drilling, location of reinforcing steel and raceways that may be present.

.2 Perform coring and drilling after normal working hours, unless specified otherwise. Confirm coring and drilling times with Owner.

.3 Wet or dry core drilling and saw-cutting are acceptable. Reduce amount of cooling water used to minimum required and collect water used in suitable containers, or use a suitable vacuum system that will collect water.

.4 Do not core structural beams or cut conduits or reinforcing steel without written permission from Landlord.

3.6 PATCHING AND REPAIRING

.1 Floors and Walls:

.1 Where walls or partitions that are demolished extend from one finished area into another, patch and repair floor and wall surfaces in the new space.

.2 Provide a level and smooth surface having uniform finish colour, texture, and appearance.

.3 Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform colour and appearance.

.4 Patch with durable seams that are as invisible as possible.

.5 Provide materials and comply with installation requirements specified in other Sections of these Specifications.

.6 Where patching occurs in a painted surface, apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.

.7 When requested, test and inspect patched areas after completion to demonstrate integrity of installation.

.8 Maintain fire rating of existing and new construction.

.2 Ceilings: Patch, repair, or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.7 CLEANUP

.1 Promptly as the Work progresses, and on completion, clean up and remove from the site all rubbish and surplus material. Remove rubbish resulting from demolition work daily.

.2 Maintain access to exits clean and free of obstruction during removal of debris.

.3 Keep surrounding and adjoining roads, lanes, sidewalks, municipal rights-of-way clean and free of dirt, soil or debris that may be a hazard to vehicles or persons.

END OF SECTION

Part 1 General

1.1 GENERAL INSTRUCTIONS

.1 Read and be governed by conditions of the Contract and sections of Division 01.

1.2 RELATED WORK

.1 Division 03 - Cast-In-Place Concrete.

.2 Section 09 05 13 - Mechanical Preparation of Flooring Substrates.

.3 Section 09 05 23 - Common Work Results for Flooring Preparation.

1.3 REFERENCE STANDARDS

.1 CSA A23.1:24/CSA A23.2:24, Concrete materials and methods of concrete construction/Test Methods and Standard Practices for concrete.

.2 ASTM C309-19, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.3 ASTM E1155/E1155M-23, Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers.

.4 ASTM E1486M-14(2022), Standard Test Method for Determining Floor Tolerances Using Waviness, Wheel Path and Levelness Criteria (Metric).

.5 ASTM F710-22, Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

.6 ACI 117-10 (R2015), Specification for Tolerances for Concrete Construction and Materials (ACI 117-10) and Commentary-Reapproved 2015.

.7 ACI 302.1R-15, Guide for Concrete Floor and Slab Construction.

1.4 QUALITY ASSURANCE

.1 Subcontractor qualifications:

.1 Execute the work this section only by a Subcontractor who has adequate equipment and skilled workers to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified, and is a member in good standing with the Concrete Floor Contractors Association of Ontario (CFCA).

.2 Subcontractor shall be approved in writing by the Product manufacturer for the installation of the Product specified. Submit proof of approval to Consultant prior to commencing work of this section. Manufacturer's representative shall be present at the Place of the Work throughout the work of this section to advise on application procedures.

.1 Upon request, submit proof of qualification in accordance with Section 01 61 00 - Product Requirements.

.2 Cooperation: Ensure that concrete supplied for slabs contain no admixtures that would be incompatible with floor penetrating sealer.

.3 Conduct a pre-installation meeting in accordance with Section - 01 31 00 - Project Managing and Coordination.

.4 Quality control to be in accordance with Section 01 45 00 - Quality Control. Independent inspection and testing company shall attend the pre-installation meeting.

.5 Manufacturer shall provide field review in accordance with Section 01 45 00 - Quality Control.

1.5 SUBMITTALS

.1 Submit required submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit shop drawings indicating proposed locations for control joints in slabs on grade for review and approval of locations by Consultant.

.3 Samples: Submit 305 mm (12") x 305 mm (12") sample of specified material.

.4 Product data sheets: Submit manufacturer's Product data sheets for Product to be used in the work of this section.

.5 Manufacturer’s certification that Product specified is suitable for intended use when installed in accordance with manufacturer's printed installation instructions.

1.6 ENVIRONMENTAL CONDITIONS

.1 Perform work only when environmental conditions are as specified in Division 03 - Cast-In-Place Concrete in accordance with manufacturer's requirements.

.2 Provide adequate temporary heating as required for cold weather work and to meet minimum strength required.

.3 Make use of adequate moisture, sun shades and wind barriers to prevent too rapid drying of concrete during hot weather.

.4 Do not apply concrete sealer when ambient temperature is below 4 °C (40 °F).

Part 2 Products

2.1 MATERIALS

.1 Interior grade curing-sealing compound; water-based: transparent, to ASTM C309, Type 1, Class B, VOC-compliant, in a true-water based carrier, with a solvent content less than 90 g/L (0.75 lb/gal).

.1 Acceptable Products:

.1 ‘VOCOMP-30’ by W.R. Meadows Inc.

.2 ‘Florseal WB’ by Sika Canada Inc.

.3 or approved alternate

.2 Horizontal control joint sealant: flexible joint filler/sealant, pourable grade, grey. Joint primer mandatory.

.1 Acceptable Products:

.1 REZ I-WELD FLEX' with P/G Primer by W.R. Meadows, Inc.

.2 Loadflex’ by Sika Canada Inc.

.3 or approved alternate

Part 3 Execution

3.1 EXAMINATION

.1 Before commencing work of this section, ensure that surfaces are acceptable to receive and maintain concrete finishing, and that specified installation will be achieved.

3.2 CONCRETE SLAB FINISHING

.1 Immediately after placing, screed and darby concrete before any water has bled to the surface.

.2 Strike off concrete level to screeds leaving no low spots. If vibrators are used on straightedge, ensure that concrete is not over-vibrated causing segregation and collection of water and fines on the surface.

.3 Smooth concrete to an even plane with a darby or bull float, and leave until bleed water and water sheen has disappeared.

.4 Proceed with finishing only when concrete has hardened sufficiently.

.5 Finish edges of concrete surfaces smooth with an edging tool, with slightly round exposed corners.

.6 Finish concrete surface with power float or with metal hand floats in areas inaccessible to power floats. Ensure that floating embeds large aggregate below surface, consolidates mortar at surface, with even planes, without humps or depressions, removes marks from edging, and prepares surface for further specified finishing. Do not bring water and fine material to surface by overworking.

.7 Steel trowel floated surface with power trowels or hand trowels in areas inaccessible to power trowels. Proceed with trowelling only when there is no sheen on surface. Repeat trowelling until surface is brought to approved finish. Allow sufficient time between trowelling for additional set of concrete.

.8 Rerun tooled edges following finishing of surfaces.

.9 Draw a soft bristled brush in straight lines (with no swirls) over steel trowelled surfaces to achieve a very light broom surface where non-slip floor finish is required.

.10 Finish floor surfaces level, dense, with no aggregate showing, and free of blemishes.

.11 Ensure that concrete mix proportions and finishing methods result in a surface free from dusting.

.12 Finish floors after bleed water has evaporated. Do not add water to slab to facilitate finishing. Do not overwork slab surfaces.

3.3 CONCRETE CURING

.1 Cure concrete as specified in CSA A23.1/A23.2, and by methods indicated elsewhere in the Contract Documents. Ensure that no curing compound is used that is detrimental to bond for finish flooring or finish flooring materials.

3.4 CURING-SEALING COMPOUND INSTALLATION

.1 Install in accordance with manufacturer’s instructions and as directed by manufacturer’s representative at the Place of the Work.

.2 Apply curing-sealing compound to new concrete as soon as the concrete is firm enough to work on after trowelling, except on coloured concrete, in which case application of curing- sealing compound shall not occur until after 30 days, minimum.

.3 Spray-on curing-sealing compound at the following rates:

.1 Broomed Surface: 7 m2/L minimum.

.2 Trowelled Surface: 12 m2/L minimum.

.4 Spray on in a fine, fog pattern without spurts and dribbles to form a thin, continuous film.

.5 Avoid puddles in low areas and if puddles occur, brush or roll them out.

.6 Apply 2 coats of curing-sealing compound at right angles. Apply second coat immediately prior to date of Substantial Performance of the Work.

3.5 PATCHING AND REFINISHING

.1 Before completion of the Work, patch and refinish defective surfaces to match surrounding areas with no discernible variation in appearance.

3.6 PROTECTION

.1 Ensure that finished concrete floor areas are protected from abrasion from foot or wheeled traffic, and from damage caused by spillage of oil or other harmful materials for 12 hours after application of concrete hardener.

3.7 CONCRETE SLAB SURFACE FINISHING TOLERANCES

.1 Comply with tolerances required by building code.

.2 Concrete tolerances: Straightedge in accordance with CSA A23.1/A23.2.

.1 Class A: Place and steel trowel finish concrete floor surface of concrete floors to within ±8 mm in 3000 mm (±5/16 in 10 ft) as described in ACI 117 and ASTM F710.

.2 Class B: For exposed concrete or concrete floor scheduled or indicated to receive floor finishes: Place and steel trowel finish surface of concrete floors to within ±5 mm in 3000 mm (±3/16 in 10 ft) as described in ACI 117 and ASTM F710. Floor finish shall be smooth and free of trowel marks or other defects which telegraph through to finished flooring when viewed from a distance range of within 1800 to 3000 mm (8 ft to 10 ft").

.1 Surface of concrete floors shall be flat when tested to Waviness Index ASTM E1486, (SWI2-10) of 2.5 mm (0.10"), as described to ASTM F710 appendix.

.3 Independent testing company may measure for straightedge tolerances in accordance with CSA A23.1/A23.2, in accordance with Section 01 45 00.

.3 Concrete tolerances: F-number in accordance with CSA A23.1/A23.2.

.1 Measure f-number finish tolerance requirements in accordance with CSA A23.1/A23.2 and submit log records of measurements.

3.8 CONCRETE FLOOR FINISHING SCHEDULE

.1 Concrete to receive finish flooring materials: smooth steel power trowel finish.

.2 Provide level scratched finish at concrete surfaces scheduled to receive concrete topping or tile on thin set mortar bed.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 05 50 00 - Metal Fabrications.

.2 Section 07 92 00 - Joint Sealants.

.3 Section 08 11 13 - Metal Doors and Frames.

.4 Section 09 91 00 - Painting.

1.2 REFERENCES

.1 ASTM International:

.1 ASTM A116-22, Standard Specification for Metallic-Coated, Steel Woven Wire Fence Fabric.

.2 ASTM A123/A123M-24, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.3 ASTM A153/A153M-23, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.4 ASTM A240/A240M-25a, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

.5 ASTM A307-21, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

.6 ASTM A496/A496M-07, Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement. (Withdrawn 2013)

.7 ASTM A563/A563M-24, Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric).

.8 ASTM A641/A641M-19(2025), Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

.9 ASTM A653/A653M-25a Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.10 ASTM A1011/A1011M-25, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.

.11 ASTM B633-23, Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.

.12 ASTM C73-23, Standard Specification for Calcium Silicate Brick (Sand-Lime Brick).

.13 ASTM C140/C140M-26, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.

.14 ASTM C207-24, Standard Specification for Hydrated Lime for Masonry Purposes.

.15 ASTM C216-24, Standard Specification for Facing Brick (Solid Masonry Units Made of Clay or Shale).

.16 ASTM C549-23, Standard Specification for Perlite Loose Fill Insulation.

.17 ASTM E336-25a, Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings.

.18 ASTM E488/E488M-22, Standard Test Methods for Strength of Anchors in Concrete Elements.

.19 ASTM F593-24, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

.20 ASTM F594-24, Standard Specification for Stainless Steel Nuts.

.21 ASTM F738M-02(2008), Standard Specification for Stainless Steel Metric Bolts, Screws, and Studs. (Withdrawn 2015)

.22 ASTM F836M-20, Standard Specification for Style 1 Stainless Steel Metric Nuts (Metric). (Withdrawn 2023)

.23 ASTM F3125/F3125M-25a, Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength.

.2 Brick Industry Association (BIA):

.1 Technical Note No. 20-2018, Cleaning Brickwork.

.3 Canadian Standards Association (CSA International):

.1 CSA A23.1:24/A23.2:24, Concrete materials and methods of concrete Construction/Test methods and standard practices for concrete.

.2 CSA-A165 Series-14 (R2019), CSA Standards on Concrete Masonry Units (Consists of A165.1, A165.2, and A165.3).

.3 CAN/CSA A179-14 (R2024), Mortar and Grout for Unit Masonry.

.4 CSA A370-14 (R2023), Connectors for Masonry.

.5 CAN/CSA A371-14 (R2024), Masonry Construction for Buildings.

.6 CSA-A3000-18, Cementitious Materials Compendium, Includes Update No. 1 and Errata (2021)

.7 CSA G30.18-21, Carbon Steel Bars for Concrete Reinforcement.

.8 CSA S304:24, Design of Masonry Structures.

.4 South Coast Air Quality Management District (SCAQMD), California State:

.1 SCAQMD Rule 1168-22, Adhesive and Sealant Applications

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Coordinate lines, levels and coursing with work of other Sections.

.2 Obtain built-in items prior to start of this work.

.2 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section and on-site installation, with Contractor, Subcontractor, material supplier and Consultant in accordance with Section 01 31 00 - Project Managing and Coordination to:

.1 Verify project requirements including specification and details for project.

.2 Confirm required mortar, grout and concrete testing; review batch control and grouting procedures.

.3 Coordinate crack control measures.

.4 Review requirements for reinforcement at corners and wall intersections.

.5 Confirm trowelled or tooled joints to concealed and exposed masonry faces.

.6 Review methods for controlling efflorescence during construction.

1.4 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

.1 Provide manufacturer's printed product literature, specifications and data sheet. Indicate masonry types, shapes, sizes, and textures.

.2 Cementitious Materials:

.1 Include brand, type, and name of manufacturer for site mixed mortar materials.

.2 Submit proposed mix proportions and sand analysis reports and compressive strength reports on the proposed mortar mix(es).

.2 Shop Drawings: Submit shop drawings indicating the following:

.1 Indicate sizes, profiles, and coursing for concrete masonry units.

.2 Detail bending and placement of unit masonry reinforcing bars, including elevations of reinforced walls if required.

.3 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.1 Provide duplicate full-size samples of each type of scheduled masonry unit; showing size, colour, design and finish.

.2 Obtain review comments from Consultant prior to ordering.

1.5 QUALITY ASSURANCE

.1 Conform to CAN/CSA A371, except as modified by this specification.

.2 The masonry Subcontractor shall be a member in good standing with the Ontario Masonry Contractors' Association.

.3 The masonry Subcontractor shall have a minimum of five years of experience on projects of similar size and magnitude and shall provide continuous active supervision by a journeyman mason while masonry work is in progress.

.4 Masonry work shall be performed by experienced, qualified journeyman masons under the direct and continual full-time supervision of certified masons.

.5 Before starting masonry work establish mix proportions based on the limitations set out in Table 2 of CSA A179.

.6 Test laboratory prepared samples of the proposed mortar(s) for compressive strength in accordance with CSA A179, by a laboratory approved by the Owner. The Owner will pay for the initial cost of mortar testing. Any re-testing required as a result of the original test failing will be borne by the Contractor.

.7 Connectors and joint reinforcement shall conform to CSA A370.

.8 Miscellaneous masonry accessories, and their use where not otherwise specified but shown or required for proper completion of the Work, shall conform to CSA A371.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver masonry units on pallets or cubes, suitably protected from road grime and moisture absorption due to exposure to rain or melting snow.

.2 Unload and store on dry, level areas, without direct contact with the ground.

.3 Remove plastic wrappings from concrete masonry units and cover with waterproof coverings which will provide protection from the elements but allow for air circulation.

.4 Deliver cement, lime, and mortar in dry condition with manufacturer's label intact and store under waterproof cover and protected from elements.

.5 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

1.7 SITE CONDITIONS

.1 Ambient Conditions: maintain materials and surrounding air temperature to:

.1 Minimum 5 degrees C prior to, during, and 48 hours after completion of masonry work.

.2 Maximum 32 degrees C prior to, during, and 48 hours after completion of masonry work.

.2 Provide adequate bracing for masonry during construction and until permanent lateral supports are in place.

Part 2 Products

2.1 CONCRETE MASONRY UNITS

.1 Standard Concrete Masonry Units: to CSA A165.1 and as follows:

.1 Classification: H/15/C/M.

.2 Size: As indicated on Drawings.

.3 Special shapes: provide plain end units for exposed corners as indicated on Drawings. Lintels and bond beams are constructed using knock-out lintel units. Provide additional special shapes as indicated.

2.2 MORTAR AND GROUT MATERIALS

.1 Use same brands of materials and source of aggregate for entire project.

.2 Cement:

.1 Portland Cement: to CSA-A3000, Type GU - General use hydraulic cement (Type 10) gray colour.

.3 Aggregate: supplied by one supplier.

.1 Fine Aggregate: to CSA A179, manufactured sand.

.2 Course Aggregate: to CSA A179.

.4 Water: clean and potable.

.5 Lime:

.1 Hydrated Lime: to CSA A179, Type S.

.6 Mortar Mixes

.1 Mortar for interior masonry:

.1 Non-Loadbearing: N based on proportion specifications.

.2 Pointing Mortar: CSA A179, Type N using property specification.

.7 Mortar Mixing:

.1 Mix mortar ingredients in accordance with CSA A179 in quantities needed for immediate use.

.2 Maintain sand uniformly damp immediately before mixing process.

.3 Do not use admixtures, including pigments, air entraining agents, accelerators, retarders, water repellent agents, or other admixtures; unless approved in writing by the Consultant.

.4 Do not use anti-freeze compounds including calcium chloride or chloride based compounds.

.5 Use a batch type mixer in accordance with CSA A179.

.6 Pointing mortar: prehydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball. Allow to stand for not less than one hour no more than two hours then remix with sufficient water to produce mortar of proper consistency for pointing.

.7 Re-temper mortar only within two hours of mixing, when water is lost by evaporation.

.8 Use mortar within 2 hours after mixing at temperatures of 32 degrees C, or 2 ½ hours at temperatures under 10 degrees C.

.8 Grout Mixes:

.1 Bond Beams: grout mix 20 MPa strength at 28 days; 200-275 mm slump; mixed in accordance with CSA A179 coarse grout.

.2 Lintels: grout mix 20 MPa strength at 28 days; 200-250 mm slump; mixed in accordance with CSA A179 coarse grout.

.3 Grout: Minimum compressive strength of 20 MPa at 28 days. Maximum aggregate size and grout slump: CSA A179.

.9 Grout Mixing:

.1 Mix batched and delivered grout in accordance with CSA-A23.1 transit mixed.

.2 Mix grout ingredients in quantities needed for immediate use in accordance with CSA A179 coarse grout.

.3 Add admixtures in accordance with manufacturer's instructions; mix uniformly.

.4 Do not use calcium chloride or chloride based admixtures.

.10 Mix Tests:

.1 Testing Mortar Mix:

.1 Test mortar to requirements of Section 01 45 00 - Quality Control, and in accordance with CSA A179, for proportion specification. Test prior to construction and during construction for:

.1 Compressive strength.

.2 Consistency.

.3 Mortar aggregate ratio.

.4 Sand/cement ratio.

.5 Water content and water/cement ratio.

.6 Air content.

.7 Splitting tensile strength

.2 Testing Grout Mix:

.1 Test grout to requirements of Section 01 45 00 - Quality Control, and in accordance with CSA A179, for proportion specification. Test prior to construction and during construction for:

.1 Compressive strength.

.2 Sand/cement ratio.

.3 Water content and water/cement ratio.

.4 Slump.

2.3 GALVANIZING

.1 The following galvanizing requirements apply to steel anchors, ties, reinforcing and accessories where requirements are not otherwise specifically listed:

- .1 Ties and Reinforcing:
  - .1 Mill Galvanized (Interior Use): In accordance with ASTM A116, Class 3
  - .2 Hot Dip Galvanized (Exterior, including inner wythe of exterior wall construction and High Humidity Use): In accordance with ASTM A153/A153M, Class B-2.
- .2 Hot Dip Hardware and Bolts: In accordance with ASTM A153/A153M, Class B-2 regardless of location.
- .3 Hot Dip Sheet Steel: In accordance with ASTM A653/653M, Coating Designation Z600, regardless of location.
- .4 Structural Shapes and Pipes: In accordance with ASTM A123/A123M, Grade 85, regardless of location.

2.4 REINFORCEMENT

.1 Bar reinforcement: Steel to CAN/CSA A371 and CSA G30.18, Grade 400 W.

.2 Masonry Joint Reinforcement: In accordance with to CAN/CSA A371 and ASTM A496/A496M, with corrosion protection in accordance with CSA S304 and CSA A370, and as follows:

- .1 Interior Walls: Hot dip galvanized, carbon steel.
- .2 Wire Size for Side Rods: W1.7 or 3.8 mm diameter.
- .3 Wire Size for Cross Rods: W1.7 or 3.8 mm diameter.
- .4 Spacing of Cross Rods, Tabs, and Cross Ties: At a maximum of 400 mm $^{O}/_{C}$.
- .5 Lengths: A minimum of 3000 mm, with prefabricated corner and tee units.

.3 Connectors: In accordance with to CSA A370 and CSA S304 with hot dip galvanized finish.

.4 Single Wythe Masonry Joint Reinforcement: Either ladder or truss type with single pair of side rods.

- .1 Basis-of-Design Materials:
  - .1 Ladder BL10 and Truss BL30, Blok Lok.

2.5 TIES AND ANCHORS

.1 Ties and anchors specified in this section shall be designed in accordance with CSA A370 for non-conventional masonry connectors as follows:

- .1 Deflection: Maximum 2 mm, including free play, when acted upon by a lateral load of 0.45 kN, in all possible positions of adjustment.
- .2 Positive restraint at position of maximum adjustment.
- .3 Free play of multi-component ties maximum 1.2 mm when assembled in all possible configurations.
- .4 Anchors shall allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall.

.2 Lateral Partition Supports (Top of Wall Anchors):

- .1 Angle Support: Fabricated from 2.657 mm core metal thickness angled steel plate having 75 mm long legs fastened to deck structure to allow vertical movement of masonry assembly; hot dip galvanized.

.1 Basis-of-Design Materials:

.1 PTA 422, Blok Lok.

.2 Plate Support: Fabricated from 2.657 mm core metal thickness steel plate with 10 mm diameter metal 150 mm long welded to plate having closed end plastic tube fitted over rod that allows rod to move in and out of tube; hot dip galvanized after fabrication.

.1 Basis-of-Design Materials:

.1 PTA 420, Blok Lok.

.3 Rigid T-Intersection Anchors: Fabricate from steel bars 38 mm wide x 6 mm thick x 600 mm long with ends turned up 50 mm or with cross pins at installers option; hot dip galvanized.

.4 Anchor Bolts: Headed steel bolts in accordance with ASTM A307, Grade A; with ASTM A563/A563M hex nuts and, where indicated, flat washers; hot-dip galvanized in accordance with ASTM A153/A153M, Class C.

.5 Post Installed Anchors: Provide chemical or torque controlled expansion anchors, with capability to sustain, without failure, a load equal to six times the load imposed when installed in solid or grouted unit masonry and equal to four times the load imposed when installed in concrete when tested in accordance with ASTM E488/E488M conducted by a qualified independent testing agency, and as follows:

.1 Indoor Locations: Carbon-steel components zinc-plated in accordance with ASTM B633, Class Fe/Zn 5.

.2 Outdoor and High Humidity Locations: Alloy Group 1 or 2 stainless steel bolts complying with ASTM F593/F738M and nuts complying with ASTM F594/ASTM F836M.

.3 Fastening Into Solid Concrete or Solidly Grouted Installation: Two component, injectable adhesive specifically manufactured for use in installing dowels or threaded anchor rods and inserts into new or existing concrete or grout, and as follows:

.1 Epoxy Composition: Sealed packaging containing resin, hardener, cement and water; components.

.2 Curing Time: Rapid set, high strength and stiffness; maximum time 45 minutes at 20°C.

.3 Basis-of-Design Materials:

.1 HIT HY150 System, Hilti Inc., no Substitutions Accepted.

.4 Fastening through Hollow Wall Installation: Two component, injectable adhesive specifically manufactured for use in installing dowels or threaded anchor rods and inserts, with cylindrical mesh screen tube into new or existing masonry cavity wall, and as follows:

.1 Epoxy Composition: Sealed packaging containing resin, hardener, cement and water.

.2 Curing Time: Rapid set, high strength and stiffness; maximum time 60 minutes at 20°C.

.3 Basis-of-Design Materials:

.1 HIT HY20 System, Hilti Inc., no Substitutions Accepted.

.5 Fastening to Hollow Wall Installation: Two component, injectable adhesive specifically manufactured for use in installing dowels or threaded anchor rods and inserts, with cylindrical mesh screen tube into new or existing masonry cavity wall, and as follows:

.1 Epoxy Composition: Sealed packaging containing resin, hardener, cement and water.

.2 Curing Time: Rapid set, high strength and stiffness; maximum time 60 minutes at 20°C.

.3 Basis-of-Design Materials:

.1 HIT HY20 System, Hilti Inc., no Substitutions Accepted.

.6 Toggle Bolts: Tumble wing type, class and style as required for supported construction.

2.6 ACCESSORIES

.1 Joint Sealants: As specified under Section 07 92 00 - Joint Sealants, and as follows:

.1 Vertical Sealant: Colour to match brick.

.2 Horizontal Sealant: Colour to match mortar.

.2 Joint Filler: Control Joint Fillers: Preformed rubber, neoprene or polyvinylchloride, size and profile to suit intended application, and as indicated on drawings.

2.7 CLEANING COMPOUNDS

.1 Use low VOC products in compliance with SCAQMD Rule 1168.

.2 Compatible with substrate and acceptable to concrete masonry manufacturer for use on products.

Part 3 Execution

3.1 EXAMINATION

.1 Verify surfaces and conditions are ready to accept work of this Section.

.2 Examine work of other Sections upon which work of this section is dependent. Should discrepancies be found which affect the proper performance of the work of this section, do not commence work until such discrepancies have been resolved.

.3 Perform work with minimal cutting and patching.

3.2 PREPARATION

.1 Protect adjacent finished materials from damage due to masonry work.

3.3 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.4 INSTALLATION: GENERAL

.1 Construction to conform to CAN/CSA A371.

.2 Where mortar has started to harden at units requiring repositioning, remove and replace with fresh mortar.

.3 Masonry horizontal and vertical joints to be 10 mm thick except where adjustments are necessary to maintain the bond pattern or to adjust coursing.

3.5 INSTALLATION: CONCRETE MASONRY UNITS

.1 Standard 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.

.2 Build in miscellaneous items such as bearing plates, steel angles, bolts, anchors, inserts, sleeves and conduits.

.3 Construct masonry walls using running bond unless otherwise noted.

.4 Build around frames previously set and braced. Fill behind hollow frames within masonry walls with mortar or grout and embed anchors.

.5 Fit masonry closely against electrical and plumbing outlets so collars, plates and covers overlap and conceal cuts.

.6 Install movement joints and keep free of mortar where indicated.

.7 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.

.8 Solid Units: apply mortar over entire vertical and horizontal surfaces. Avoid bridging of airspace between brick veneer and backup wall with mortar.

.9 Ensure compacted head joints. Use full or face-shell joint as indicated.

.10 Tamp units firmly into place.

.11 Do not adjust masonry units after mortar has set. Where resetting of masonry is required, remove, clean and reset units in new mortar.

.12 Tool exposed joints concave; strike concealed joints flush.

.13 After mortar has achieved initial set up, tool joints.

.14 Do not interrupt bond below or above openings.

3.6 TOLERANCES

.1 Tolerances for standard concrete unit masonry tolerances in accordance with CSA A165.1, supplemented as follows:

.1 Maximum variation between units within specific job lot not to exceed 2 mm.

.2 No parallel edge length, width or height dimension for individual unit to differ by more than 2 mm.

.3 Out of square tolerance not to exceed 2 mm.

3.7 INSTALLATION: CONNECTORS AND REINFORCEMENT

.1 Supply and install masonry connectors and reinforcement in accordance with CSA A370, CAN/CSA A371, CSA-A23.1 and CSA-S304.1 unless indicated otherwise.

.2 Supply and install additional reinforcement to masonry as indicated and as required for seismic loads in accordance with building code requirements.

3.8 BONDING AND TYING

.1 Install unit, adjustable, joint reinforcement where indicated and in accordance with CSA A370, CAN/CSA A371, and manufacturer's instructions.

.1 Install horizontal joint reinforcement 400 mm on centre.

.2 Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 400 mm each side of opening.

.3 Place joint reinforcement continuous in first and second joint below top of walls.

.4 Lap joint reinforcement ends minimum 200 mm.

.5 Connect joint corners and intersections with strap anchors 400 mm on centre.

3.9 REINFORCED LINTELS AND BOND BEAMS

.1 Reinforce masonry beams, masonry lintels and bond beams as indicated.

.2 Place and grout reinforcement in accordance with CSA-S304, CAN/CSA A371, and CSA A179.

.3 Support and position reinforcing bars in accordance with CAN/CSA A371.

3.10 GROUTING

.1 Grout masonry in accordance with CSA S304.1, CAN/CSA A371 and CSA A179 and as indicated.

3.11 ANCHORS

.1 Supply and install metal anchors in accordance with CSA A370 and CAN/CSA A371 as indicated.

3.12 LATERAL SUPPORT AND ANCHORAGE

.1 Supply and install lateral support and anchorage in accordance with CSA S304.1 and as indicated.

3.13 CONTROL AND EXPANSION JOINTS

.1 Install control and expansion joint materials in unit masonry as masonry progresses; do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

.2 Form control joints in concrete masonry consisting of a complete vertical break free from mortar using one of the following methods:

.1 Break joint reinforcement at control joints, but extend bond beam reinforcing 400 mm into wall across control joint and wrap with 0.15 mm polyethylene bond breaker.

.2 Fit bond breaker strips into hollow contour in ends of concrete masonry units on one side of control joint; fill resultant core with grout and rake out joints in exposed faces for application of sealant.

.3 Install preformed control joint gaskets designed to fit standard sash block.

.4 Install interlocking units designed for control joints; install bond breaker strips at joint; keep head joints free and clear of mortar or rake out joint for application of sealant.

.5 Install temporary foam plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

.6 Refer to Drawings for control and expansion joint locations, and vertical reinforcing requirements; confirm location with Consultant before installation; confirm with Consultant where not shown on Drawings.

.3 Install a minimum 10 mm high horizontal, pressure relieving joints by inserting a compressible filler, sealant and backer rod specified in Section 07 92 00 - Joint Sealants; locate horizontal, pressure relieving joints beneath shelf angles supporting masonry.

3.14 FIELD BENDING

.1 Do not field bend reinforcement and connectors except where indicated or authorized by Consultant.

.2 When field bending is authorized, bend without heat, applying a slow and steady pressure.

.3 Replace bars and connectors which develop cracks or splits.

3.15 REPAIR/RESTORATION

.1 Upon completion of masonry, fill holes and cracks, remove loose mortar and repair defective work.

.2 Place safety devices and signs near work areas as indicated and directed; seal or repair openings and joints where there is potential risk of water or chemical infiltration through the wall assembly.

.3 Rinse off masonry until no indications of chemicals are present; rinse from bottom to top and from top to bottom; cleanup work area as work progresses; remove debris and waste from site at end of each work day.

3.16 FIELD QUALITY CONTROL

.1 Site Tests, Inspection: as follows:

.1 Concrete masonry units will be sampled and tested by independent testing agency appointed and paid by Owner in accordance with CSA S304.1.

.2 Notify inspection agency minimum of 24 hours in advance of requirement for tests.

3.17 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning and Waste Management.

.2 Concrete Unit Masonry:

.1 Progress Cleaning:

.1 Standard Concrete Unit Masonry:

.1 Allow mortar droppings on masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block. Clean wall surface with suitable brush or burlap.

.3 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

.4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 00 - Cleaning and Waste Management.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 35 00 - Delegated Design.

.2 Section 04 22 00 - Concrete Unit Masonry.

.3 Section 06 10 00 - Rough Carpentry.

.4 Section 06 40 00 - Architectural Woodwork.

.5 Section 09 21 16 - Gypsum Board Assemblies.

.6 Section 09 91 00 - Painting.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM):

.1 ASTM A53/A53M-24, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

.2 ASTM A123/A123M-24, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.3 ASTM A153/A153M-23, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.4 ASTM A276/A276M-25, Standard Specification for Stainless Steel Bars and Shapes.

.5 ASTM A307-21, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.

.6 ASTM A500/A500M -23: Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

.7 ASTM A501/A501M -21: Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

.8 ASTM A570-79, Standard Specification for Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality. (Withdrawn)

.9 ASTM A591/A591M-98, Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Weight [Mass] Applications. (Withdrawn 2005)

.10 ASTM A653/A653M-25a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.11 ASTM A780/A780M-20, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

.12 ASTM B177/B177M-11(2021), Standard Guide for Engineering Chromium Electroplating.

.13 ASTM B221-21, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

.14 ASTM B221M-21, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).

.15 ASTM B632/B632M-24, Standard Specification for Aluminum-Alloy Rolled Tread Plate.

.16 ASTM F593-24, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

.17 ASTM F3125/F3125M-25a, Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.

.2 Canadian Standards Association (CSA International):

.1 CSA-G40.20-13/G40.21-13 (R2023), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CSA-G164-18 (R2023), Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CSA G189-1966(R2003), Sprayed Metal Coatings for Atmospheric Corrosion Protection.

.4 CSA-S16:24, Design of Steel Structures.

.5 CSA W47.1:25, Certification of Companies for Fusion Welding of Steel.

.6 CSA W48:23, Filler Metals and Allied Materials for Metal Arc Welding.

.7 CSA W55.3-08 (R2023), Certification of companies for resistance welding of steel and aluminum.

.8 CSA W59:24, Welded Steel Construction.

.9 CSA W178.1:18 (R2023), Certification of Welding Inspection Organizations.

.10 CSA W178.2:18 (R2023), Certification of Welding Inspectors.

.3 National Association of Architectural Metal Manufacturers (NAAMM):

.1 NAAMM AMP 500-06, Metal Finishes Manual.

.2 NAAMM AMP 521-01 (R2012), Pipe Railing Manual.

.3 NAAMM AMP 555-92, Code of Standard Practice for the Architectural Metal Industry (Including Miscellaneous Iron).

.4 Naval Publications and Form Center (NPFC):

.1 NPFC-MIL-P-21035, Paint High Zinc Dust Content, Galvanizing Repair (Metric) (2021).

.5 The Society for Protective Coatings (SSPC)/National Association of Corrosion Engineers (NACE International):

.1 Surface Preparation Guidelines:

.1 SSPC SP 3-2024, Power Tool Cleaning.

.2 SSPC-SP5/NACE No. 1, White Metal Blast Cleaning (2007).

.3 SSPC-SP6/NACE No. 3, Commercial Blast Cleaning (2007).

.4 SSCP-SP7/NACE No. 4, Brush off Blast Cleaning (2007).

.6 UL Environmental Choice Program (ECP):

.1 UL 2760, Surface Coatings - Recycled Water-Borne Coatings (formerly CCD-048).

.2 UL 2768, Architectural Surface Coatings (formerly CCD-047).

1.3 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures:

.1 Submit manufacturer's printed product literature, specifications and data sheets.

.2 Provide one electronic copy of WHMIS SDS - Safety Data Sheets in accordance with WHMIS acceptable to Labour Canada, and Health and Welfare Canada and indicate VOC content for:

.1 Finishes, coatings, primers and paints.

.2 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures:

.1 Indicate materials, finishes, profiles, core thicknesses, connections, joints, sizes of sections, method of anchorage, number of anchors, supports, fasteners, rivets, welds, reinforcement, details, and accessories.

.2 For items where design is delegated to fabricator, provide shop drawings signed and sealed by the professional engineer registered in Province of Work, responsible for the design as indicated in Section 01 35 00 - Delegated Design.

.3 Submittals shall bear the seal of a professional engineer registered in the Province of the Work.

.4 Submit delegated design professional engineer's design notes and calculations upon request of the Consultant.

.5 Submit Letter of Commitment, signed and sealed by the professional engineer required by the Work of this Section in compliance with Section 01 35 00 - Delegated Design; professional engineer shall define applicable responsibilities in the completed Letter of Commitment and Letter of Compliance in compliance with the intent of the Building Code. Submit in conjunction with Shop drawings.

.6 Submit evidence of welder qualifications specified in this Section.

.7 Prior to declaration of Substantial Performance, submit subcontractor’s design engineer to certify substantial compliance with the system design by submitting a Letter of Compliance, signed and sealed by the retained professional engineer required by the Work of this Section in compliance with Section 01 35 00 - Delegated Design.

1.4 QUALITY ASSURANCE

.1 Fabricator Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

.2 Welding: Qualify procedures and personnel according to the following:

.1 When steel is to be welded, it is required that a welding procedure suitable for the grade of steel and intended use or service will be utilized. See Appendix X3 of Specification A6/A6M for information on weldability.

.2 Welders shall be qualified by Canadian Welding Bureau for classification of work being performed.

.3 The fabricator shall be certified to CSA W47.1, Division 1 or 2.1.

.4 Welding inspection to CSA W178.

.5 Resistance welding: by welders certified to CSA W55.3.

.6 Welding: to CSA W59.

.3 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

.4 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.5 Detail and fabricate metal fabrications in accordance with the NAAMM AMP 555.

.6 Perform Work to the highest standard of modern shop and field practice, by personnel experienced in this Work. Accurately fit joints and intersecting members in true planes with adequate fastening. Build and erect the Work plumb, true, square, straight, level, accurate to the sizes shown, and free from distortion or defects.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Exercise due care in storing, handling and erecting all materials and support all materials properly at all times so that no piece will be bent, twisted or otherwise damage structurally or visibly.

.2 Correct damaged material and where the Consultant deems damage irreparable, replace the affected items at no additional expense to the Consultant or Owner.

.3 Apply protective covering to face of all exposed finished metalwork before it leaves shop, covering to remain until item installed.

.4 Fabricate large assemblies so they can be safely and easily transported and handled to their place of installation.

.5 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

1.6 SITE CONDITIONS

.1 Coordinate this Work with the remainder of the Work and exercise the necessary scheduling to ensure that all Work is carried out and all items incorporated during the appropriate construction phase.

.2 Provide instructions and drawings to other trades for setting bearing plates, anchors blots, and other members that are built in to work of other trades.

.3 Protect other Sections of the Work from damage by this Section of the Work.

Part 2 Products

2.1 MATERIALS

.1 Steel sections and plates: to CSA-G40.20/G40.21, Grade 300W.

.2 Hollow Structural Sections: In accordance with CSA G40.20/G40.21, Grade 350W, Class C.

.3 Steel Tubing: ASTM A500/500M, Grade B or ASTM A501/501M.

.4 Welding materials: to CSA W59.

.5 Welding electrodes: to CSA W48 Series.

.6 Fasteners: Bolts, nuts, washers, rivets, lock washers, anchor bolts, machine screws, and machine bolts.

.1 Unfinished fasteners: In areas not exposed to public, use unfinished bolts conforming to ASTM A307, Grade A, with hexagon heads and nuts. Supply bolts of lengths required to suit the thickness of the material being joined, but not projecting more than 6 mm beyond nut, without the use of washers.

.2 Finished fasteners:

.1 In areas exposed to public use, bolts, nuts, washers, rivets, lock washers, anchor bolts, machine screws and machine bolts to be hot dip galvanized in accordance with ASTM A153/A153M or CSA-G164.

.2 For joining stainless steel components use stainless steel fasteners of same type.

.7 Structural bolts: to ASTM F3125/F3125M.

.8 Stainless steel fasteners, washers and nuts: to ASTM F593, 18-8 austenitic stainless steel (Grade 8 - B8/B8A), sized as required for purpose intended, or as otherwise indicated. Cold finished: Condition B, cold worked, per ASTM A276/A276M.

.9 Grout: non-shrink, non-metallic, non-corrosive flowable, 15 MPa at 24 hours.

.10 Slotted Channel Framing: Cold formed metal channels with flange edges returned toward web and with 14 mm wide slotted holes in webs at 50 mm O/C and as follows:

.1 Width of Channels: as required in accordance with Section 01 35 00 - Delegated Design.

.2 Depth of Channels: as required in accordance with Section 01 35 00 - Delegated Design. Metal and Thickness: Galvanized steel in accordance with ASTM A653/A653M, structural quality, Grade 230, with Z275 coating.

.3 Acceptable Materials:

.1 Powerstrut Engineering Co., Inc.

.2 Unistrut Corporation.

2.2 FABRICATION

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Use self-tapping shake-proof flat, round, or oval headed screws on items requiring assembly by screws or as indicated.

.3 Where possible, fit and shop assemble work, ready for erection.

.4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush. Seal exterior steel fabrications to provide corrosion protection in accordance with CSA-S16.

.5 Welding is to conform to CSA W59 and the fabricator certified to CSA W47.1. Include for welding inspection in the Contract.

.6 File or grind all exposed welds smooth and flush. Repair or fill all pits, cracks and holes. Grind and polish all handrails to a smooth, even surface. Smooth all inside corners, returns.

.7 Insulate when necessary to prevent electrolysis due to metal to metal contact or metal to masonry or concrete contact. Use bituminous paint or other approved method.

.8 Provide fastenings, including anchor bolts, bolts, lag screws, expansion bolts, straps, brackets, etc. required for the fabrication and erection of work of this Section.

2.3 FINISHES

.1 Prior to priming steel, prepare all surfaces in conformance with SSPC SP-3 – Power Tool Cleaning for non-exposed locations and any overhead steel not subject to contact.

.2 Hot dip galvanizing: galvanize steel, where indicated, to ASTM A123/A123M, minimum zinc coating of 600 g/m². (Severe, unprotected exposures).

.3 Electrolytic galvanizing: galvanize steel, where indicated, to ASTM A591/A591M, minimum zinc coating of 180 g/m². (Non-severe, unprotected exposures).

.4 Wipe coat galvanizing: galvanize steel, where indicated to CSA G189, minimum zinc coating of 75 g/m^2. (Non-severe, protected exposures)

.5 Shop Primers: Provide primers that are compatible with paint systems specified.

.6 Touch up galvanized surfaces with zinc rich coating, to ASTM A780/A780M: NPFC-MIL-P-21035 zinc rich paint, minimum DFT 8 mils.

.7 Zinc Rich Paint: Conforming to NPFC-MIL -P-21035 zinc rich paint.

.1 Clean metal to equivalent of commercial sand blast SSPC-SP6, remove sandblast in residue.

.2 Apply one coat of zinc rich paint to surfaces exposed after assembly to minimum dry film thickness of 60 μm (2.5 mil). Apply coating immediately after cleaning and over primer.

.8 Isolation Coating: Apply an isolation coating to contact surfaces in contact with cementitious materials, wood materials and dissimilar metals except stainless steel.

.9 Paint: Prepare the Work and paint in accordance with CSA-S16, primed ready for site finish as specified in Section 09 91 00 - Painting. Leave surfaces to be welded unpainted.

2.4 ROUGH HARDWARE

.1 Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required. Fabricate items to sizes, shapes, and dimensions required.

2.5 MISCELLANEOUS FABRICATIONS

.1 Miscellaneous Framing and Supports: Provide steel framing and supports for applications indicated that are not a part of structural steel framework, as required to complete work.

.2 Fabricate units to sizes, shapes, and profiles indicated and required to receive adjacent other construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitred joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.

.3 Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.

.4 Miscellaneous Steel Trim: Provide shapes and sizes indicated for profiles shown. Unless otherwise indicated, fabricate units from structural steel shapes, plates, and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings, and anchorages as required for coordination for assembly and installation with other work.

2.6 ANGLE LINTELS

.1 Steel angles: galvanized, sizes indicated for openings. Provide 150 mm minimum bearing at ends.

.2 Weld or bolt back-to-back angles to profiles as indicated.

.3 Finish: shop painted where exposed.

2.7 CHANNEL FRAMES

.1 Fabricate frames from steel, sizes of channel and opening as indicated.

.2 Weld channels together to form continuous frame for jambs and head of openings, sizes as indicated.

.3 Weld steel strap anchors to channel jamb frame at centres as required.

.4 Finish: galvanized.

Part 3 Execution

3.1 INSTALLATION

.1 Install Work in accordance with manufacturer's/fabricator's written instructions and Contract Documents.

.2 Do welding work in accordance with CSA W59 unless specified otherwise.

.3 Supply finished items to be built-in to those trades along with instructions for proper installation.

.4 Fasteners to draw adjoining sections together in proper, true alignment, and are capable of field adjustment.

.5 All fasteners, mountings to be non-loosening and installed so that they will be hidden at completion.

.6 Install all Work to true, straight lines, accurate to profile, all properly aligned.

.7 Isolate dissimilar metals in a manner approved by the Consultant to prevent electrolytic action or corrosion.

.8 Install finish hardware supplied under other Sections required for completion of components of this Section.

.9 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.10 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.

.11 Make field connections with high tensile bolts to CSA-S16 and weld to prevent loosening.

.12 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.

.13 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.

.14 Repair galvanized areas damaged by welding, flame cutting or during handling, transport or erection in accordance with ASTM A780/A780M. Touch-up with organic zinc-rich paint to NPFC-MIL-P-21035 zinc rich paint, minimum DFT 8 mils.

3.2 CHANNEL FRAMES

.1 Install steel channel frames to openings as indicated.

3.3 MISCELLANEOUS ITEMS

.1 Provide steel angle frame, hanging rods and bracing for supporting bulkheads and shelving.

.2 Provide bracket backing supports for vanities.

.3 Steel angle masonry supports as detailed.

.4 Supply and install miscellaneous metal items as indicated or specified, or as otherwise required for a complete job, in accordance with the design intent of the project.

3.4 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 06 40 00 - Architectural Woodwork.

.1 Section 10 28 10 - Toilet and Bath Accessories.

1.2 REFERENCES

.1 ASTM International (ASTM)

.1 ASTM A307-21, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 ASTM C954-22, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.

.3 ASTM D1761-20, Standard Test Methods for Mechanical Fasteners in Wood and Wood-Based Materials.

.4 ASTM D2559-12a(2018), Standard Specification for Adhesives for Bonded Structural Wood Products for Use Under Exterior Exposure Conditions.

.5 ASTM D3498-19a, Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing.

.6 ASTM F1667/F1667M-21a, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

.2 American Wood Council (AWC)

.1 AWC Wood Design Package - 2018 Edition.

.3 American Wood Preservers Association (AWPA):

.1 AWPA Book of Standards, 2023.

.4 CSA Group (CSA)

.1 CAN/CSA O80 SERIES:21, Wood Preservation, Includes Administrative Update (2022) and Errata (2022).

.2 CSA O121-17 (R2022), Douglas Fir Plywood.

.3 CSA O141-05(R2019), Softwood Lumber.

.4 CSA O325:21, Construction sheathing (Adopted NIST PS 2-18, with Canadian deviations), Includes Administrative Update (2021).

.5 CSA S16:19, Design of steel structures, Includes Errata (2019) and Errata (2023).

.5 National Lumber Grading Association (NLGA):

.1 Standard Grading Rules for Canadian Lumber 2022.

.6 Telecommunication Industry Association (TIA)

.1 ANSI/TIA-569-E: Telecommunications Pathways and Spaces, 2019.

.7 Underwriters' Laboratories of Canada (ULC)

.1 ULC 102-18, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies (ULC S102).

1.3 DEFINITIONS

.1 For the purpose of this project the following definitions shall apply:

.1 Structural Light Framing: All horizontal and vertical load bearing framing including members indicated as on the drawings shall be considered to be No. 2 Grade and better and shall be used throughout unless prior approval is provided by the Consultant.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures:

.1 Submit manufacturer's printed product literature, specifications and datasheets.

.2 Submit MSDS sheets or official manufacturer literature stating no urea-formaldehyde was used in the manufacturing of composite wood.

.2 Submit engineered, stamped shop drawings designed by a structural engineer (P.Eng.) licensed to practice in Ontario for load-bearing construction, including details, elevations, sections and plans. Include engineering calculations with submissions.

1.5 QUALITY ASSURANCE

.1 Work shall meet or exceed the applicable requirements of the AWC Wood Design Package and Ontario Building Code.

.2 Lumber identification: Grade stamp of an agency certified by the Canadian Lumber Standards Accreditation Board.

.3 Plywood identification: Grade mark in accordance with applicable CSA standards.

.4 Each board of fire retardant treated material to shall bear the ULC label indicating 'Flame Spread Classification' (FSC), and smoke developed.

.5 Engage the services of a structural engineer (P.Eng.), to Section 01 35 00 - Delegated Design, licenced to practice in Ontario to design, draw and stamp the engineered shop drawings and review the site as required by Code.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver wood products bundled or crated to provide adequate protection during transit. Inspect wood products for damage upon delivery and remove and replace damaged materials.

.2 Store materials a minimum of 150 mm off the ground on blocking. Keep materials under cover and dry. Provide for air circulation within and around stacks and under temporary coverings.

.3 Protect sheet materials to prevent breaking of corners and damage to surfaces.

Part 2 Products

2.1 LUMBER

.1 Supply and install all structural wood elements and accessories as required in accordance with the structural design Drawings and schedules.

.2 Selection of lumber in each instance shall meet or exceed AWC Wood Design Package and Ontario Building Code requirements, and comply with Contractor's delegated design stamped and signed engineered shop drawings.

.3 Miscellaneous Lumber:

.1 Provide lumber for support or attachment of other construction, including furring, blocking, nailing strips, ground, rough bucks, curbs, fascia, backing sleepers, and similar members.

.2 Fabricate miscellaneous lumber from dimension lumber of sizes indicated, and into shapes shown on drawings.

.3 Moisture Content: 19% maximum for lumber items not specified to receive wood preservative treatment.

.4 Grade: for dimension lumber sizes provide No. 2 or Standard grade lumber per NLGA. For board-sized lumber, provide sheathing grade, S2S.

2.2 PANEL MATERIALS

.1 Interior plywood: Plywood panels to CSA O325, thickness as indicated.

.2 Exterior grade plywood: exterior grade Douglas Fir (DFP) to CSA O121, thickness as indicated; waterproof glue bond.

.3 Fire-Rated Materials: ULC-labelled fire resistant, provide grade stamp or certification as noted for fire retardant pressure treated lumber.

.4 Fire Rated Plywood Panels, to CSA O325, Class A fire retardant produced under Performance Standard PS-1, certified by the American Plywood Association. Fire-Rated Materials: ULC-labelled fire resistant, provide grade stamp or certification as noted for fire retardant pressure treated lumber.

.5 Panels shall have no added urea formaldehyde.

2.3 ACCESSORIES

.1 Joint Sealants: in accordance with Section 07 92 00 - Joint Sealants. Maximum allowable VOC limit 250 g/L in accordance with SCAQMD Rule 1168.

.2 Structural Adhesive: LePage PL 400, or approved equivalent.

.3 Screws for Fastening to Cold-Formed Metal Framing: to ASTM C954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

.4 Rough Hardware (bolts, nuts, washers, etc.): hot dip galvanized in conformity to ASTM A153.

.5 Proprietary fasteners: hot dip galvanized or type 316 stainless steel toggle bolts, expansion shields and lag bolts, screws and lead plugs, recommended for purpose by manufacturer.

.6 Wood Screws – select screws to suit location, site conditions and purpose, and of sufficient length for adequate penetration of structural elements, per Ontario Building Code.

.1 Strong-Drive® SDWS FRAMING Screws, or equivalent.

.2 Strong-Drive® SDWH TIMBER-HEX Screws, or equivalent.

.3 Strong-Drive® SD CONNECTOR SS Screws, or equivalent.

.4 Strong-Drive® SDS HEAVY-DUTY CONNECTOR Screw, or equivalent.

.5 Strong-Drive® DWP WOOD SS Screws, or equivalent.

.6 Other screw types as required.

.7 Nails and spikes: shall be spiral shank type, to ASTM F1667; finish: hot dipped galvanized for exterior work and pressure preservative and fire-retardant treated materials.

.8 Rough Hardware (bolts, nuts, washers, etc.): Hot dip galvanized in conformity to ASTM A153.

.9 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.

.10 Nailing discs: flat caps, minimum 25 mm diameter, minimum 0.4 mm thick, fibre, formed to prevent dishing. Bell or cup shapes not acceptable.

.11 Isolation Coating: CRL Black Bituminous Paint – aerosol or paint, by C.R. Laurence of Canada, or equivalent.

2.4 FASTENER FINISHES

.1 Stainless steel: use type 316 stainless steel fasteners for pressure-preservative or fire-retardant treaded wood products.

.1 Galvanizing: use hot-dipped galvanized fasteners complying with ASTM A153 and connectors complying with ASTM A653, class G185, for all other applications.

Part 3 Execution

3.1 COMPLIANCE

.1 Fabrication, erection and installation shall meet or exceed the requirements of Ontario Building Code, errata and amendments, and AWC Wood Design Package.

.2 Accurately frame and properly assemble rough carpentry work. Include all necessary nails or other connectors.

3.2 ISOLATION COATING

.1 Apply isolation coating to contact surfaces in contact with cementitious materials, wood materials, and dissimilar metals.

.2 Apply isolation coating into all drilled holes, onto all fasteners (e.g., bolts, screws, rivets) and between all flat surfaces (e.g., behind door handles, hinges, lamp-housings, diamond plate, mirror housing, latches, brackets, door trim, frame rails, suspension mounts, etc).

.3 Generally, 2 – 3 mil thickness is required per application. Each application needs enough product applied so that excess isolation coating “oozes out” during assembly (this will ensure you have created a proper seal).

.4 Assemble and wipe away any excess product.

3.3 INSTALLATION – GENERAL

.1 Install members true to line, levels and elevations, square and plumb.

.2 Construct continuous members from pieces of longest practical length.

.3 Install spanning members with crown-edge up.

.4 Apply deck joist tape in accordance with manufacturer’s published instructions, specifications and details.

.5 Select exposed framing for appearance. Install lumber and panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.

.6 Install blocking at locations indicated to support washroom accessories.

.7 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding, electrical equipment mounting boards, and other work as required.

.8 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

.9 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using hot dipped galvanized steel fasteners.

.10 Use dust collectors and high-quality respirator masks when cutting or sanding wood panels.

3.4 ERECTION

.1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

.2 Countersink bolts where necessary to provide clearance for other work.

.3 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

3.5 FASTENINGS AND ROUGH HARDWARE

.1 Unless indicated otherwise, fasten to concrete surfaces with expansion shields and bolts.

.2 Where screws are required use lead or inorganic fibre plugs. Wood or organic plugs not permitted.

.3 Powder actuated fasteners may be used in lieu of bolts if approved by the Consultant in writing prior to materials arriving on site.

.4 Provide all rough hardware such as nails, bolts, nuts, washers, screws, clips and strap metal.

3.6 BLOCKS, PLATES, STRAPPING AND FURRING

.1 Install wood plates where indicated. Erect plumb and true. Rigidly support and securely anchor to masonry, concrete, and metal stud framing, as required.

.2 Provide and install wood strapping or furring indicated on drawings or as required.

.3 Strapping: Shimmed out plumb, square and true to line. Use 19 mm x 89 mm at 406 mm O/C, unless indicated otherwise.

.4 Furring: As indicated.

.5 Install blocking behind all sheathing and wallboard joints, and where required for items to be fixed to walls.

3.7 MISCELLANEOUS

.1 Install wood stud framing for temporary weather closure and cladding. Construct to resist wind pressures.

3.8 FIRE-RETARDANT-TREATED WOOD INSTALLATION

.1 Install as indicated and as required by Code and as directed by authorities having jurisdiction.

.2 Field Cuts:

.1 Do not rip, mill or conduct extensive surfacing of fire retardant treated lumber, label will be voided.

.2 Only end cuts, drilling holes and joining cuts are permitted.

.3 All cuts on plywood will be considered end cuts.

.4 Fire-retardant lumber and plywood can be given a light sanding for cosmetic cleaning after treatment.

.5 Pre-cut to the greatest extent possible before treating.

.3 Fire retardant treated plywood used in structural applications shall be graded or span-rated material.

.4 Use only hot-dipped galvanized, corrosion resistant nail or screw fasteners. Staples are not acceptable for installation of fire resistant treated materials.

.5 Where humidity conditions are such that moisture may condense between hardware and treated wood, hardware shall be back-primed with a corrosive inhibitive paint.

3.9 PLYWOOD BLOCKING

.1 Provide plywood blocking for mounting millwork, toilet partitions and washroom accessories as required. Use minimum ¾-inch thick softwood plywood.

.2 Coordinate with other trades as required to ensure wood blocking required behind gypsum board and plywood panels is installed prior to installation of gypsum board.

3.10 POWER, TELECOMMUNICATIONS AND DATA PANEL BOARDS

.1 Provide 19 mm fir plywood boards in telephone rooms to receive wiring and equipment. Install minimum 1220 mm x 2440 mm panels on all periphery walls over 305 mm wide, mounted 150 mm off of finished floor.

.2 Paint panels with 2 coats of light-coloured fire retardant paint finish; coat all sides of panels (back, front and sides) in accordance with TIA/EIA 569 requirements; coordinate with electrical trades as required.

3.11 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning and Waste Management. 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 00 - Cleaning and Waste Management. Perform cleaning after installation to remove construction and accumulated environmental dirt.

.3 Manage and dispose of demolition and construction waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

3.12 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by Work of this Section.

3.13 SCHEDULE

.1 Erect and install all wood members, elements and fabrications in accordance with the design Drawings, and stamped, signed delegated design engineered shop drawings.

.2 Provide stamped, signed engineered shop drawings for all structural construction and construction supporting wall-hung cabinetry, washroom accessories and other wall-supported equipment or elements.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 The work of this section includes the supply installation of shop manufactured architectural woodwork in accordance with Architectural Woodwork Standards (NAAWS).

.2 Cabinet hardware to be supplied by this section.

1.2 RELATED REQUIREMENTS

.1 Refer to and coordinate with Division 01 of Contract.

.2 Section 05 50 00 - Metal Fabrications.

.3 Section 06 10 00 - Rough Carpentry.

.4 Section 07 92 00 - Joint Sealants.

.5 Section 09 91 00 - Painting.

1.3 REFERENCES

.1 American National Standards Institute (ANSI):

.1 ANSI A208.1-2022, Particleboard.

.2 ANSI A208.2-2022, Medium Density Fiberboard (MDF) for Interior Applications.

.3 ANSI/NEMA LD 3-2005, High-Pressure Decorative Laminates. (HPDL).

.4 ANSI/HPVA HP-1-2020, American Standard for Hardwood and Decorative Plywood.

.2 American Society for Testing and Materials International (ASTM):

.1 ASTM D1037-12(2020), Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials.

.2 ASTM D2555–17a, Standard Practice for Establishing Clear Wood Strength Values.

.3 ASTM D2832-92(2016), Standard Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.

.4 ASTM D5116-17, Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products.

.5 ASTM D5672/D5673M-22, Standard Test Method for Testing Flexible Cellular Materials Measurement of Indentation Force Deflection Using a 25-mm (1-in.) Deflection Technique.

.6 ASTM E1333-22, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Using a Large Chamber.

.3 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI):

.1 North American Architectural Woodwork Standards (NAAWS), Most Recent Edition.

.4 California Air Resources Board (CARB):

.1 Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products (2007).

.5 Canadian Standards Association (CSA International):

.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.2 CAN/CSA O80 Series:21 – Wood Preservation, Includes Administrative Update (2022) and Errata (2022).

.3 CSA O112.10-08 (R2017), Evaluation of Adhesives for Structural Wood Products (Limited Moisture Exposure), Includes Update No. 1 (2010), Update No. 2 (2010).

.4 CSA O115-M1982 (R2001), Hardwood and Decorative Plywood.

.5 CSA O121-17 (R2022), Douglas Fir Plywood.

.6 CSA O141-05 (R2019), Softwood Lumber.

.7 CSA O151-17 (R2022), Canadian Softwood Plywood.

.6 International Organization for Standardization (ISO):

.1 ISO 14040:2006, Environmental Management-Life Cycle Assessment - Principles and Framework.

.2 ISO 14041:1998, Environmental Management-Life Cycle Assessment - Goal and Scope Definition and Inventory Analysis.

.7 National Hardwood Lumber Association (NHLA):

.1 Rules for the Measurement and Inspection of Hardwood and Cypress 2019.

.8 National Lumber Grades Authority (NLGA):

.1 Standard Grading Rules for Canadian Lumber 2017.

.9 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD):

.1 SCAQMD Rule 1113-16, Architectural Coatings.

.2 SCAQMD Rule 1168-22, Adhesive and Sealant Applications.

.10 Sustainable Forestry Initiative (SFI) & Forest Implementation:

.11 Underwriters Laboratories of Canada (ULC):

.1 ULC-102, Standard Method for Surface Burning Characteristics of Building Materials and Assemblies (ULC S102).

1.4 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.1 Show location of each item, dimensioned plans and elevations, large scale details, attachment devices, and other components.

.2 Show details of construction, profiles, jointing, fastening and other related details.

.3 Show materials, thicknesses, finishes and hardware.

.4 Show locations and sizes of cut-outs and holes for plumbing fixtures and other items installed in architectural woodwork.

.2 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit two finished samples, 610 mm x 610 mm of each finish to be applied at the factory, to the Consultant for approval. Where materials are being matched, verify that specified materials match existing prior to submitting samples.

.2 Alternative cabinet hardware from that specified shall be submitted to the Consultant for approval.

.3 Reviewed samples shall become the standard for the work.

1.5 CLOSEOUT SUBMITTALS

.1 Project Record Sheet: Submit to the Consultant two copies of the project record sheet identifying the project title and address, Owner, Consultant, and Architectural Woodwork Subcontractor. Indicate also materials and finishes used for architectural woodwork and whether shop finished, or site finished and by whom. Include type and source of all cabinet hardware and any special items used under architectural woodwork.

.2 Submit in accordance with Section 01 78 10 - Closeout Submittals and Requirements.

1.6 QUALITY ASSURANCE

.1 Architectural Woodwork Standards (NAAWS) and Errata shall be used to establish the minimum level of quality for this project.

.2 Execute the work of this Section by a member of AWMAC with five years' experience in work of comparable complexity and scope.

.3 Any reference to Custom or Premium grade in this specification shall be as defined in the NAAWS.

.4 Any item not given a specific quality grade shall be Custom grade as defined in the NAAWS.

.5 A copy of the NAAWS shall be made readily available for reference purposes on the job site.

.6 References in this specification to part and item numbers mean those parts and items contained within the NAAWS.

.7 Perform the Work in accordance with the definition of 'Good Workmanship' as defined in the NAAWS.

.8 Remove and replace finish carpentry Work which does not conform to the NAAWS.

.9 Materials and installation shall be in metric measurements.

.10 Mock-Up

.1 Provide mock-up in accordance with requirements of Section 01 45 00 - Quality Control.

.2 Construct mock-up for each form of construction and finish required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution before fabricating and installing interior casework.

.3 Build full size mock-up on site using specified materials and hardware required for the completed work, and as follows:

.1 Place mock-up in location and size indicated.

.2 Notify Consultant seven days in advance of dates and times when mock-up will be fabricated and installed.

.3 Demonstrate the proposed range of aesthetic effects and workmanship; Consultant may request minor changes to finish, fabrication or hardware that does not affect Contract Price.

.4 Obtain Consultant's acceptance of mock-up prior to starting interior casework fabrication.

.5 Maintain mock-up during construction in an undisturbed condition as a standard for judging the completed work.

.6 Mock-up may form a part of the completed work when accepted by the Consultant.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, and handle materials in accordance with the NAAWS. Control the temperature and humidity in accordance with NAAWS recommendations, before, during, and after delivery, during storage, and during and after installation as required.

.2 Provide protective coverings of suitable material for plastic laminate items, taking special precautions to protect corners.

.3 Do not permit delivery of millwork to the site until the area is sufficiently dry so that woodwork shall not be damaged by excessive changes in ambient humidity.

.4 Packaging Waste Management

.1 Separate waste materials for recycling in accordance with Section 01 74 00 - Cleaning and Waste Management.

1.8 SITE CONDITIONS

.1 Comply with the NAAWS requirements for care and storage for optimum temperature and humidity conditions. Maintain a minimum 430 lx (40 f.c.) illumination on surfaces and areas where work is being installed.

.2 Where work is indicated to be fitted to other construction, check dimensions of other construction by field measurement before fabrication; show recorded field measurements on final Shop Drawings. Coordinate fabrication schedule with construction schedule and progress to avoid delay of Work.

.3 Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabrication without field measurements. Coordinate other construction to ensure that actual dimensions correspond to guaranteed dimensions.

Part 2 Products

2.1 MATERIALS

.1 Solid Wood:

.1 Unless otherwise indicated, provide NAAWS Premium Grade.

.2 All wood materials shall be new, straight and clean, free of sap, knots, pitch, and other defects, except as permitted by applicable grading rules.

.3 All wood shall be kiln dried to a maximum moisture content of 6% to 8% for interior components and maximum 12% for exterior components.

.4 Hardwood: Refer to **09 60 00 FINISH SCHEDULE.**

.5 Concealed locations: Softwood, to CSA O141, dressed all sides.

.2 Panel Materials:

.1 Melamine Faced Panels: Melamine resin impregnated sheet thermally fused to particleboard core, to American Laminators Association, performance standards for low pressure melamine (LPL) papers; colours/textures selected by Consultant.

.1 Acceptable Products:

.1 Uniboard Panval or equivalent product by other manufacturer as approved by Consultant.

.2 Hardwood Plywood: to CSA O115, Type II; face veneer NAAWS Grade A, Maple for paint finish.

.3 Softwood Plywood to CSA O151, Sanded Grade, solid two sides. Use in concealed locations only, except as indicated.

.4 Particleboard: to ANSI A208.1, Grade R, minimum 700 kg/m3 density.

.5 Medium Density Fibreboard (MDF): to ANSI A208.2, density 750 kg/m3.

.6 Exterior Grade Plywood: Douglas Fir Plywood: to CSA O121, exterior grade DFP, sanded both sides. Provide exterior grade plywood where plywood to be provided below composite stone counters at Change Room Washrooms.

.7 Solid Core Doors: to CAN/CSA O132.2 SERIES, flush doors, 35 mm thick, plastic laminate (VGS) veneer and painted hardwood edge banding matching adjacent cabinetwork.

.3 Plastic Laminate Components:

.1 Plastic Laminate Facing Sheet: to ISO 4586-3, Grades HGS, VGS, HGP; colours, gloss and texture will be selected by Consultant from full range of products by Formica, Arborite, Nevamar, Pionite, Wilsonart. Refer to **09 60 00 FINISH SCHEDULE.**

.2 Backing Sheet: BKL Grade by manufacturer of facing sheet.

.3 Core: to ANSI A208.2, minimum Grade R, 700 kg/m^3 density.

.4 Laminating Adhesive: to CSA O112.9.

.5 Core Sealer: Clear water resistant synthetic resin sealer.

.4 PVC Edging: 3 mm thick “Woodgrain” or “Solid Colour” machine applied, radiused edging by Woodtape; colour and pattern to be selected by Consultant, to match melamine or plastic laminate facing.

.5 Fasteners and Adhesive:

.1 Nails and Staples: to CSA B111, galvanized.

.2 Screws: Zinc, cadmium or chrome plated steel.

.3 Adhesive: to CSA O112.9, waterproof type.

.6 Sealant: in accordance with Section 07 92 00 – Joint Sealants.

2.2 CABINET WORK

.1 Work shall conform to applicable NAAWS requirements.

.2 Door and Drawer Bumpers: Self-adhesive type approximately 6 mm diameter clear silicone bumpers for all cabinet work doors and drawer faces, two per door and drawer, placed at door top and bottom and drawer top.

2.3 CABINET FABRICATION

.1 General

.1 Flush overlay cabinet doors and drawer fronts as detailed.

.2 Fabricate gables and edges meeting walls oversize to allow for scribing to fit on site.

.3 Use non-telegraphing grain plywood when laminate is the specified finish.

.4 Assemble Work with flush butt hairline corners and joints. Cut-outs for services to be done on site during installation. No hairline cracks will be allowed in the face area of cabinet work modules unless approved in writing by Consultant.

.5 Carefully fit, cope or mitre and well glue-up Joints. There shall be no end wood visible on finished surfaces.

.6 Set nail heads in finished surfaces. Countersink screws and bolts, except those detailed to be exposed, and fill holes with edge grain wood plugs to match colour and grain.

.7 Ensure adjacent part of continuous work match in colour and pattern.

.2 Construction

.1 Minimum core thicknesses as follows:

.1 Drawer bottoms, particleboard, 12 mm;

.2 Drawer sides and backs, particleboard, 12 mm;

.3 Drawer fronts, MDF, 19 mm;

.4 Doors, MDF, 19 mm;

.5 Lower case backs against walls, particleboard, 10 mm;

.6 Upper case backs against walls, particleboard, 10 mm;

.7 Shelves, fixed and adjustable, plywood, 19 mm;

.8 Counter top cores, Plywood with non-telegraphing grain, 19 mm with 38 mm edge, for wet areas, use plywood with type two adhesive and ensure that all cut-outs are sealed prior to installation of sinks, primer is not considered to be an appropriate sealer;

.9 Backsplashes at all locations: Poplar Veneer Plywood, 19 mm; use plywood with type two adhesive at wet areas,

.10 All other work Poplar Veneer Plywood, 19 mm.

.2 Glue, dowel, mortise, lock joint or dado all cabinet work and cabinet work. Do not use staples. Nailing and screws are acceptable. Do not surface nail or screw through countertops.

.3 Blocking, framing, web frames to be solid lumber.

.4 Cut and adapt all Work to receive hardware.

.1 Drill and prepare end gables for insert type shelf standards on gables.

.2 Install all finishing hardware and fittings in shop.

.3 Fittings which may be susceptible to damage during shipping and installation may be installed after millwork installed on site.

2.4 CABINET HARDWARE

.1 Provide the following cabinet hardware, in quantity required, complete with all screws, bolts, washers for complete installation.

.2 Non-Exposed Fasteners: fabricators choice consistent with quality level specified.

.3 Exposed Fasteners: Architectural appearance, material, finish and fastener tool type as selected by Consultant; coordinate sample submittals before ordering materials.

.4 Draw Bolt Fasteners: Mitre butt joint fastener, adjustable and requiring no special tools for installation, galvanized.

.1 Acceptable Materials:

.1 Häfele Canada Inc.

.2 K&V 516, Knape & Vogt Canada.

.3 BP5162G, Richelieu

.5 Spacers: Rigid PVC to size and profile indicated.

.1 Typical lockable doors and drawers: Nickel finished, master keyed, keyed alike in groups, cam lock with plate, adjust keying group to suit requirements:

.1 Basis of Design Materials:

.1 100DR, Olympus

.2 Acceptable Manufacturers:

.1 CompX National.

.2 Richelieu.

.3 Trimline.

.4 .

.6 Shelf Rests:

.1 Stainless steel pin rests: 7 mm Ø socket collar inserts for steel pin shelf supports, drill holes in cabinet work to accept collar, chrome or nickel finish:

.1 Acceptable Materials:

.1 Series 331/325 grommet, Knape & Vogt Canada.

.2 5829-180/2292-180, Richelieu.

.2 Surface wall mounted pilaster with shelf rests sized for shelf depth, nickel finish.

.1 Basis-of-Design Materials:

.1 233 Series, Knape & Vogt.

.3 Flush mounted pilaster with shelf rests sized for shelf depth, nickel finish.

.1 Basis-of-Design Materials:

.1 255 Series, Knape & Vogt.

.4 Recessed mounted pilaster w/clips: Nickel plated, surface mounted steel standards mounted 150 mm from top & bottom, one support for each 305 mm of standard:

.1 Acceptable Materials:

.1 00120, Hettich Canada LP.

.2 255/256, Knape & Vogt.

.3 2552G/CP2562G, Richelieu.

.5 Door Slides:

.1 Light Duty Flipper Door Slide: Doors maximum height 1067 mm x 610 mm wide, 14 kg, length to suit; for flush overlay installation when closed, having hinges and mounting plates; black finish:

.1 Basis-of-Design Materials:

.1 123 Series, Accuride.

.2 Medium Duty Flipper Door Slide: Doors from 915 mm to maximum 1830 mm high x 660 mm wide, length to suit, 34 kg capacity; for flush overlay installation when closed, having anti-racking system, carrier strip, hinges and mounting plates; [black] [zinc] finish:

.1 Acceptable Materials:

.1 1332, Accuride.

.2 Panorama 2002, Hettich Canada LP.

.7 Sliding Glass Doors, Display Cabinet:

.1 Top Track: Extruded satin anodized aluminum finish:

.1 Basis-of-Design Materials:

.1 1451210, Richelieu.

.2 Bottom Track: Extruded satin anodized aluminum finish:

.1 Basis-of-Design Materials:

.1 1491210, Richelieu.

.3 Bottom Shoe Track: Extruded satin anodized aluminum finish:
.1 Basis-of-Design Materials:
.1 1461210, Richelieu.

.4 Rollers: Ball bearing steel roller:
.1 Basis-of-Design Materials:
.1 D012916, Richelieu.

.5 Bottom Shoe Track: Extruded satin anodized aluminum finish:
.1 Basis-of-Design Materials:
.1 1461210, Richelieu.

.6 Finger Grip: Extruded chrome finish:
.1 Basis-of-Design Materials:
.1 D010, Richelieu.

.7 Spline gasket for glass: Extruded rubber:
.1 Basis-of-Design Materials:
.1 125, Richelieu.

.8 Silencer: Extruded rubber:
.1 Basis-of-Design Materials:
.1 BP129-11, Richelieu.

.9 End cap: Extruded chrome finish:
.1 Basis-of-Design Materials:
.1 CP148140, Richelieu.

.10 Track lock: Extruded chrome finish, reversible:
.1 Basis-of-Design Materials:
.1 68101175, Richelieu.

Part 3 Execution

3.1 EXAMINATION

.1 Site Conditions for installation of architectural woodwork shall be in accordance with applicable NAAWS requirements.

.2 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of Work means acceptance of existing conditions.

3.2 PREPARATION

.1 Obtain measurements from site.

.2 Check access to ensure large pieces of work can be safely handled to their place of final installation.

.3 Verify that solid blocking for support and anchoring of woodwork is installed where required. Confirm exact height and location with Drawings and Consultant.

.4 Protect finished surfaces and materials of other trades from damage.

.5 Ensure services and roughing-in which affect or are connected to or through this work are complete and acceptable.

.6 Back prime cabinet work immediately after delivery to site.

3.3 INSTALLATION

.1 Install work to applicable NAAWS and Quality Assurance requirements.

.2 Install cabinet work in its indicated locations, plumb, level, and true.

.3 Anchor to floor, walls, blocking, or ceiling using fastening devices and hardware consistent with the building materials encountered. Do not use wood plugs. Do not use plastic plugs for ceilings or walls. Provide wall strapping as required.

.4 Anchor cabinet work and millwork to building structure. Shim level and set square in relation to adjoining surfaces. Scribe to adjacent Work. Provide allowance for finish flooring installation to base.

.5 Cabinet work:

.1 Fasten to framing using zinc-coated bolts, countersunk and plugged with matching wood plugs.

.2 Set cabinetwork in place, on base, anchoring securely to building structure and to adjoining cabinetwork. Use approved connector type fasteners between items of cabinetwork to hold adjoining pieces tightly together.

.3 Scribe to smooth snug fit with adjoining surfaces and materials to align work. Mitre corners.

.4 Perform cutting, fitting, repairing in woodwork as required by other trades where their work is connected to or part of this work.

.5 Cut out openings for mechanical, electrical, and communications fittings and fixtures. Coordinate and cooperate in the connection and installation of mechanical, electrical, and communications work.

.6 Apply sealant between countertops and adjoining walls and cabinetwork. Seal edges of cut-out core material before fixtures installed.

.7 Install finishing hardware shipped loose.

.6 Supply and install hardware required for the completion of architectural woodwork, including, without limitations, adjustable shelf supports and cabinet hinges, catches, pulls, drawer accessories, bumpers, drawer slides, and similar items. Install millwork hardware in the shop wherever possible. Install millwork hardware secure, plumb, level, true to line, and in accordance with the hardware manufacturers' printed instructions. Cut and fit to millwork for proper installation and operation. Provide smoothly operating units free from binding. Clean and adjust hardware for proper operation.

3.4 ADJUSTING

.1 During and after installation adjust all hardware and operating parts as necessary to ensure smooth and proper operation.

3.5 CLEANING

.1 Clean all cabinet, countertops, shelves and fixtures.

.2 Repair any marks, scratches or marring.

.3 Remove and replace damaged, marked, or stained architectural woodwork.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Refer to and coordinate with Division 01 of Contract.

.2 Foam-in-place insulation at perimeter of exterior window and door frames as required to ensure continuity of the thermal control layer performance.

.3 Foam-in-place insulation at penetrations of the building enclosure thermal control layer.

1.2 REFERENCES

.1 Canadian Urethane Foam Contractors Association (CUFCA)

.2 ASTM International (ASTM)

.1 ASTM C518-21, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

.2 ASTM C1642-20(2024), Standard Practice for Determining Air Leakage Rates of Aerosol Foam Sealants and Other Construction Joint Fill and Insulation Materials.

.3 Underwriters Laboratories of Canada (ULC)

.1 ULC 101-14, Standard Methods of Fire Endurance Tests of Building Construction and Materials (CAN/ULC S101-14).

.2 ULC 102-18, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies (ULC S102).

.3 ULC 102.2-18, Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies (ULC S102.2).

.4 ULC 705.1-15, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Material – Specification (CAN/ULC S705.1-15).

.5 ULC 705.2-20, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Application.

.6 ULC 710.1-19, Standard for Thermal Insulation - Bead - Applied One Component Polyurethane Air Sealant Foam, Part 1: Material Specification.

.7 ULC 710.2-11, Standard for Thermal Insulation - Bead-Applied One Component Polyurethane Air Sealant Foam - Part 2: Installation (CAN/ULC S710.2-11).

.8 ULC 711.1-19, Standard for Thermal Insulation - Bead-Applied Two Component Polyurethane Air Sealant Foam Part 1: Material Specification.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit manufacturer's printed product literature, specifications and datasheets and include product characteristics, performance criteria, and limitations.

.2 Quality assurance submittals:

.1 Test reports: submit certified test reports for insulation from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.

.2 Submit test reports in accordance with ULC 101 for fire endurance and ULC 102 for surface burning characteristics.

.3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.

1.4 QUALITY ASSURANCE

.1 Qualifications:

.1 Installers: Use companies that are members and licensed CUFCA having trained and certified installers in accordance with CUFCA requriements.

.2 Manufacturer: Obtain foam-in-place materials from a single manufacturer regularly engaged in manufacturing the products specified in this Section.

.2 Cooperate and coordinate with requirements of other units of work specified in other sections.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling, and unloading:

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

1.6 SITE CONDITIONS

.1 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.

.2 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

.3 Ensure temperature is maintained throughout the curing period.

Part 2 Products

2.1 MATERIALS

.1 Foam-in-Place Sealant: one or two component closed cell, low-pressure foam sealant, and as follows, selected to suit site conditions and compatibility with bonding substrates:

.1 Standard of Acceptance:

.1 Johns Manville Window & Door Polyurethane Foam Sealant – designed to seal openings around doors and windows.

.2 Dupont Froth-Pak™ Foam Sealant – for penetrations and cracks greater than 2 inches and less than 4 inches wide.

.3 Dupont Froth-Pak™ Insulation Spray Foam – designed for wider areas. It fills cavities, penetrations, and cracks in rim joists, roof-wall junctures, and around pipes and ducts up to 2” thick.

.4 Equivalent foam-in-place products with same or better physical properties and performance values.

Part 3 Execution

3.1 PREPARATION

.1 Clean spaces that are to receive insulation, of dirt, dust, grease, loose material, and other foreign matter that may inhibit adhesion.

.2 Provide sufficient ventilation during and until insulation has cured, to ensure safe working conditions. Introduce fresh air and exhaust air continuously during the 24-hour period after application.

.3 Protect adjacent surfaces from overspray and dusting.

.4 Prior to application, slightly moisten surfaces to which foam in place insulation is being applied, to accelerate curing.

.5 Temporarily brace frames as may be required to prevent possible bowing of frames due to over expansion of the foam-in-place insulation.

3.2 FOAM-IN-PLACE SEALANT APPLICATION

.1 Install sealant material to seal gaps, penetrations and transitions as required to maintain the continuity of the thermal control system, applicable instructions found in ULC 710.2, manufacturer's published installation instructions, and as follows:

.1 Install sealant material around exterior window and door frames as required to maintain continuity of thermal control layer. Ensure that foam completely fills spaces without voids and is continuous at corners.

CLEANING

.2 Leave Work area clean at end of each day.

.3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment. Perform cleaning after installation to remove construction and accumulated environmental dirt.

3.3 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by Work of this Section.

3.4 SCHEDULE

.1 Install at penetrations through thermal control layers, and at exterior window and door framing as required to maintain continuity of thermal control performance.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section includes through penetration firestopping and smokeseal systems for penetrations through the following fire resistance rated assemblies, including both empty openings and openings containing penetrating items:

- .1 Wall and partitions.
- .2 Construction enclosing compartmentalized areas.

.2 This Section includes fire resistive joint systems for the following:

- .1 Floor-to-wall joints.
- .2 Head-of-wall joints.
- .3 Wall-to-wall joints.

.3 This specification section provides requirements for Rated Systems or systems requiring Engineered Judgements (EJ):

- .1 Use of materials that have not been tested in a system or that are not capable of obtaining an Engineered Judgement will not be acceptable for use on this Project.
- .2 Materials having only a ULC, CUL or FM Approved label will not be acceptable for use on this Project, unless supporting documentation is provided indicating its use in a ULC and FM Approved Rated Assembly Listing for Firestop Systems and Components of an Engineered Judgement specific to the installation conditions of the project.

.4 This Section includes requirements for installation of Fire Stop systems under a single source of responsibility; either through direct supervision of the Contractor or a single trade responsibility performed by a specialty Subcontractor at the choice of the Contractor.

.5 This Section includes requirements for third-party verification of installed Fire Stop system components forming a part of the work of this Section by an inspection agency that employs personnel who are qualified to perform this work in accordance a recognized training program acceptable to the Consultant and Authority Having Jurisdiction.

1.2 RELATED REQUIREMENTS

.1 Section 01 35 00 - Delegated Design

.2 Section 04 22 00 - Concrete Unit Masonry.

.3 Section 09 21 16 - Gypsum Board Assemblies.

.4 Division 21-23 Mechanical.

.5 Division 26-28 Electrical.

1.3 DEFINITIONS

.1 Fire-Resistance Rating: The time in minutes or hours that a material or assembly of materials will withstand the passage of flame and transmission of heat when exposed to fire meeting the requirements of CAN/ULC S101 or as determined by formal testing of material or assembly of materials meeting requirements of CAN/ULC S115, or an interpretation of information derived from formal testing in accordance with requirements of the Building Code and acceptable to the Authority Having Jurisdiction.

.2 Fire Separation: Assembly that acts as a barrier against the spread of fire, smoke and noxious gases resulting from combustion as defined by the Building Code and includes the following assemblies having a Fire-Resistance Rating requiring Fire Stopping as follows:

.1 Penetration-Type Fire Stop systems located within non-load bearing walls and partitions.

.2 Penetration-Type located within floor assemblies.

.3 Construction Joint-Type and other assemblies having a Fire-Resistance Rating indicated on Drawings or Schedules.

.3 Fire Compartment: Spaces within a building that are enclosed by exterior walls or separated from other parts of the building by enclosing Fire Separations having a Fire-Resistance Rating.

.4 Fire Stop: System consisting of a material, component and means of support used to fill gaps between Fire Separations or between Fire Separations and other assemblies, or used around items that wholly or partially penetrate a Fire Separation.

1.4 REFERENCES

.1 ASTM International Inc. (ASTM)

.1 ASTM A1008/A1008M-25, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

.2 ASTM E119-26, Standard Test Methods for Fire Tests of Building Construction and Materials.

.3 ASTM E814-24, Standard Test Method for Fire Tests of Penetration Firestop Systems.

.4 ASTM E1966-24, Standard Test Method for Fire-Resistive Joint Systems.

.5 ASTM E2174-24, Standard Practice for On-Site Inspection of Installed Firestops.

.6 ASTM E2307-25b, Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus.

.7 ASTM E2393-24, Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.

.2 Factory Mutual Global

.1 Approval Standard for Firestopping Class Number 4990, December 2009.

.2 Approval Standard for Firestop Contractors Class Number 4991, October 2013.

.3 International Firestop Council (IFC):

.1 Recommended IFC Guidelines for Evaluating Fire Stop Systems in Engineering Judgments.

.2 Recommended IFC Guidelines for Evaluating Fire Stop Systems in Engineering Judgements: Perimeter Fire Barrier Systems.

.3 Recommended IFC Guidelines for Evaluating Fire Stop Systems in Engineering Judgments on Fire Resistant Duct Enclosure Systems for Ventilation Ducts.

.4 Firestop Contractors International Association (FCIA):

.1 FCIA Manual of Practice.

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 SDS - Safety Data Sheets.

.6 National Fire Protection Agency (NFPA)

.1 NFPA 251, Standard Methods of Tests of Fire Endurance of Building Construction and Materials, Current Edition.

.7 Underwriter's Laboratories of Canada (ULC)

.1 ULC Fire Stop Systems and Components, Current Edition.

.2 ULC-S101-14-REV2, Standard Methods of Fire Endurance Tests of Building Construction and Materials. (CAN/ULC-S101-14)

.3 ULC-S102:2019 (R2024), Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies. (ULC S102)

.4 ULC-S114:2018 (R2024), Standard Method of Test for Determination of Non-Combustibility in Building Materials.

.5 ULC-S115:2023, Standard Method of Fire Tests of Firestop Systems.

.8 Underwriters Laboratories Inc. (UL)

.1 UL 1479-2026, Standard for Fire Test of Through-Penetration Firestops.

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with contractor's representative and Consultant in accordance with Section 01 31 00 - Project Managing and Coordination to:

.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 Schedule: Submit a schedule listing surfaces or components to which firestopping and smokeseals is to be applied, and indicating the firestopping and smokeseals system and materials required and detailing installation not later than 30 working days following Award of Contract.

1.6 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit product data in accordance with Section 01 33 00 - Submittal Procedures:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Provide two copies of WHMIS SDS - Safety Data Sheets in accordance with WHMIS acceptable to Labour Canada, and Health and Welfare Canada.

.3 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.

.1 Test reports: in accordance with CAN-ULC-S101 for fire endurance and CAN-ULC-S102 for surface burning characteristics and CAN-ULC S115.

.1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties.

.2 Document from Engineer of Record showing compliance of alternative fire stopping solution with CAN-ULC S115 and the EJ guidelines

provided by the National Research Council, *Best Practices Guide on Fire Stops and Fire Blocks and Their Impact on Sound Transmission*.

.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.

.4 Manufacturer's Field Reports: submit to manufacturer's written reports within three days of review, verifying compliance of Work, as described in PART THREE - FIELD QUALITY CONTROL.

.4 Provide a third party inspection agency upon completion of the Work of this Section to inspect the fire stopping work and submit written reports and verifications/approval of the installation of products and systems and the products are installed to the manufacturer's requirements to achieve the required fire ratings.

1.7 QUALITY ASSURANCE

.1 Regulatory Requirements: Use materials and methods of determining required thickness of application that have the full acceptance of Authority Having Jurisdiction and that are tested in accordance with ULC S115, and that form a part of a ULC or CUL listed system, Engineered Judgement or Equivalent Fire Resistance Rated Assembly.

.2 Use materials and methods of determining required thickness of application that have the full acceptance of authority having jurisdiction.

.3 Qualifications: Installer: company or person specializing in fire stopping installations and approved by manufacturer with five years documented experience

.4 Where possible determine thickness to be applied from tests of assemblies identical to the assembly to be protected, conducted in accordance with ULC S-101, ASTM E119, ULI 1479, NFPA 251, and ASTM E814.

.5 Determine system from available engineering studies, or correspondence with the labelling agency indicating the effect of the differences on the fire separation of the assembly. Confirm acceptance of system by authorities having jurisdiction in writing.

.6 Where the assembly includes conditions that do not correspond to those included in any previously tested assembly and for which no relevant engineering information is available use the same system and material as would be required for a tested assembly with similar conditions and that will achieve at least the minimum level of performance required in a previously tested assembly.

.7 Use materials tested to CAN/ULC-S115. Assemblies containing the materials shall be in accordance with assemblies tested and approved by agencies acceptable to authority having jurisdiction.

.8 Source Responsibility: Obtain through penetration firestop and joint systems, for each kind of penetration and construction condition indicated, from a single source of installation responsibility.

.9 Delegated Design Professional: Use a Professional Engineer, registered in the province of the Work and familiar with installations of similar scope and complexity to design firestopping and smokeseals.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Product Requirements.

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, and ULC markings.

.2 Storage and Protection:

.1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

.3 Use stock before its expiration date.

.3 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

1.9 SITE CONDITIONS

.1 Install firestopping and smokeseals materials only when the areas in which they are scheduled are closed-in and protected from dampness.

.2 Install firestopping and smokeseals systems when ambient or substrate temperatures are within temperature and moisture limits permitted by firestopping and smokeseals system manufacturers or when substrates are not wet due to rain, frost, condensation, or other causes.

.3 Ventilate firestopping and smokeseals systems in accordance with manufacturer's written instructions by natural means or forced air circulation where natural means are not adequate.

Part 2 Products

2.1 MANUFACTURERS

.1 Acceptable Manufacturers: Subject to compliance with requirements specified in this Section, manufacturers offering products that may be incorporated into the Work include; but are not limited to, the following:

.1 3M Canada Inc.

.2 A/D Fire Protection Systems Inc.

.3 EZ-Path Fire Rated Pathways.

.4 Firestop Systems Inc.

.5 Hilti Canada Ltd.

.6 Johns Manville Fire Protection Systems.

.7 Nuco Self Seal Firestopping Products.

.8 Passive Fire Protection Partners Firestop Systems Inc.

.9 Roxtec, Preformed Fire Stopping Systems.

.10 Specified Technologies Inc.

.11 Tremco Ltd.

2.2 PERFORMANCE/DESIGN CRITERIA

.1 Delegated Design Requirements: Design firestopping and smokeseals required by the Contract Documents to withstand fire ratings indicated and in accordance with

requirements of the Building Code, and as described in Section 01 35 00 - Delegated Design.

.2 Performance Requirements: Manufacturer shall design proprietary assemblies to withstand the listed ratings in accordance with the Building Code, Underwriters Laboratories Canada, and authorities having jurisdiction, and as follows:

.1 Provide through penetration firestop and joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire resistance rating of assembly penetrated:

.1 Fire resistance rated load bearing walls, including partitions, with fire protection rated openings.

.2 Fire resistance rated non-load bearing walls, including partitions, with fire protection rated openings.

.3 Fire resistance rated floor assemblies.

.2 F-Rated Systems: Provide through penetration firestop systems with F-ratings indicated, as determined by ULC S115 or ASTM E814, but not less than that equalling or exceeding fire resistance rating of constructions penetrated.

.3 T-Rated Systems: For the following conditions, provide through penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per by ULC S115 or ASTM E814, where systems protect penetrating items exposed to potential contact with adjacent materials:

.1 Penetrations located outside wall cavities.

.2 Penetrations located outside fire resistive shaft enclosures.

.3 Penetrations located in construction containing fire protection rated openings.

.4 Penetrating items larger than 100 mm diameter nominal pipe or 100 cm^2 in overall cross sectional area.

.4 Firestopping and Smokeseals Systems Exposed To View: Systems exposed to view, traffic, moisture, and physical damage; provide products that after curing do not deteriorate when exposed to these conditions both during and after construction, and as follows:

.1 Provide moisture resistant through penetration firestop systems for piping penetrations for plumbing and wet pipe sprinkler systems.

.2 Provide firestopping and smokeseals systems capable of supporting floor loads involved either by installing floor plates or by other means for floor penetrations with annular spaces exceeding 100 mm in width and exposed to possible loading and traffic.

.3 Provide firestopping and smokeseals systems not requiring removal of insulation for penetrations involving insulated piping.

.4 Provide products with flame spread ratings of less than 25 and smoke developed ratings of less than 50 for firestopping and smokeseals and joint systems exposed to view.

.5 Fire Resistance of Joint Systems: Assembly ratings and movement capabilities indicated, but with assembly ratings not less than that equalling or exceeding fire resistance rating of constructions in which joints are located.

2.3 MATERIALS: FIRESTOPPING AND SMOKESEALS, GENERAL

.1 Compatibility: Provide firestopping and smokeseals systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating firestopping and smokeseals systems, under conditions of service and application, as

demonstrated by firestopping and smokeseals system manufacturer based on testing and field experience, and as follows:

.1 Service penetration assemblies: certified by ULC in accordance with ULC S115 and listed in ULC Guide No. 40 U19.

.2 Service penetration firestopping and smokeseals components: certified by ULC in accordance with ULC S115 and listed in ULC Guide No. 40 U19.13, under the Label Service of ULC.

.3 Fire resistance rating of installed firestopping and smokeseals assembly not less than the fire resistance rating of surrounding floor and wall assembly.

.4 Firestopping and Smokeseals at openings intended for ease of re-entry such as cables: elastomeric seal; do not use cementitious or rigid seal at such locations.

.5 Firestopping and Smokeseals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal; do not use a cementitious or rigid seal at such locations. Exemption to fire dampers.

.2 Accessories: Provide components for each firestopping and smokeseals systems that are needed to install fill materials. Use only components specified by firestopping and smokeseals system manufacturer and approved by the qualified testing and inspecting agency for firestopping and smokeseals systems indicated. Accessories include, but are not limited to, the following items:

.1 Permanent forming, damming and backing materials, including the following:

.1 Slag or rock wool fibre insulation.

.2 Sealants used in combination with other forming, damming or backing materials to prevent leakage of fill materials in liquid state.

.3 Fire-rated form board.

.4 Fillers for sealants.

.2 Temporary forming materials.

.3 Substrate primers.

.4 Collars.

.5 Steel sleeves.

.6 Primers: to manufacturer's recommendation for specific material, substrate, and end use.

.7 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.

.8 Metal fire stop: Commercial galvanized steel, to ASTM A1008/A1008M, zinc coating 260 g/m^2, minimum metal core thickness 0.912 mm.

.9 Labels: Peel-and-stick labels printed with the following information:

.1 ATTENTION: FIRE RATED ASSEMBLY. DO NOT MODIFY.

.2 Name of firestopping manufacturer.

.3 Names of products used.

.4 Hour Rating of Assembly.

.5 Manufacturers standard detail number, or Engineered Judgement identifier; ULC or $_{c}UL_{us}$ Number.

.6 Date of installation.

.7 Name of installing Subcontractor.

.8 Contact telephone number for repair or replacement of firestopping materials.

2.4 FILL MATERIALS

.1 General:

.1 Provide firestopping and smokeseals systems containing the types of fill materials indicated in the Firestopping and Smokseals System Schedule below by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.

.2 Firestopping and smoke seal systems shall be tested in accordance with ULC S115, and be comprised of asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gases, and not to exceed opening sizes for which they are intended for the ratings as indicated on drawings.

.2 Cast-in-Place Firestopping and Smokeseals Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

.3 Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.

.4 Firestopping and Smokeseals Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrating item.

.5 Cable Penetration Devices:

.1 Pre-manufactured intumescent blocks, as follows:

.1 Hilti CFS-BL Intumescent Blocks.

.2 Roxtec Intumescent Blocks.

.2 Pre-manufactured sleeves, consisting of an adjustable core, and as follows:

.1 Hilti CP 653 Speed Sleeves.

.2 Specified Technologies EZ-Path Fire Rated Pathway.

.3 Pre-manufactured cable management system, consisting of a system of intumescent inserts and adjustable cores, and as follows:

.1 Hilti Transit.

.2 Roxtec Preformed Fire Stopping Systems.

.6 Intumescent Composite Sheets: Rigid panels consisting of aluminum foil faced elastomeric sheet bonded to galvanized steel sheet.

.7 Intumescent Putties: Non-hardening dielectric, water resistant putties containing no solvents, inorganic fibres, or silicone compounds.

.8 Intumescent Spray Foam: Expanding spray-in-place intumescent foam sealant.

.9 Intumescent Wrap Strips: Single component intumescent elastomeric sheets with aluminum foil on one side.

.10 Mortars: Pre-packaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.

.11 Pillows/Bags: Reusable, heat expanding pillows/bags consisting of glass fibre cloth cases filled with a combination of mineral fibre, water insoluble expansion agents and fire retardant additives.

.12 Silicone Foams: Multi-component, silicone based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.

.13 Silicone Sealants: Moisture curing, single component, silicone based, neutral curing elastomeric sealants of grade indicated below:

.1 Grade for Horizontal Surfaces: Pourable (self levelling) formulation for openings in floors and other horizontal surfaces.

.2 Grade for Vertical Surfaces: non-sag formulation for openings in vertical and other surfaces.

2.5 MIXING

.1 For those products requiring mixing before application, comply with firestopping and smokeseals system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

Part 3 Execution

3.1 EXAMINATION

.1 Examine surfaces, components, materials to receive firestopping and smokeseals material; report any conditions which would detrimentally affect the application of the material or the proper firestopping and smokeseals of the system.

.2 Commence Work when conditions of surfaces and the working conditions are suitable.

.3 Where penetration sealants or caulking are required, ensure all service lines are in place, tested and approved.

.4 Verify all proper blocking, framing (using non-combustible materials) are properly installed and prepared to receive firestopping and smokeseals. Notify Consultant in writing of any deficiencies affecting the proper performance of the firestopping and smokeseals, do not proceed until deficiencies are corrected.

3.2 PREPARATION

.1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.

.1 Ensure that substrates and surfaces are clean, dry and frost free.

.2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.

.3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.

.4 Prime surfaces as required.

.5 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.3 INSTALLATION

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

.2 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.

.3 Apply firestopping and smokeseals materials/systems to maintain the fire separations in the project as indicated on drawings.

.4 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.

.5 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.

.6 Tool or trowel exposed surfaces to neat finish.

.7 Remove excess compound promptly as work progresses and upon completion.

3.4 FIELD QUALITY CONTROL

.1 Review: notify Consultant when ready for review and prior to concealing or enclosing fire stopping materials and service penetration assemblies.

.1 Cut tests may be made at random by the Owner. Frequency of cut tests shall be determined by the Consultant, but will not be more than 1% of total length of firestopping and smokeseals.

.2 Make all necessary repairs and correct all deficiencies noted after completion of cut tests.

.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 ONE - 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, twice during progress of Work at 25% and 60% complete.

3.5 CLEANING

.1 Proceed in accordance with Section 01 74 00 - Cleaning and Waste Management.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

3.6 SCHEDULE

.1 Design and provide through penetration firestopping and smokeseals as follows for:

.1 Systems with No Penetrating Items: Select one or more of the following fill materials:

.1 Latex sealant.

.2 Silicone sealant.

.3 Intumescent putty.

.4 Intumescent foam blocks or boards.

.5 Intumescent spray foam.

.2 Systems for Metallic Pipes, Conduit, or Tubing: Select one or more of the following fill materials:

.1 Latex sealant.

.2 Silicone sealant.

.3 Intumescent putty.

.4 Intumescent foam blocks or boards.

.5 Intumescent spray foam.

.3 Systems for Non-metallic Pipe, Conduit, or Tubing: Select one or more of the following fill materials:

.1 Latex sealant.

.2 Silicone sealant.

.3 Intumescent putty.

.4 Intumescent wrap strips.

.5 Firestopping and Smokeseals device.

.6 Intumescent spray foam.

.4 Re-enterable and Cable Managed Systems for Electrical, and Data and Communications Cables:

.1 Prefabricated Firestop Sleeve CP653 (Hilti).

.2 Preformed Intumescent Blocks CFS-BL (Hilti).

.3 Preformed Intumescent Blocks (Roxtec).

.4 Prefabricated Cable Pathways (EZ-Path).

.5 Systems for Electrical, and Data and Communications Cables: Select one or more of the following fill materials:

.1 Latex sealant.

.2 Silicone sealant.

.3 Intumescent putty.

.4 Silicone foam.

.5 Prefabricated Firestop Sleeve CP 653 (Hilti).

.6 Preformed Intumescent Blocks CFS-BL (Hilti).

.7 Preformed Intumescent Blocks (Roxtec).

.8 Prefabricated Cable Pathways (EZ-Path).

.9 Intumescent foam blocks or boards.

.10 Intumescent spray foam.

.6 Systems for Cable Trays: Select one or more of the following fill materials:

.1 Latex sealant.

.2 Intumescent putty.

.3 Silicone foam.

.4 Pillows/bags.

.5 Intumescent foam blocks or boards.

.7 Systems for Insulated Pipes: Select one or more of the following fill materials:

.1 Latex sealant.

.2 Intumescent putty.

.3 Silicone foam.

.4 Intumescent wrap strips.

.5 Intumescent foam blocks or boards.

.6 Intumescent spray foam.

.8 Systems for Miscellaneous Electrical Penetrations: Select one or more of the following fill materials:

.1 Latex sealant.

.2 Intumescent putty.

.3 Intumescent foam blocks or boards.

.4 Intumescent spray foam.

.9 Systems for Miscellaneous Mechanical Penetrations: Select one or more of the following fill materials:

.1 Latex sealant.

.2 Intumescent foam blocks or boards.

.3 Intumescent spray foam.

.10 Systems for Groupings of Penetrations: Select one or more of the following fill materials:

.1 Latex sealant.

.2 Intumescent wrap strips.

.3 Firestopping and Smokeseals device.

.4 Intumescent composite sheet.

.5 Intumescent foam blocks or boards.

.6 Intumescent spray foam.

.2 Design and provide joint firestopping and smokeseals as follows for:

.1 Floor-to-Floor, Fire Resistive Joint System: Provide materials to meet the following criteria:

.1 Assembly Rating: As indicated.

.2 Nominal Joint Width: As indicated.

.3 Movement Capabilities: Compression and extension.

.2 Floor-to-Wall, Fire Resistive Joint System: Provide materials to meet the following criteria:

.1 Assembly Rating: As indicated.

.2 Nominal Joint Width: As indicated.

.3 Movement Capabilities: To be confirmed, compression, extension, or horizontal shear.

.3 Head-of-Wall, Fire Resistive Joint System: Provide materials to meet the following criteria:

.1 Assembly Rating: As indicated.

.2 Nominal Joint Width: As indicated.

.3 Movement Capabilities: Compression and extension.

.4 Wall-to-Wall, Fire Resistive Joint System: Provide materials to meet the following criteria:

.1 Assembly Rating: As indicated.

.2 Nominal Joint Width: As indicated.

.3 Movement Capabilities: Compression and extension.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Division 03 - Cast-In-Place Concrete.

.2 Section 06 40 00 - Architectural Woodwork.

.3 Section 08 11 13 - Metal Doors and Frames.

.4 Section 08 31 00 - Access Doors and Panels.

.5 Section 09 21 16 - Gypsum Board Assemblies.

.6 Section 09 30 13 - Tiling.

.7 Section 09 65 00 - Resilient Sports Flooring.

.8 Division 23 - Mechanical.

.9 Other technical sections as required.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

.1 ASTM C794-18(2022), Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.

.2 ASTM C834-17(2023), Standard Specification for Latex Sealants.

.3 ASTM C919-24, Standard Practice for Use of Sealants in Acoustical Applications.

.4 ASTM C920-18(2024), Standard Specification for Elastomeric Joint Sealants.

.5 ASTM C1193-25, Standard Guide for Use of Joint Sealants.

.6 ASTM C1330-23, Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.

.7 ASTM C1521-19(2025), Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.

.8 ASTM D2240-15(2021), Standard Test Methods for Rubber Property, Durometer Hardness.

.2 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act, 1999 (2018) (CEPA).

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 SDS - Safety Data Sheets.

.4 Sealant, Waterproofing, and Restoration Institute (SWRI) publication – Sealants: The Professionals' Guide 2013.

.5 South Coast Air Quality Management District (SCAQMD), California State

.1 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.

.6 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act, 1992 (2019 ammend.) (TDGA).

.7 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC 115-2018, Standard Method of Fire Tests of Firestop Systems.

1.3 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit WHMIS SDS - Safety Data Sheets. WHMIS SDS acceptable to Labour Canada and Health and Welfare Canada for sealants. Indicate VOC content.

.2 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.1 Provide colour samples of the actual sealants for approval; painted or printed colour charts are not acceptable.

.3 When required by Consultant, submit test certificates from an approved Canadian materials testing laboratory indicating that sealants meet the requirements of the standards specified, and that the tests have been conducted in accordance with ASTM D2240.

.4 Submit manufacturer's printed product literature, specifications and data sheet. Indicate the following:

.1 Caulking compound.

.2 Primers.

.3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

.4 Manufacturers Sample Warranty.

.5 Submit manufacturer’s installation instructions for each product used.

1.4 QUALITY ASSURANCE

.1 Caulking shall be performed by a caulking contractor with minimum three years successful experience in Work of similar size and complexity.

.2 Before performing Work of this Section, submit the names of proposed materials. If specified using Standards, indicate Qualification Number.

.3 Compatibility: Ensure sealants are compatible with adjacent materials and are approved by manufacture for use with adjacent materials.

.4 Mock-Ups

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Before performing caulking work do sample applications of each type of sealant for approval. Site locations for sample applications shall be designated by Consultant. Approved samples shall form standard for this project and no work of inferior quality will be allowed. Start no final work until approval of samples is given by the Consultant.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Product Requirements.

.2 Deliver containers labelled and sealed, complete with written application and maintenance instructions.

.3 Store materials in a dry heated enclosure in accordance with manufacturer's instructions.

.4 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.5 Place materials defined as hazardous or toxic in designated containers.

.6 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.7 Unused sealant material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.8 Divert unused joint sealing material from landfill to official hazardous material collections site approved by Consultant.

.9 Empty plastic joint sealer containers are not recyclable. Do not dispose of empty containers with plastic materials destined for recycling.

.10 Fold up metal banding, flatten, and place in designated area for recycling.

.11 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

1.6 SITE CONDITIONS

.1 Environmental Limitations:

.1 Do not proceed with installation of joint sealants under following conditions:

.1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.

.2 When joint substrates are wet.

.2 Joint-Width Conditions:

.1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:

.1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

.2 Substrate must be clean, dry, and frost free.

1.7 WARRANTY

.1 Contractor hereby warrants that caulking work will not leak, crack, crumble, melt, shrink, run, lose adhesion or stain adjacent surfaces in accordance with General Conditions, but for three years.

.2 Provide Warranty for sealants to include in maintenance manuals as specified in Section 01 78 10 - Closeout Submittals and Requirements.

Part 2 Products

2.1 MANUFACTURERS

.1 Acceptable Manufacturers: Subject to compliance with requirements in this Section and as recommended by the manufacturer, manufacturers offering products that may be incorporated into the Work include the following:

.1 Master Builders Solutions (previously BASF, Sonneborn).

.2 Chemtron Manufacturing Ltd.

.3 DuPont

.4 GE Silicones Limited.

.5 Loxon, Sherwin Williams
.6 MAPEI Inc.
.7 Pecora
.8 Sika Chemical of Canada Ltd.
.9 Tremco Ltd.

2.2 PERFORMANCE/DESIGN CRITERIA

.1 Sealant system shall satisfy following requirements for duration of warranty period:

.1 Waterproof, flexible, and thermally compatible with substrate under applicable service conditions.
.2 Provide a weather-tight seal that does not allow moisture penetration.
.3 Shall not debond, crack, or craze.
.4 Shall not leak.

.2 Reference to products does not relieve manufacturer of responsibility to comply fully with specified criteria.

2.3 SEALANT MATERIALS

.1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.

.2 When low toxicity caulks are not possible, confine usage to areas which offgas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize offgas time.

.3 Unless otherwise specified, VOC content limits of sealants shall be in accordance with SCAQMD Rule 1168 and as follows:

.1 Architectural Materials:
.1 Sealants: VOC content limit 250 g/L.
.2 Sealant Primers for Non-Porous Surfaces: VOC content limit 250 g/L.
.3 Sealant Primers for Porous Surfaces: VOC content limit 775 g/L.

.2 All Other Applications:
.1 Sealants: VOC content limit 420 g/L.
.2 Sealant Primers: VOC content limit 750 g/L.

2.4 SEALANT MATERIAL DESIGNATIONS

.1 Type S-1: Acrylic Latex One Part, Shore A Hardness 20, to ASTM C834.

.1 Acceptable Materials:
.1 Latacalk, Chemtron.
.2 Sonolac, BASF Sonneborn.
.3 Latex 100, Tremco.

.2 Type S-2: Silicone Sealant; mould and mildew resistant.

.1 To ASTM C920; type S; grade NS; class 50; use NT, G, and A.
.1 Acceptable Materials:
.1 Multiseal, Chemtron.
.2 795 Silicone, DuPont.
.3 SCS2000, GE.

.4 895 NST, Pecora
.5 Spectrem 2 Silicone, Tremco Inc.

.1 To ASTM C920; type S; grade NS; class 50; use NT, G, and A.
.1 Acceptable Materials:
.1 790 Silicone, DuPont.
.2 SilPruf SCS 2000, GE.
.3 890 NST, Pecora
.4 Spectrem 1 Silicone, Tremco Inc.

.2 To ASTM C920; type S; grade NS; class 25; use NT, G, and A.
.1 Acceptable Materials:
.1 OmniPlus, BASF Sonneborn.
.2 786 Silicone, DuPont.
.3 SCS1700, General Electric.
.4 898 NST, Pecora
.5 Tremsil 200, Tremco Inc.

.3 Type S-3: Silicone Sealant; general construction and air-seal sealant.
.1 To ASTM C920: type S; grade NS; class 25; use NT, M, G, A, O.
.1 Acceptable Materials:
.1 790 or 795 Silicone, DuPont.

.4 Type S-5: Acoustical Sealant; interior, non-skimming, non-hardening, simple component synthetic rubber sealant.
.1 Acceptable Materials:
.1 Metaseal, Chemtron.
.2 AIS 919, Pecora
.3 Acoustical Sealant, Tremco.

.5 Type S-7: Single-component polyurethane or hydrid sealant; non-sag, for general construction.
.1 To ASTM C920: type S; grade NS; class 25; use NT, M, A, O, T.
.2 Acceptable Materials:
.1 Masterseal NPI or 150, BASF Sonneborne.
.2 Multiflex, Chemtron.
.3 H1 or S1, Loxon
.4 Mapeflex P1, MAPEI Inc.
.5 Dynatrol I-XL Hybrid, Pecora
.6 Sikaflex 1a or SikaHyflex 150LM, Sika.
.7 Dymonic FC, Tremco Inc.
.8 Pourthane NS, W.R. Meadows Canada.

2.5 COLOURS

.1 Colours: To match adjacent materials, as selected by Consultant, from manufacturer's standard colour range.

2.6 SEALANT SELECTION

.1 Where no specified type of sealant is shown or specified, choose one of the sealants specified in this Section appropriate for its location.

.2 Make sealant selections consistent with manufacturer's recommendations.

.3 Use acrylic sealant Type S-1 only on the interior and only in situations where little or no movement can occur.

.4 Use mould & mildew resistant silicone sealant Type S-2 for non-moving joints in washrooms . Do not use on floors.

.5 Use silicone general construction sealant Type S-3 or Type S-6 and S-7 for all joints, interior and exterior, where no other specific sealant type specified. Use Type S-6 for joints over 19 mm.

.6 Use acoustical sealant Type S-5 and air seal sealant Type S-3 only where they will be fully concealed and only where no constant or consistent air pressure difference will exist across the joint.

2.7 ACCESSORIES

.1 Preformed Compressible and Non-Compressible back-up materials that are non-staining, compatible with joint substrate, sealants, primers, and other joint fillers, and are approved for applications indicated by sealant manufacturer based on site experience and laboratory testing.

.1 Rod Type Sealant Backings:

.1 ASTM C1330, Type C (closed cell material with a surface skin), Type O (open cell material) or Type B (bi-cellular material with a surface skin).

.2 Use any of the preceding types, as approved in writing by joint sealant manufacturer for joint application indicated.

.3 Size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

.4 Non-adhering to sealant, to maintain two sided adhesion across joint.

.2 High Density Foam.

.1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m^3 density, or neoprene foam backer, size as recommended by manufacturer.

.3 Bond Breaker Tape.

.1 Polyethylene bond breaker tape or other tape recommended by sealant manufacturer which will not bond to sealant.

.2 Preformed Sealants

.1 Preformed Silicone Sealant System: Manufacturer's standard system consisting of pre-cured low modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral curing silicone sealant for bonding extrusions to substrates:

.1 Acceptable Materials:

.1 DuPont; 123 Silicone Seal.

.2 GE Silicones; UltraSpan US1100.

.3 Tremco; Spectrem Ez Seal.

.3 Primer: Non-staining type as recommended by sealant manufacturer.

.4 Joint Cleaner: Non-corrosive solvent type recommended by sealant manufacturer for applicable substrate materials.

.5 Bond Breaker: Pressure-sensitive plastic tape that will not bond to sealants.

Part 3 Execution

3.1 PROTECTION

.1 Protect installed Work of other trades from staining or contamination.

3.2 EXAMINATION

.1 Carefully inspect surfaces, materials to receive sealants and verify they are physically capable of retaining sealant bond.

.2 Verify that fillers and backing provided under other Sections properly installed.

.3 Grind joint surfaces if required to achieve adequate surface preparation.

3.3 PREPARATION

.1 Prepare surfaces in accordance with manufacturer’s instructions.

.2 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.3 Maintain workmanship of highest quality in accordance with best trade practice.

.4 Ensure that joint forming materials are compatible with sealant.

.5 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work. Wire brush loose materials and other foreign matter which might impair adhesion of sealant.

.6 Use air stream to blow out dirt and water from crevices.

.7 Ensure joint surfaces are dry and frost free.

.8 Prime all porous material (e.g. wood, masonry, concrete, ceramic or paver tile, etc).

.9 Prime other joints when recommended by manufacturer. Use a brush that will reach all parts of the joints. Mask adjoining surfaces with tape prior to priming to prevent staining.

3.4 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

.2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.5 BACKUP MATERIAL

.1 Use backer rod as specified, to limit depth of sealant and to act as bond breaker at back of joint.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

.3 Where depth of joint does not permit the use of backer rod apply paper masking tape to back of joint to act as bond breaker.

.4 Ensure that no joints are formed which are bonded on adjacent sides where there is any possibility of movement.

3.6 MIXING

.1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.7 APPLICATION

.1 Apply sealant in strict accordance with manufacturer's recommendations.

.2 For joints where movement is possible, apply backer rod to achieve a joint depth of one half the joint width but not less than 9 mm; for joints larger than 25 mm use a depth of 13 mm.

.3 Use pressure gun fitted with suitable nozzle. Use sufficient pressure to fill voids and joints solid.

.4 Form surface of sealant smooth, free from ridges, wrinkles, sags, or air pockets and imbedded impurities. Neatly tool surface to a slight concave appearance.

.5 Tool sealants to achieve air tight joints. Use wet tools as required.

.6 Ensure bead is solid, filling entire space between sides and bedding material, exerting sufficient pressure to obtain maximum bond, by allowing sealant to bulge out in advance of nozzle.

.7 Apply sealant within recommended temperature ranges. Consult manufacturer when sealant cannot be applied within recommended temperature range.

.8 Seal perimeters of hollow metal door frames on both sides.

.9 Seal control joints in gypsum boards, and junctures between interior partitions with exterior walls.

.10 Seal door frames around the inside perimeter, so that an airtight seal is obtained, as indicated on drawings.

.11 Seal joints in floors and walls and around service and mechanical and electrical fixture penetrations.

.12 Seal at all locations where dissimilar material meet.

.13 Curing

.1 Cure sealants in accordance with sealant manufacturer's instructions.

.2 Do not cover up sealants until proper curing has taken place.

.3 On porous surfaces allow sealant to cure overnight, and remove excess by light wire brushing.

3.8 CLEANING

.1 Clean adjacent surfaces immediately and leave Work neat and clean.

.2 Remove excess and droppings, using recommended cleaners as work progresses.

.3 Remove masking tape after initial set of sealant.

.4 Correct staining and discolouring of adjacent surfaces as directed by Consultant.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 The Work of this Section includes the provision of all labour, materials, plant and equipment necessary for the completion of wood door restoration work, including but not limited to:

.1 Removal of door, removal of coatings from all door surfaces down to bare substrate, refurbishment and reinstallation of wood door, complete with new weather stripping.

.2 Coordinate for new door hardware requirements.

1.2 RELATED REQUIREMENTS

.1 Section 08 71 00 - Door Hardware.

.2 Section 08 80 50 - Glazing.

.3 Section 09 91 00 - Painting.

1.3 REFERENCES

.1 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)

.1 North American Architectural Woodwork Standards (NAAWS) 4.0 Errata Edition.

.2 CSA Group (CSA)

.1 AAMA/WDMA/CSA 101/I.S.2/A440-22, North American Fenestration Standard/Specification for windows, doors, and skylights (NAFS).

.2 CSA A440.4:19 (R2024), Window, door, and skylight installation.

.3 CAN/CSA O80 SERIES:21, Wood Preservation, Includes Administrative Update (2022) and Errata (2022).

.4 CSA O112.9:21, Evaluation of Adhesives for Structural Wood Products (Exterior Exposure), Includes Administrative Update (2022).

.5 CSA O132.4-M1980 (R1998), Hinged Exterior Wood Door Frames

.6 CSA O132.5-M1992(R1998), Stile and Rail Wood Doors.

.7 CSA O141:23, Canadian Standard Lumber.

.3 Fenestration & Glazing Industry Alliance (FGIA)

.1 AAMA 701/702-23-Performance Specification for Pile Weatherstrips (AAMA 701) and Polymer Weatherseals (AAMA 702).

.4 National Lumber Grades Authority (NLGA)

.1 NLGA Standard Grading Rules for Canadian Lumber (2025 Edition).

.5 Window & Door Manufacturers Association (WDMA)

.1 WDMA I.S. 4-25 Industry Specification for Preservative Treatment for Millwork .

.2 FMA/AAMA/WDMA 300-12 Standard Practice for the Installation of Exterior Doors in Wood Frame Construction for Extreme Wind/Water Exposure.

1.4 REPAIR INTENT

.1 The intent of the repairs to the existing wood door is to make it structurally sound, stable, and smoothly operating while conserving the maximum amount of existing material and its existing character.

.2 Where possible, original woodwork is to be repaired instead of replaced.

.3 Obtain approval from Consultant for any areas or components needing replacement not identified which are revealed in the course of the work.

.4 Fabricate replacement elements to match existing in size, section and mould profile. Use as far as possible the original methods of fastening or adhering. The intent is to provide a restored wood door in the repaired location.

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Following contract award and prior to commencement of any work on or off site, Contractor to organize, attend and chair a pre-restoration meeting with the Consultant. Contractor to prepare and distribute minutes.

.2 The purpose of the meeting is to review the requirements of the project, methods of repair and restoration, and establish a schedule of work including delivery of Submittals.

.3 At the meeting, Contractor to provide a Project Schedule.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals shall meet the requirements of Section 01 33 00 - Submittal Procedures.

.2 Submit product data:

.1 Submit manufacturer's published product literature, specifications and data sheets, including, but not limited to, the following:

.1 Glazing materials;

.2 Wood Adhesive;

.3 Wood Filler;

.4 Wood Preservative;

.5 Epoxy Wood Consolidant;

.6 Epoxy Wood Filler;

.7 Water-based, low-VOC, wood water-proofer and stain.

.2 Submit electronic copies of WHMIS Safety Data Sheets. Indicate VOCs:

.1 For caulking materials during application and curing.

.2 For door materials and adhesives.

.3 For sealers and stains.

.3 Submit shop drawings

.1 Show new weather stripping at reinstalled doors.

.4 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit 150 x 150 mm sample of tinted, finished wood, same species as door.

1.7 QUALITY ASSURANCE

.1 Restore and refinish doors in accordance with the NAAWS Premium grade, and WDMA I.S. 4.

.2 Provide for all work to be done by qualified and experienced trades personnel with a minimum of 5-years' experience in the type of work specified.

.3 Execute all work of this Section under the continuous supervision and direction of a competent finish carpenter.

.4 Obtain written review from Consultant for changes to qualified personnel before proceeding with new personnel on site

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Pack and ship all materials to ensure no damage occurs.

.2 If door(s) must be removed to execute repairs and refinishing, provide a temporary door to maintain accessibility, exiting and security. Protect interiors from the elements during the work. When reinstalling the restored door, remove the temporary door from site.

.3 Store materials in safe, dry location in such a way as to prevent site damage prior to, during and after installation, but prior to handover. Store lumber in a dry place indoors and protect from damage.

1.9 WARRANTY

.1 Submit a warranty for the craftsmanship and materials of this Section for a period of 2-years from date of acceptance of the Work of this Section.

Part 2 Products

2.1 MATERIALS

.1 Lumber:

.1 Lumber generally: to CAN/CSA O141.

.2 Wood species used must be one of the listed species within CSA A440. At time of manufacture, moisture content must not exceed 12% moisture content by mass. Final repairs should be free from splits, checks, shakes or knots.

.3 Identify lumber by grade stamp of an agency certified by Canadian Lumber Standards Administration Board, to National Lumber Grades Authority standards

.4 Use shed stock with maximum moisture content of 12% at time of fabrication.

.2 Repairs to existing door: match wood species and cut of existing.

2.2 ACCESSORIES

.1 Adhesive: waterproof, synthetic, formulated emulsion adhesive, tested to CSA O112.9.

.2 Adhesive for wood Dutchman repairs:

.1 Standard of Acceptance:

.1 Abatron LiquidWood + WoodEpox, or approved equivalent.

.3 Exterior filler for finishing:

.1 Elmer's Professional Wood Filler,

.2 PC-Woody Epoxy Paste by PC-Products,

.3 or approved equivalent.

.4 Wood preservative surface application: to CSA O80-SERIES, clear copper naphthenate solution.

.5 Epoxy Wood Consolidant:

.1 PC-Petrifier by PC-Products.

.2 LiquidWood Epoxy Wood Consolidant, by Abatron Inc.

.6 Epoxy Wood Filler:

.1 PC-Woody by PC-Products.

.2 WoodEpox Wood Filler by Abatron Inc.

.7 Water-based, low-VOC, wood water-proofer and stain:

.1 Standard of Acceptance:

.1 SEAL-ONCE Nano+Poly Penetrating Wood Sealer with Polyurethane; provide with semi-transparent tint as selected by Consultant from manufacturer's full range.

.8 Glazing Tape: Adhesive Butyl tape 2.5 mm thick:

.1 Tremco 440, or approved equivalent.

.9 Window and Door Sealants:

.1 LePage QUAD® Max, or approved equivalent.

.10 New Weather Stripping:

.1 Weather stripping shall be EPDM compression seal, Shore A hardness [X], tested in accordance with AAMA 701/702, compatible with wood substrates, and free of materials causing staining or deterioration of adjacent wood surfaces.

2.3 FABRICATION

.1 Fabricate in accordance with NAAWS section 9, Premium grade.

.2 Door Repairs:

.1 Fabricate replacement materials to match existing in length, section and profile. Use as far as possible the original methods of attachment.

.2 Fabricate replacement materials with sharp true profiles to match existing exactly.

.3 Sand elements lightly and ease corners in preparation for finishing.

.4 Use only adhesives and fastenings that develop sufficient strength for intended use, which are non-staining, and are unaffected by the environment to which exposed.

.3 Tolerances:

.1 Fabrication: custom cut members: 1 mm (1/32") different maximum, from existing.

.2 Installation: alignment at joints: 1 mm (1/32") different maximum, from existing.

2.4 FINISHES

.1 Factory finish doors in accordance with NAAWS Section 5 – Finishing, System 9 UV-Curable, Acrylated Epoxy, Polyester or Urethane as a minimum.

.2 Paint in accordance with Section 09 91 00 - Painting.

Part 3 Execution

3.1 EXAMINATION

.1 Before commencing repairs ensure that existing opening is made good and ready for the work of this Section.

.2 Thoroughly document doors and hardware before commencing work.

.3 Starting work will indicate acceptance of site conditions.

.4 Any difficulties with installation will then be at the expense of this Section.

.5 Report to Consultant in writing any substantial areas of deterioration revealed during the course of work. Await instructions regarding repair before proceeding.

3.2 PROTECTION OF IN-PLACE CONDITIONS

.1 Protect adjacent finished work against damage which may be caused by on-going work.

3.3 PREPARATION

.1 Wood Doors, Frames and Transoms:

.1 Remove all coatings to bare substrate in preparation for wood repairs.

.2 Review all required repairs with Consultant before proceeding.

.3 Report any other deterioration, damage or missing components uncovered in the course of the work to the Consultant. Await Consultant's instructions before proceeding with any additional work.

3.4 WOOD REPAIR – GENERAL

.1 Flush areas where decayed or damaged wood have been cut out with zinc napthanate and consolidate and fill with epoxy resins and fillers, or piece in with new wood, glued and fastened, for larger areas of damage.

3.5 WOOD DUTCHMAN REPAIRS

.1 Material spliced in as repair shall be same wood species and cut as existing, with grain orientated to match original.

.2 Joints shall be tight so that after finishing they are visible only upon close inspection.

.3 In exterior situations, joints shall be weather tight; bevel joints so that they would drain to the exterior should moisture penetrate.

.4 Material spliced-in shall be attached to the parent piece, not adjacent element.

.5 Remove any loose and/or rot-damaged wood.

.6 Make smooth, straight cuts for tight joints.

.7 Chisel out to a straight edge.

.8 Prepare wood repair component.

.9 Apply specified Dutchman adhesive and set Dutchman in place true and plumb.

.10 Generally surface fasteners are to be avoided in Dutchman repairs; clamp until adhesive has set and protect from pressure marks.

.11 Once glue is set, sand and level the joint.

3.6 EPOXY WOOD CONSOLIDANT APPLICATION

.1 Provide dry, clean surface removing all dry rot, dirt, saw dust or loose paint. Remove existing paint and/or varnish to increase acceptance of consolidant by wood.

.2 For vertical surfaces drill small holes in wood on angle to hold consolidant.

.3 Apply mixture by pouring and brushing onto the wood surface until damaged area is fully saturated. The applicator bottle can be used to inject into drilled holes or larger openings in the wood. Consolidant will readily follow grain of wood. Apply wood consolidant while absorption continues.

.4 Reapply prior to cure if required.

.5 After curing is complete, infill missing pieces with epoxy wood filler.

.6 Epoxy wood consolidant to be used only on repairs that are les than 50mm x 50mm in area.

3.7 TINTING EPOXY FILLERS

.1 Tint epoxy fillers to match finished colour of adjacent wood substrate prior to application; verify colour match by mock-up before proceeding. Apply finish coats over full door surface including repaired areas.

3.8 EPOXY REPAIRS

.1 Without removing any wood, consolidate doors wherever wood surface is soft or punky, with epoxy dilutant applied as per manufacturer's instructions.

.2 Fill any voids or holes in wood with epoxy filler. Finish filler flush with wood surface.

3.9 EPOXY WOOD FILLER APPLICATION

.1 Provide dry, clean surface removing all dry rot, dirt, saw dust or loose paint.

.2 Where rotted wood is present, remove or encapsulate with epoxy consolidant before applying epoxy wood filler.

.3 Use screen wire or wood blocks to bridge or reinforce larger holes.

.4 Using separate knives to remove equal amount needed, mix equal parts of A (off-white) and B (light brown) on flat surface until uniform tan colour. Mixing for a longer period of time will assure better performance.

.5 For best results, allow 15 - 20 minutes of standing time after application before roughly shaping and moulding.

.6 Form mould profiles to match existing wood profiles and / or as indicated on drawings.

.7 Let filler cure. Full cure achieved in 3-7 days. Cured epoxy can be worked and tooled similar to real wood.

.8 Sanding can generally take place within 1-2 days - premature sanding will gum up sandpaper. Always sand with wood grain.

3.10 STAINING AND WATERPROOFING

.1 Supply pre-tinted product per approved samples.

.2 Preparation:

.1 Proper preparation is critical for maximum penetration and longevity.

.2 Clean the Surface: Thoroughly clean the wood to remove dirt, debris, mildew, and previous coatings. Use a wood cleaner/brightener (e.g., Seal-Once All Wood Cleaner) to open the pores of the wood.

.3 Remove Old Finishes: Remove any existing, failing coatings. The surface must be bare and porous to allow for penetration.

.4 Dry Time: Let the wood dry completely for 1–2 days after cleaning before applying the sealant.

.5 Check Absorbency: Sprinkle a few drops of water on the surface; if it does not immediately soak in, the surface needs further cleaning or stripping.

.6 Temperature & Conditions: Apply only when air and surface temperatures are between 45°F (7.2°C) and 95°F (35°C). Do not apply if rain is expected within 24 hours.

.7 Protect Adjacent Areas: Cover plants, vegetation, and surrounding areas to protect from overspray.

.3 Application:

.1 Preparation: Shake or stir the sealer thoroughly before use. Do not thin.

.2 Application Method: Apply with a synthetic brush, roller, or sprayer (using a 15–17 tip for sprayers).

.3 Two-Coat "Wet-on-Wet" Method:

.1 First Coat: Apply an even first coat.

.2 Second Coat: Apply the second coat within one hour of the first, while the first coat is still damp (but not excessively wet).

.4 Back Brushing: If using a sprayer or roller, immediately back brush to ensure even penetration and remove excess product.

.5 Avoid Puddling: Do not allow the sealer to pool or puddle on the surface.

.6 Final Touches: Wipe off any excess, unabsorbed sealer with a rag.

.7 Ends: Apply to all surfaces, ensuring wood ends are thoroughly sealed.

3.11 DOOR INSTALLATION

.1 If doors were removed to facilitate restoration work, install refurbished door true and plumb, at proper elevation and in alignment with other work.

.2 Fit door to meet specified clearances.

.3 Install new hardware as specified.

.4 Adjust door to swing freely and easily, to remain stationary at any point of swing, to close evenly and tightly against stop seals and weatherstripping without binding.

3.12 INSTALLATION OF WEATHER STRIPPING

.1 Provide new weather stripping as indicated on approved shop drawings. Review extent of weather-stripping replacement with Consultant before proceeding with work.

3.13 ADJUSTMENT

.1 Adjust doors and hardware just prior to completion of building to function freely and properly.

3.14 CLEANING

.1 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.

.2 Remove traces of sealers and caulking; clean doors and frames.

.3 Clean glass and glazing materials with approved non-abrasive cleaner.

.4 On completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.15 PROTECTION

.1 Protect finished work against damage that may be caused by adjacent on-going work or scheduled work which is part of this contract.

3.16 SCHEDULE

.1 Restore doors at locations indicated.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 22 00 - Concrete Masonry Units.

.2 Section 07 92 00 - Joint Sealants.

.3 Section 08 71 00 - Door Hardware.

.4 Section 09 91 00 - Painting.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)/ Steel Door Institute (SDI):

.1 ANSI/SDI A250.4-2024, Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors.

.2 ANSI/SDI A250.8-2023, Recommended Specifications for Standard Steel Doors and Frames.

.3 SDI A250.11:2022, Recommended Erection Instructions for Steel Frames.

.2 American Society for Testing and Materials International (ASTM):

.1 ASTM A653/A653M-2023, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM A780/A780M-20, Standard Practice for Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings.

.3 ASTM A879/A879M-12(2017), Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface.

.4 ASTM A924/A924M-20, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

.5 ASTM B29-19, Standard Specification for Refined Lead.

.6 ASTM B749-20, Standard Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.

.7 ASTM D4726-18, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Exterior-Profile Extrusions Used for Assembled Windows and Doors.

.8 ASTM D6386-16a, Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting.

.9 ASTM D7396-14 (2020), Standard Guide for Preparation of New, Continuous Zinc-Coated (Galvanized) Steel Surfaces for Painting.

.10 ASTM E90-09(2016), Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

.11 ASTM E413-16, Classification for Rating Sound Insulation.

.3 Builders Hardware Manufacturers Association (BHMA):

.1 BHMA A156.115 -2016, Hardware Preparation in Steel Doors and Steel Frames.

.2 BHMA A156.16-2013, Auxiliary Hardware.

.4 Canadian Standards Association (CSA Group):

.1 CSA-G40.20-13/G40.21-13 (R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel, Includes Update No. 1 (2014).

.2 CSA W47.1:19, Certification of companies for fusion welding of steel.

.3 CSA W59-18, Welded Steel Construction, Includes Errata (2020).

.5 Canadian Steel Door Manufacturers' Association (CSDMA)/National Association of Architectural Metal Manufacturers (NAAMM):

.1 NAAMM HMMA 840-17, Guide Specification for Receipt, Storage and Installation Hollow Metal Doors and Frames.

.2 CSDMA, Recommended Specifications for Commercial Steel Doors and Frames, 2009.

.3 CSDMA, Recommended Selection and Usage Guide for Commercial Steel Door and Frame Products, 2009.

.4 CDSMA, Guide Specification for Installation and Storage of Hollow Metal Doors and Frames, 2012.

.6 International Code Council (ICC):

.1 ICC A117.1-2017, Accessible and Usable Buildings and Facilities.

.7 South Coast Air Quality Management District (SCAQMD), California State:

.1 SCAQMD Rule 1113-11, Architectural Coatings.

.2 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.

.8 The Society for Protective Coatings (SSPC):

.1 SSPC-PS 12.01, One Coat Zinc-Rich Painting System. (Includes 2004 Revisions)

.2 SSPC-PS Guide 12.00, Guide to Zinc-Rich Coating Systems.

1.3 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Product Data:

Submit product data in accordance with Section 01 33 00 - Submittal Procedures:

.1 Submit manufacturer’s printed product literature, specifications and data sheets for each type of door and frame specified.

.2 Shop Drawings:

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures:

.2 Indicate general construction of each type of door and frame, configurations, locations, door handing, sizes, material, material thickness, core description and details, edge construction, jointing methods, mortises, reinforcements, anchors, arrangement of hardware, finish and special features.

.3 Reference door and frame types to Door Schedule. Indicate door numbers where applicable.

.3 Samples:

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures:

.2 Submit one 300 x 300 mm corner sample of each type of door.

.3 Submit one 300 x 300 mm corner sample of each type of frame. Show butt cutout and finish.

.4 Submit test and engineering data, and installation instructions.

.5 Test and Evaluation Reports:

.1 Submit test reports from approved independent testing laboratories, certifying compliance with specifications.

.2 All test reports that reference the NAFS must include, on the first page, a summary of the results including, at minimum:

.1 The product manufacturer.
.2 The type of product.
.3 The model number/series number.
.4 The primary product designation.
.5 The test completion date.

1.4 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for cleaning and maintenance of finishes for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 QUALITY ASSURANCE

.1 Quality Standard: Comply with ANSI A250.8, unless more stringent requirements are indicated. Comply with ANSI A117.1.

.2 Qualifications

.1 Manufacturer/Fabricator: Use a member in good standing of the Canadian Steel Door and Frame Manufacturer's Association.

.2 Installer: Use installers who are experienced with the installation of hollow metal doors and frames of similar complexity and extent to that required for the Project.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Product Requirements and as follows:

.1 Receive and store materials as recommended by materials manufacturer.

.2 Inspect and frames on delivery for damage, and notify shipper and supplier if damage is found. Minor damages may be repaired provided refinished items match new work and are acceptable to Consultant. Remove and replace damaged items that cannot be repaired as directed.

.3 Adequately protect surfaces from damage during moving, handling and storage.

.2 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

Part 2 Products

2.1 PERFORMANCE/DESIGN CRITERIA

.1 Perform work in accordance with CSDMA, Recommended Specifications for Commercial Steel Doors and Frames, except as otherwise specified herein.

.2 Provide doors and frames complying with ANSI A250.8 for quality and ANSI A250.4 for physical-endurance level.

.3 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35 degrees C to 35 degrees C.

2.2 MATERIALS

.1 Steel:

.1 Doors and Frames: coated steel sheets to ASTM A924/A924M; coating designation to ASTM A653/A653M: Commercial Steel (CS), Type B, ZF120 (A40) galvannealed; stretcher levelled.

.2 High Humidity Area doors and frames: coated steel sheets to ASTM A924/A924M; coating designation to ASTM A653/A653M: Commercial Steel (CS), Type B, ZF120 (A40) galvannealed; stretcher levelled.

.3 Metallic coated steel sheets in accordance with ASTM A924/A924M; coated to meet requirements of ASTM A653/A653M, Commercial Steel (CS), Type B, ZF75 galvannealed; suitable for unexposed applications; stretcher levelled standard of flatness. Provide Canadian produced steel.

.2 Nominal Base Metal Thickness Requirements:

.1 Frames: refer to frame fabrication requirements specified in this section.

.2 Doors: refer to door fabrication requirements specified in this section.

.3 Hardware Reinforcement for Doors and Frames: Carbon steel, welded in place, prime painted, to the following minimum nominal thicknesses:

Hardware Reinforcement	Door (mm)	Frame (mm)
Pivot Hinge:	4.20	4.20
Mortise Hinge:	[3.51] [4.20]	[3.51] [4.20]
Mortise or Bored Lock or Deadbolt:	[1.98] [3.51]	[1.98] [3.51]
Flush or Surface Bolt Front:	[1.98] [3.51]	[1.98] [3.51]
Surface or Concealed Closer:	[2.74] [3.51]	[2.74] [3.51]
Strike Reinforcements:	[1.98] [3.51]	[1.98] [3.51]
Hold Open Arm:	[1.98] [3.51]	[1.98] [3.51]
Electronic Hardware Reinforcements:	1.98	1.98
Pull Plates and Bars:	1.30	1.30
Mortar Box:	--	0.84
Surface Exit Devices:	[1.98] [3.51]	[1.98] [3.51]
Door Surface Hardware Reinforcements:	[1.30] [1.98]	[1.30] [1.98]
Frame surface hardware reinforcements:	2.74	2.74
Notes: Provide guard boxes to protect mortised cut-outs from spray applied insulation, fully sealed.		

.3 Door Core Materials

.1 Honeycomb (interior only): Structural small cell 25 mm maximum. kraft paper honeycomb:

.1 Weight: 36.3 kg/ream minimum.

.2 Density: 16.5 kg/m^3 minimum.

.3 Sanded to required thickness.

2.3 ADHESIVES

.1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.

.1 Adhesive: maximum VOC content 50 g/L to SCAQMD Rule 1168.

2.4 PRIMER

.1 Touch-up primer: to ASTM A780/A780M and SSPC-PS 12.01.

.1 Maximum VOC limit 50 g/L to GC-03.

2.5 FINISHING

.1 Shop apply zinc rich primer to repair damaged zinc coatings arising from fabrication; cure primer fully before shipping to site; include compatible primer for site finishing and correction of surface abrasions to zinc coatings and factory applied primer.

.2 Remove weld slag and splatter from exposed surfaces.

.3 Fill and sand smooth tool marks, abrasions and surface blemishes to present smooth uniform surfaces. Prepare surfaces for field painting to ASTM D6386 and ASTM D7396 and Section 09 91 00 - Painting.

2.6 ACCESSORIES

.1 Door silencers (bumpers): Grey rubber, to ANSI/BHMA A156.16 Type 6-180; three silencers on strike jambs of single door frames; two silencers on heads of double door frames; screw fastener applied. Stick on bumpers are not acceptable.

.2 Floor anchors: 3.5 mm minimum adjustable floor clip angles with 2 holes for anchorage to floor.

.3 Metallic paste filler: to manufacturer's standard.

.4 Fasteners: tamperproof type 304 stainless steel screws with countersunk flat head.

.5 Sealant: Section 07 92 00 - Joint Sealants.

.1 Maximum VOC limit 250 g/L to SCAQMD Rule 1168.

2.7 FABRICATION GENERAL

.1 Welded construction: assemble units by welding in accordance with CSA W59 to produce a finished unit square, true and free of distortion. Welding shall be undertaken only by a fabricator fully approved by the Canadian Welding Bureau to the requirements of CSA W47.1.

.2 Fabricate steel doors and frames units complying with ANSI A250.8 and to be rigid, neat in appearance, and free from defects including warp and buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site.

.3 Make provisions in doors and frames to suit requirements of trade or section providing electrically operated hardware or security devices. Provide removable plates or knock outs for electrical contacts. Provide junction boxes on security door frames as required for door strikes, mag locks and door contacts. Ensure frames arrive on site prepared for wiring.

2.8 FRAMES FABRICATION: GENERAL

.1 Fabricate frames in accordance with CSDMA specifications and ANSI A250.8.

.2 Accurately form frames to profiles indicated. Construct frames straight and free from twist or warp.

.3 Interior frames: 1.6 mm minimum for single doors; 1.98 mm for frames with opening width in excess of 1220 mm; welded type construction. 50 mm face standard frame profile, throat and frame width to suit wall construction. Knock-down frames are not allowed.

.4 Blank, drill, reinforce and tap frames to receive mortised, templated hardware, and electrical devices, using templates provided by finish hardware supplier. Reinforce frames for installation of closers. For transportation, install stiffener plates or two angle

spreaders where required to prevent bending of frame and to maintain alignment when setting. Weld reinforcement in place. Remove prior to installation.

.5 Provide removable portion of stop and frame where required for overhead concealed door closers, properly connected to frame, and prepare for attachment of closer prior to shipment.

.6 Protect mortised cutouts with steel guard boxes.

.7 Manufacturer's nameplates on frames and screens are not permitted.

.8 Conceal fastenings except where exposed fastenings are indicated.

.9 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.

2.9 FRAME ANCHORAGE

.1 Provide appropriate anchorage to floor and wall construction.

.2 Where frames terminate at finished floor, supply floor plates for anchorage to slab. Check depth of extension of finished floor to structural slab and provide jamb extension anchorage as required. Provide 50 mm minimum adjustment.

.3 Locate wall anchors immediately above or below each hinge reinforcement on the hinge jamb, and directly opposite on the strike jamb. Provide three anchors per jamb for frames up to 2300 mm. Add one anchor per jamb for each additional 760 mm or fraction thereof in frame height.

.4 Locate anchors for frames in existing openings not more than 150 mm from top and bottom of each jambs and intermediate at 660 mm o.c. maximum.

2.10 FRAMES: WELDED TYPE

.1 Welding in accordance with CSA W59.

.2 Cut frame mitres accurately and weld on inside of frame profile. Fill frame corners, exposed surface depressions and butted joints with air drying paste filler. Sand to a smooth uniform finish. Touch up damaged galvanized finish with zinc rich primer.

.3 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.

.4 Securely attach floor anchors to inside of each jamb profile.

.5 Weld in two temporary jamb spreaders per frame to maintain proper alignment during shipment.

2.11 DOOR FABRICATION GENERAL

.1 Fabricate steel doors rigid, neat in appearance, and free from defects including warp and buckle; 45 mm thickness of types and sizes indicated on drawing, and as follows:

.1 Door faces of all steel doors shall be fabricated without visible seams, free of scale, pitting, coil brakes, buckles and waves.

.2 Form edges true and straight with minimum radius suitable for thickness of steel used.

.3 Bevel lock and hinge edges 3 mm in 50 mm; confirm requirement with builder’s hardware or door swing that could dictate a different bevel.

.2 Fabricate doors with longitudinal edges locked seam and spot welded. Seams: not visible, grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish visible. Bevel both stiles of single doors 1 in 16.

.3 Interior Doors: Flush, lock seam construction, hollow steel doors fabricated in accordance with CSDMA Manufacturing Specifications for Doors and Frames, and as follows:

.1 Face sheets: Minimum 1.30 mm base steel sheet thickness.

.2 Stiffened and sound deadened with honeycomb core laminated under pressure to each face sheet.

Part 3 EXECUTION

3.1 EXAMINATION

.1 Verify condition and dimensions of previously installed work upon which this Section depends. Report defects to Consultant. Commencement of work means acceptance of existing conditions.

3.2 INSTALLATION GENERAL

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

.2 Install back angle for sill PMMA membrane to terminate on below the threshold in line with the primary air seal.

.3 Install doors, frames and accessories in accordance with reviewed shop drawings, ANSI A250.11, CSDMA Guide Specification for Installation and Storage of Hollow Metal Doors and Frames, manufacturer’s data, and as specified in this Section.

.4 Damaged or twisted door and frames, or doors with interior cores or frame telegraphing through, will be rejected.

3.3 FRAME INSTALLATION

.1 Door Frames:

.1 Remove temporary spreaders before installing door frames, leaving exposed surfaces smooth and undamaged.

.2 Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set; limit of acceptable frame distortion 2 mm out of plumb measured on face of frame, maximum twist corner to corner of 3 mm; align horizontal lines in final assembly.

.3 Brace frames rigidly in position until adjacent construction is complete; install wooden spreaders at third points of frame rebate to maintain frame width, install centre brace to support head of frames 1200 mm and wider in accordance with ANSI A250.1; do not use temporary metal spreaders for bracing of frames.

.4 Place frames before construction of enclosing walls and ceilings, except for frames located in existing walls or partitions allowing for deflection of adjacent construction to ensure that structural loads are not transmitted to frames, and as follows:

.1 Check and correct opening width and height, squareness, alignment, twist and plumb as frames are installed in accordance with CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames.

.2 Metal Stud Partitions: Provide a minimum of three wall anchors per jamb for frames up to 2150 mm high and one additional anchor for each 600 mm over 2150 mm high; install adjacent to hinge location on hinge jamb

and at corresponding heights on strike jamb; attach wall anchors to studs with screws.

.3 Remove wooden braces after frames are securely fastened or attached to adjacent construction.

.5 For frames over 1220 mm in width, provide vertical support at the centre of head.

.2 Frame Tolerances: Install frames to tolerances listed in ANSI A250.11, and as follows:

.1 Squareness: Maximum 1.6 mm measured across opening between hinge jam and strike jamb.

.2 Plumbness: Maximum 1.6 mm measured from bottom of frame to head level.

.3 Alignment: Maximum 1.6 mm measured offset between face of hinge jamb and strike jamb relative to wall construction.

.4 Twist: Maximum 1.6 mm measured from leading edge of outside frame rabbet to leading edge of inside frame rabbet.

.3 Install door silencers.

3.4 DOOR INSTALLATION

.1 Fit hollow metal doors accurately in frames within clearances required for proper operation; shim as necessary for proper operation. Install as specified in ANSI A250.8.

.2 Install hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00 - Door Hardware.

.3 Provide even margins between doors and jambs and doors and finished floor [and thresholds] as follows.

.1 Hinge side: 1.0 mm.

.2 Latchside and head: 1.5 mm.

.3 Finished floor: 6 mm; 13 mm at openings in non-fire rated separations where undercuts are indicated.

.4 Adjust operable parts for correct clearances and function.

.5 Install louvres.

3.5 FINISH REPAIRS

.1 Touch-up areas where galvanized coating has been removed or damaged with primer.

.2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

3.6 FIELD PAINTING

.1 Prepare surfaces for field painting, to ASTM D6386 and ASTM D7396.

.2 Field painting: refer to Section 09 91 00 - Painting. Protect weatherstrips from paint. Provide final finish, free of scratches or other blemishes.

3.7 ADJUSTING

.1 Adjust doors for smooth, easy, free swinging operation and balanced door movement.

3.8 CLEANING

.1 Clean doors, and frames.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section includes requirements for supply and installation of the following:

.1 Non-rated wall access doors and frames.

.2 Fire rated wall access doors and frames.

.3 Non-rated Ceiling access doors and frames.

1.2 RELATED REQUIREMENTS

.1 Section 05 50 00 - Metal Fabrications.

.2 Section 06 10 00 - Rough Carpentry.

.3 Section 07 92 00 - Sealants.

.4 Section 08 71 00 - Door Hardware.

.5 Section 09 21 16 - Gypsum Board Assemblies.

.6 Section 09 91 00 - Painting.

.7 Division 22 - Plumbing

.8 Division 23 - Heating, Ventilating and Air Conditioning

.9 Division 26 - Electrical

1.3 REFERENCES

.1 American Society for Testing and Materials International (ASTM):

.1 ASTM A568/A568M-19a, Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.

.2 ASTM A780/A780M-20, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

.3 ASTM A653/653M-19a, Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process, General Requirements

.4 ASTM A1008/A1008M-18, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

.5 ASTM B221-20, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

.6 ASTM B633-19, Standard Specification for Electrodeposited Coatings of Zinc or Iron and Steel

.7 ASTM C1396/C1396M-17, Standard Specification for Gypsum Board

.2 Underwriters Laboratories of Canada (ULC):

.1 ULC 104, Standard Method for Fire Tests of Door Assemblies. (CAN/ULC S104-15)

.3 Underwriters' Laboratories (UL), Standards for Safety acceptable to the Standards Council of Canada (SCC).

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Determine specific locations and sizes for access doors needed to gain access to concealed equipment, and indicate on schedule specified and as follows:

.1 Coordinate locations of all access panels in gypsum board ceilings with Consultant for size and location prior to installation, making every effort to locate outside of gypsum board ceilings.

.2 Coordinate acceptable locations and sizes with Architectural Reflected Ceiling Plans; no access panels are allowed in public corridors or feature ceilings.

.3 Coordinate closely with mechanical and electrical sections for size and locations of access panels in walls and ceilings; provide access doors and panels required for project.

.2 Pre-installation meeting: one week prior to beginning work of this Section, with Contractor, Consultant, installer, manufacturer's representative to:

.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.

1.5 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

.1 Provide product data for each type of door and frame indicated, including construction details relative to materials, individual components and profiles, finishes, and fire ratings (if required) for access doors and frames.

.2 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.1 Provide coordination drawings and reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items with concealed framing, suspension systems, piping, ductwork, and other construction. Show the following:

.1 Method of attaching door frames to surrounding construction.

.2 Ceiling mounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim.

.3 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements: Provide fire rated access doors and frames in accordance with NFPA 80 or ULC S104, and labelled and listed by UL, ULC or ITS/Warnock Hersey, or another testing and inspecting agency acceptable to Authority Having Jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

Part 2 Products

2.1 NON-RATED ARCHITECTURAL ACCESS PANELS

.1 Flush doors and trimless frames, fabricated as follows:

.1 Aluminum Extrusions: ASTM B221/B221M, alloy 6063-T6.

.2 Door: Extruded aluminum frame with gypsum board inlay and structural nylon corner elements:

.1 Gypsum Board: to ASTM C1396, 13 mm and 16 mm thickness to match adjacent construction.

.2 Size: Square sized to suit access requirements if not indicated on Drawings.

.3 Latch: Flush cam latch operated by tamper-resistant torx drive.

.4 Hinge: Concealed, two point pin hinge, non corroding, allowing door to open 120° and allowing door to be removed.

.5 Edge Bead: Recessed extruded aluminum frame edge bead providing surface that can be finished to adjacent gypsum board.

.6 Accessories: Fibreglass reinforced nylon, zinc plated screws, stainless steel springs and retaining wire to manufacturer’s standard.

.7 Finish: Aluminum frames, gypsum board, nylon and aluminum cam latch to receive the same finish and paint as the surrounding surface.

.8 Basis of Design Materials:

.1 Access Panel Solutions, BaucoPlus Architectural Access Panel

2.2 FIRE RATED ACCESS PANELS IN MASONRY OR CONCRETE

.1 Flush, fire rated access doors and trimless frames, fabricated from zinc coated steel sheet, and as follows:

.1 Cold-Rolled Steel Sheets: ASTM A1008/A1008M, Commercial Steel (CS), or ASTM A1008/A1008M, Drawing Steel (DS), Type B; stretcher-levelled standard of flatness; with minimum thickness indicated representing specified nominal thickness according to ASTM A568/A568M.

.2 Galvanizing: Electrolytic zinc-coated steel sheet, complying with ASTM B633, Class C coating or ASTM A653/A653M Z180 (G60) mill phosphatized zinc coating, at fabricator's option.

.3 Door: Flush panel, minimum thickness of 0.95 mm.

.4 Latch: Self-latching bolt operated by tamper-resistant torx drive with interior release.

.5 Hinge: Concealed, two point pin hinge, non-corroding, allowing door to open 120° and allowing door to be removed.

.6 Automatic Closer: Spring type.

.7 Edge Trim: All purpose exposed flange formed from 1.98 mm nominal thickness zinc coated steel sheet.

.8 Door Frame: Minimum 1.6 mm thick sheet metal with gypsum board bead.

.9 Acceptable Materials: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

.1 Acudor Products, Inc., FB-5050

.2 Nystrom Building Products Co., UT Series

.3 Milcor Limited., UNIFRAD Universal Fire Rated Access Door

2.3 FABRICATION

.1 Provide access door assemblies manufactured as integral units ready for installation.

.2 Provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness for metal surfaces exposed to view in the completed Work.

.3 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.

.4 Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed based on size of door or panel opening.

.5 Apply manufacturer's standard protective coating on aluminum that will come in contact with concrete after fabrication.

2.4 FINISHES

.1 Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

.2 Finish metal fabrications after assembly.

.3 Aluminum Finishes:

.1 Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

.2 As-Fabricated Finish: AA-M10 Mechanical Finish: as fabricated, unspecified (mill finish).

.4 Steel Finishes:

.1 Surface Preparation: Clean surfaces with non-petroleum solvent so surfaces are free of oil and other contaminants. For galvanized surfaces, apply, after cleaning, a conversion coating suited to the organic coating to be applied over it. For zinc coated surfaces, clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A780.

.2 Factory Priming for Field-Painted Finish: Apply shop primer immediately after cleaning and pre-treating, as follows:

.1 Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate free, universal modified alkyd primer selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.

.2 Shop Primer for Zinc Coated Steel: Organic zinc-rich primer complying with SSPC-Paint 20 and compatible with topcoat.

.3 Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

Part 3 Execution

3.1 PREPARATION

.1 Advise installers of other work about specific requirements relating to access door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices.

3.2 INSTALLATION

.1 Installation shall be completed by Section 09 21 16 - Gypsum Board Assemblies.

.2 Comply with manufacturer's written instructions for installing access doors and frames.

.3 Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.

.4 Install access doors with trimless frames flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING

.1 Adjust doors and hardware after installation for proper operation.

3.4 CLEANING

.1 Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Refer to and coordinate with Division 01 of Contract.

.2 Section 05 50 00 - Metal Fabrications.

.3 Section 06 10 00 - Rough Carpentry.

.4 Section 07 21 19.19 - Foam-in-Place Sealant.

.5 Section 07 92 00 - Joint Sealants.

.6 Division 08 71 00 - Door Hardware.

.7 Section 07 92 00 - Joint Sealants.

.8 Section 08 80 50 - Glazing.

.9 Refer to Door Schedule and Drawings, and coordinate with adjacent existing condition as required.

1.2 REFERENCES

.1 Aluminum Association.(AA)

.1 AA DAF-45-2003 (R2009), Designation System for Aluminum Finishes.

.2 AA ADM-2020, Aluminum Design Manual, 2020 Edition.

.3 AA 23, Welding Aluminum: Theory and Practice, Fifth Edition, 2008.

.4 ASM International, Properties of Aluminum Alloys: Fatigue Data and the Effects of Temperature, Product Form, and Processing, 2008.

.2 ASTM International (ASTM).

.1 ASTM A123/A123M-24, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.2 ASTM A653/A653M-25a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process.

.3 ASTM B209/B209M-21a, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.4 ASTM B221-21, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

.5 ASTM B429/B429M-20, Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.

.6 ASTM C864-05(2019), Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.

.7 ASTM C920-18(2024), Standard Specification for Elastomeric Joint Sealants.

.8 ASTM D638-22, Standard Test Method for Tensile Properties of Plastics.

.9 ASTM D695-26, Standard Test Method for Compressive Properties of Rigid Plastics.

.10 ASTM D790-25, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

.11 ASTM D953-19, Standard Test Method for Pin-Bearing Strength of Plastics.

.12 ASTM E283/E283M-19, Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

.13 ASTM E330/E330M-14(2021), Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls, by Uniform Static Air Pressure Difference.

.14 ASTM E331-00(2023), Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

.15 ASTM E547-00 (2024), Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference.

.16 ASTM E783-02(2018), Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.

.17 ASTM E1105-15(2023), Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.

.3 Canadian General Standards Board (CGSB).

.1 CAN/CGSB 12.8-2017, Insulating Glass Units.

.4 CSA Group (CSA).

.1 CSA AAMA/WDMA/CSA 101/I.S.2/A440:22, North American Fenestration Standard / Specification for windows, doors, and skylights, Includes Errata (2023) and Update No. 1 (2024).

.2 CSA G40.20-13/G40.21-13 (R2023), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel, Includes Update No. 1 (2014).

.3 CSA G164-18 (R2023), Hot Dip Galvanizing of Irregularly Shaped Articles, Includes Update No. 1 (2020).

.4 CSA S136-16 (R2021), North American specification for the design of cold-formed steel structural members.

.5 CSA S157-17/S157.1-17 (R2022), Strength Design in Aluminum / Commentary on CSA S157-17, Strength Design in Aluminum.

.6 CSA W59.2:24, Welded Aluminum Construction.

.7 CAN/CSA Z91-17 (R2022), Health and Safety Code for Suspended Equipment Operations.

.5 Fenestration & Glazing Industry Alliance (FGIA).

.1 AAMA CW-10-15, Care and Handling of Architectural Aluminum from Shop to Site.

.2 AAMA CWM-19, Curtain Wall Manual (CWM).

.3 AAMA TIR-A1-15, Sound Control for Fenestration Products.

.4 AAMA TIR-A8-16, Structural Performance of Composite Thermal Barrier Framing Systems.

.5 AAMA 501-24, Methods of Test for Exterior Walls.

.1 AAMA 501.1-17, Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure.

.2 AAMA 501.5-23, Test Method for Serviceability of Exterior Fenestration After Thermal Cycling.

.6 AAMA 503-24, Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems.

.7 AAMA 609 & 610-25, Cleaning and Maintenance Guide for Architecturally Finished Aluminum.

.8 AAMA 611-24, Specifications for Anodized Architectural Aluminum.

.9 AAMA 612-20, Voluntary Specifications, Performance Requirements, and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum.

.10 AAMA 701/702-23, Performance Specification for Pile Weatherstrips (AAMA 701) and Polymer Weatherseals (AAMA 702).

.11 AAMA 1503-09, Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections-AAMA 1503-09.

.6 Society for Protective Coatings (SSPC).

.1 Surface Preparation Guidelines:

.1 SSPC-SP COM Surface Preparation Commentary for Steel and Concrete Substrates.

.2 SSPC-PS Guide 12.00, Guide to Zinc-Rich Coating Systems.

.2 SSPC - Paint 20 Zinc Rich Coating.

.3 SSPC - Paint 25 Alkyd, Zinc Oxide Linseed Oil and Primer for Use Over Hand Cleaned Steel Type 1 and Type 2.

1.3 DESIGN RESPONSIBILITY

.1 Drawings and details are diagrammatic and are intended to show design concept, configuration, components and arrangements; they are not intended to identify nor solve completely the problems of thermal and structural movements, air pressure equalization, air and vapour barriers, assembly framing, fixings and anchorages, moisture disposal, water penetration, orientation of walls, shading factors, size and shape of glazing, location of convectors, and problems at the glass line associated with glazing installation, movements, pressure fracture or thermal shock and weather seal.

.2 The design, engineering, procurement, fabrication and erection of the curtain wall assemblies, as required to meet these performance specifications shall be the complete responsibility of the Contractor.

1.4 PERFORMANCE REQUIREMENTS

.1 General Performance:

.1 Meet or exceed the requirements of OBC 2024.

.2 Product to comply with the specified performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction, as determined by testing of glazed aluminum curtain walls representing those indicated for this project.

.3 Glazed aluminum curtain walls shall withstand movements of supporting structure.

.4 Failure includes any of these events:

.1 Thermal stresses transferring to building structure;

.2 Glass breakage;

.3 Loosening or weakening of fasteners, attachments, and other components;

.2 Delegated Design:

.1 Design glazed aluminum curtain walls, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation Meetings: Convene pre-installation meeting one week prior to beginning work of this Section and on-site installation, with Contractor, Consultant, installer, and manufacturer's representative:

.1 Verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements;

.2 Review location and alignment of vertical and horizontal elements as they relate to the aesthetic criteria indicated on the Drawings, and the technical requirements indicated on the shop drawings.

.2 Coordination: Coordinate installation of system with work specified in other Sections to ensure proper placement and installation of vapour barrier, insulation and flashing in order that air, vapour and thermal barrier of building is intact and moisture will be diverted to the exterior, and as follows:

.1 Coordinate installation of sealants so that ambient and surface temperatures are greater than 5°C from time of application until sealants have cured.

.2 Coordinate connection of curtain wall system structural connections at floor slabs to vertical members.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit manufacturer's published product literature, specifications and datasheets for all products and materials incorporated into the Work of Contract.

.2 Provide one electronic copy of WHMIS SDS - Safety Data Sheets in accordance with WHMIS acceptable to Labour Canada, and Health and Welfare Canada.

.3 Submit shop drawings:

.1 Submit shop drawings, signed and sealed (Engineer's Stamp) by the delegated design engineer, detailing fabrication and assembly of glazed aluminum curtain wall systems clearly indicating all construction details including; but not limited to, the following:

.1 Fully dimensioned layouts for positioning of secondary support members and anchorage of tie-back devices to structures;

.2 Large scale details of members and materials, of brackets and anchorage devices and of connection and jointing details;

.3 Fully dimensioned layouts for positioning of brackets and anchorage devices to structures;

.4 Dimensions, gauges, thicknesses;

.5 Type, size and spacing of fastening devices;

.6 Glazing details;

.7 Air/vapour barrier details, acoustic control details, aluminum alloy and temper designations, metal finishing specifications and other pertinent data and information;

.8 Internal drainage and pathways for draining to the exterior;

.9 Allowances for thermal and other types of movement;

.10 Ventilation of framing and spandrel panels;

.11 Show details of connecting work of this section with work of adjacent sections.

.4 Submit samples:

.1 Submit samples of materials for Consultant's verification of specified finishes including; but not limited to, the following:

.1 300 mm x 450 mm for sheets, plates and glass;

.2 300 mm long for extrusions and formed or rolled shapes;

.3 300 mm long for tapes and gaskets;

.4 150 mm long for sealants;

.5 Samples shall fully represent physical and chemical properties, finish, and colours of materials to be supplied.

.5 Information Submittals: Provide the following:

.1 Delegated Design Submittals: Submit letters of commitment and compliance as follows:

.1 Provide Letter of Commitment in conjunction with shop drawings, signed and sealed by the professional engineer required by the Work of this Section indicating the following are designed to the intent of the Building Code:

.1 Curtain wall connections to building structure.

.2 Curtain wall reinforcement.

.3 Deflection of members.

.4 Glass thickness as it relates to glass area.

.2 Provide Letter of Compliance, signed and sealed by the professional engineer required by the Work of this Section indicating that connections, reinforcement and deflection criteria, and glass thickness of installed system is in compliance with the intent of the Building Code and reviewed shop drawings before declaration of Substantial Performance.

.2 Calculations:

.1 Submit complete design study calculations, certified by a professional engineer licensed to design structures and registered in the jurisdiction of the Place of the Work, including pertinent information affecting design, wind reactions, shading effects and failure probability for thermal glazing units and spandrel panels, to Consultant as evidence of compliance with design criteria, prior to manufacture.

.3 Sealant Data:

.1 Submit product information on the sealants to be used, complete with all recommendations and installation instructions, including cleaning and priming procedures.

.2 Submit sealant manufacturer's test reports on adhesion to metal and glass production samples tested in accordance with ASTM C794, 7-day cure and 7-day water submersion, tensile strength at 100% elongation and bite size of sealants.

.3 Submit sealant manufacturer's compatibility statement that all materials in contact with the sealants are compatible with the sealants in accordance with procedures of ASTM C1087.

.4 Submit sealant manufacturer's verification that sealants are suitable for purposes intended.

.6 Test Reports:

.1 The specified test reports shall be submitted at same time as the shop drawings.

.2 Submit test reports showing compliance with specified performance characteristics and physical properties including air infiltration, water infiltration, structural performance and thermal cycling.

.3 Submit thermal simulation reports prepared by an NFRC certified modeller showing total system U-values. Provide reports for 2 representative areas of the Project as selected by the Consultant.

.7 Closeout Submittals: Provide operation and maintenance data for incorporation into manual:

.1 Submit data for cleaning of aluminum finishes and operational hardware;

.2 Instruction for replacement of glass units (insulating and structural glass).

1.7 QUALITY ASSURANCE

.1 Sole Source: to ensure compatibility, use the same manufacturer for exterior aluminum framing: exterior entrances, operable windows and curtain wall systems.

.2 Qualifications: The firm producing and executing the Work of this Section shall have a minimum of 10 years' successful experience in the fabrication and erection of systems of similar sizes, shapes and finishes to the units required for this project and shall have ample facilities to produce, furnish and supply the units as required for installation without delay to the Work.

.3 Delegated Design Professional: Retain a Professional Engineer (P.Eng.), licensed to practice in the Province of Newfoundland and Labrador, to design fabrication and erection of the Work of this Section in accordance with applicable Building Code and Contract Documents requirements including, but not limited to, the following:

.1 Seal and signature to shop drawings and design submittals.

.2 Site review of installed components. P.Eng. required to perform at least one field inspection for their stamped shop drawings, and one more to confirm remedial action if deficiencies noted in first visit.

1.8 MOCK-UP

.1 Mock-up: Construct full size 3 x 3 m (10 x 10 ft) mock-up of vertical glazed aluminum curtain wall using proposed procedures, materials and quality of work where directed by Consultant.

.2 Include framing components, glass, and insulated infill panel.

.3 Assemble to illustrate component assembly including glazing materials, weep drainage system, attachments, anchors, and perimeter sealant.

.4 Purpose: To judge quality of work and material installation.

.5 Allow Consultant 24 hour's minimum prior to inspection of mock-up.

.6 Test the mock-up. If any adjustments are required to installation procedures in order to pass these tests, record all procedures and provide a report detailing the methods used to pass the tests, which will then become the standard for the remainder of the curtain wall work.

.7 Do not proceed with work prior to receipt of written acceptance of mock-up by Consultant.

.8 When accepted, mock-up will demonstrate minimum standard of quality required for work of this Section.

.9 Approved mock-up will remain part of finished work.

1.9 DELIVERY, STORAGE, AND HANDLING

.1 Comply with AAMA CW-10 for care and handling of all aluminum Products through the entire manufacturing, finishing, fabrication, delivery and installation phases.

.2 Protect metal and metal finishes to prevent damage during fabrication, storage, shipping, handling and installation.

.3 Protect insulating glass units during shipment. Repair or replace damaged components or units as required to meet Contract requirements, and replace any gas leakage during shipping to specified concentrations.

.4 Deliver, handle and store units by methods approved by manufacturer. Store units at site on wood platforms raised above grade or in enclosures protected from elements and corrosive materials. Stack units vertically in manner to prevent racking. Do not remove from crates or other protective covering until ready for installation.

1.10 SITE CONDITIONS

.1 Site Measurements: Verify dimensions of other construction by site measurements before fabrication and indicate measurements on shop drawings where aluminum curtain wall systems are indicated to fit to other construction.

.2 Established Dimensions: Establish dimensions and proceed with fabricating aluminum curtain wall without site measurements where site measurements cannot be made without delaying the Work, coordinated with other construction to ensure that actual dimensions correspond to established dimensions.

.3 Ambient Conditions: Confirm installation requirements for ambient and surface temperatures of sealants with manufacturer and apply sealants when temperatures are greater than manufacturer’s stated minimum from time of application until sealants have cured.

1.11 WARRANTY

.1 Provide manufacturers written guarantee, signed and issued in the name of Owner, to replace the following items for defective material and workmanship for the time stated from date of Substantial Performance:

.1 Framing, panels and glazing: failure of performance requirements specified in Contract Documents; 2 years.

.2 Sealants, caulking: failure to maintain seal; 2 years.

.3 Aluminum brake shapes: oil-canning and delamination; 2 years.

.2 Provide Warranty for aluminum windows to include in maintenance manuals.

Part 2 Products

2.1 STANDARD OF ACCEPTANCE SYSTEMS DESCRIPTIONS

.1 Where specific products are named, supply that system or similar with same or better physical properties and performance characteristics that suites the design concept of the project and meets or exceeds the requirements of this specification Section.

.2 Window System:

.1 Standard of Acceptance:

.1 Kawneer 8400TL Thermal Windows, Kawneer Canada Ltd., or approved equivalent.

.2 Depth: 101.6 mm.

.3 Wall thickness: minimum 1.78 mm.

.4 Glazing molding shall be 1.3 mm thick.

.5 Glazing gaskets shall be EPDM elastomeric extrusions or thermoplastic elastomer.

.3 Aluminum Swing Entrance Doors:

.1 Standard of Acceptance:

.1 350 Heavy Wall™ Swing Door, Kawneer Canada Ltd., or approved equivalent.

.2 Medium stile

.3 Vertical face dimension: 88.9 mm.

.4 Depth: 50.8 mm.

.5 Wall thickness: 4.8 mm.

.6 Major portions of the door members shall be 4.8 mm nominal thickness.

.7 Glazing molding shall be 1.3 mm thick.

.8 Glazing gaskets shall be EPDM elastomeric extrusions or thermoplastic elastomer.

.9 Provide adjustable glass jacks to center glass in door opening.

.10 Structural silicone sealant: Dow Corning 995 or Tremco Proglaze SSG

.4 Door hardware shall be supplied by Division 08 door hardware vendor and installed by this Section 08 44 13. The following requirements are mandatory; coordinate with door hardware vendor accordingly.

.1 Door hinges shall be stainless steel full-mortise butt hinge type.

.2 Provide 3 hinges for doors up to 2135 mm in height and 4 hinges for doors up to 2745 mm in height.

.5 Include complete hardware packages, sills, thresholds, frames, connections, anchors, fasteners, flashings, transition membranes, and all accessories as required for a complete installation.

2.2 PERFORMANCE / DESIGN CRITERIA

.1 Design glass, framing members, and anchorage to the requirements of Ontario Building Code for wind, seismic, guard, and human impact loads.

.2 Engage Registered Professional Engineer to review structural design and attachment to building structure and seal shop drawings.

.3 Where flush threshold doors are required, 330 Pa water resistance is unlikely. For these locations, "Limited water" (LW) rated doors are appropriate provided there is minimum 2:1 door height to overhang ratio protection.

.4 Design frames and doors in exterior walls to:

.1 Accommodate expansion and contraction within service temperature range of -35 to +35 degrees C.

.2 Limit deflection of mullions to maximum 1/175th of clear span when tested to ASTM E330 under wind load of 1.2 kPa. Submit certificate of tests performed.

.5 Size glass thickness and glass unit dimensions to limits.

.6 Thermal performance:

.1 Condensation Resistance: temperature index >= 0.6.

.2 U-value maximum 0.55 BTU/hr/ft2/F°.

.3 SHGC: maximum 0.4.

.7 Provide continuous air barrier and vapour retarder through door system. Primarily in line with inside pane of glass and heel bead of glazing compound.

2.3 MATERIALS

.1 Aluminum Extrusions:

.1 Alloy and temper recommended by glazed aluminum curtain wall manufacturer for strength, corrosion resistance, and application of required finish

.2 Not less than 0.070" (1.8 mm) wall thickness at any location for the main frame

.3 Complying with ASTM B221: 6063-T6 alloy and temper

.2 Aluminum Sheet Alloy:

.1 Shall meet the requirements of ASTM B209.

.3 Fasteners, Anchors, Clips, and Accessories:

.1 Provide all accessories, anchors and fasteners as required for a complete installation.

.2 Anchors, clips, and accessories shall provide sufficient strength to withstand the design pressure indicated.

.3 Fasteners: To ASTM A480, stainless steel, type 304 as recommended by curtain wall manufacturer selected to prevent galvanic action with the components fastened, of suitable size to sustain imposed loads.

.4 Pressure Plate:

.1 aluminum plate, fastened to the mullion with stainless steel screws.

.5 Reinforcing Members:

.1 Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B633 for SC 3 severe service conditions or other suitable zinc coating.

.2 Reinforcing members must provide sufficient strength to withstand the design pressure indicated.

.6 Sealant:

.1 For sealants required within fabricated curtain wall system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

.7 Thermal Barrier:

.1 Captured system four-side continuous polyamide thermal break.

.8 Tolerances:

.1 References to tolerances for wall thickness and other cross-sectional dimensions of glazed curtain wall members are nominal and in compliance with AA Aluminum Standards and Data.

.9 Flexible flashing, flexible air/vapour retarder:

.1 Flashing as recommended by the curtain wall manufacturer, compatible with adjacent materials and systems.

.2 Adhesive, tapes, primers and sealant: as recommended by the flexible flashing manufacturer.

.10 Sheet metal air/vapour barrier to be bonded to glazing frame and extended behind mounting frame. Seal to maintain continuity of seal. Install flexible flashing with continuous metal retaining strip to lap to interior wall assembly.

.1 Sheet metal for metal air/vapour barriers and air seals: ASTM A653 / A853M, minimum 1 mm sheet steel, galvanized, stretcher-levelled, minimum coating weight 380 g/m^2.

.11 Sealants, including primer, joint filler: as specified in section 07 92 00, augmented as follows:

.1 Sealants used in structural joints shall have adequate strength to retain insulating units to the metal framing or each other under design conditions.

.2 Sealants shall be from the same manufacturer for all work of this Section.

.3 Materials used in the work shall be resistant to rodents, vermin, mildew, fungus and algae.

.12 Glass and Glazing: Insulated glass unit to Section 08 80 50 - Glazing

2.4 ALUMINUM ENTRANCES

.1 Aluminum Extrusions: Alloy and temper recommended by aluminum-framed glass door manufacturer for strength, corrosion resistance, and application of required finish.

.2 Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with sliding aluminum-framed glass door members, trim hardware, anchors, and other components.

.3 Anchors, Clips, and Accessories: Aluminum or nonmagnetic stainless steel; provide sufficient strength to withstand design pressure indicated.

.4 Reinforcing Members: Aluminum or nonmagnetic stainless steel; provide sufficient strength to withstand design pressure indicated.

.5 Weather Seals: Provide weather stripping with integral barrier fin or fins of semi rigid, polypropylene sheet or polypropylene-coated material. Comply with AAMA 701/702.

.6 Door stile and rail face dimensions of entrances shall be as indicated. Provide manufacturer’s heavy-duty commercial door adaptors.

.7 Major portions of the door members to be 3.2 mm nominal in thickness and glazing molding to be 1.3 mm thick.

.8 Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.

.9 Provide adjustable glass jacks to help center the glass in the door opening.

2.5 FABRICATION – GENERAL

.1 Do not start fabrication until samples, shop and erection drawings have been reviewed.

.2 Insofar as practical, execute fitting and assembly in the shop with the various parts or assemblies ready for erection at the building site.

.3 Where possible, take field measurements and levels required to verify or supplement those shown on the drawings for the proper layout and installation of the work. Coordinate dimensional tolerances in adjacent building elements and confirm prior to the commencement of the Work.

.4 Weld aluminum, where required, with inert metal arc equipment. Welders to qualify according to CSA W47.2. Make exposed welds continuous and flush with adjacent surface. Do not mar surface finishes with welds in back of exposed aluminum. Do not deform the exposed metal and finish way by welding.

.5 Weld steel, where required, to CSA W59. Welded joints to be of adequate strength and durability with jointing tight and flush. Welders to be fully approved by the Canadian Welding Bureau and to comply with CSA W47.1. Where it is necessary to weld components already galvanized, remove galvanizing for 50 mm around weld.

.6 Make provisions in doors and frames to suit requirements of electrically operated hardware and security devices, as applicable, provided under other trades or sections. Blank, drill, reinforce and tap to receive hardware, security and electrical devices. Provide removable plates or knockouts for electrical contacts. Provide fish wires as required.

.7 Equip perimeter framing with factory installed air and vapour barrier material as required for sealing to building air and vapour barrier, and as follows:

.1 Material: identical to, or compatible with, building air barrier and vapour retarder materials to provide required air tightness and vapour diffusion control throughout exterior envelope assembly.

.2 Material width: adequate to provide required air tightness and vapour diffusion control to building air barrier and vapour retarder from interior.

2.6 FABRICATION – FRAMING MEMBERS

.1 Fabricate members to the profiles shown on the drawings. Wall thickness of extrusions to be as required to meet the design requirements. Frames that are to receive insulating glass units shall have a continuous thermal break.

.2 Accurately machine file and fit, and rigidly frame together joints, corners and mitres. Match components carefully to produce perfect continuity of line and design. Make exterior joints watertight and interior joints airtight in accordance with specified allowances. Metal in contact to have hairline joints. Locations of exposed joints to be subject to the approval of the Consultant.

.3 Sill Trim: Provide continuous extruded "U" trim to inside of bottom rail at each level with provision for receiving steel base and convector covers, as detailed

.4 Reinforce frames and assemblies by concealed means as necessary to meet the specified design requirements and as shown. Reinforcing to be hot-rolled mild steel and be securely anchored to horizontal and vertical members by approved positive mechanical means.

.5 Seal hairline joints at junctions of frame members. Gun-inject sealant from inside ensuring a continuous seal of the joint. Ensure that bead in the glazing space does not impair seating of glazing materials. Remove excess sealant that is forced onto face of frame assembly.

.6 Location of joints and pressure equalizing drain vents to be subject to consultant's acceptance.

.7 Provide sheet continuous air/vapour barrier between framing and building structure. Overlap corner joints. Apply barriers and retain with continuous aluminum or galvanized steel plates or bars and non-corrosive mechanical fasteners. Where indicated, fill void between frame and other building components solid with foamed in place polyurethane foam insulation.

.8 Develop drainage holes with moisture path to exterior.

.9 Prepare components to receive anchor devices. Fabricate anchorage items.

.10 Arrange fasteners, attachments, and jointing to ensure concealment from view.

.11 Cope, notch and drill to provide minimum tolerance throughout system and to fit with hairline joints.

.12 Conceal interconnecting members and fastenings in completed assembly. Provide pressure-equalizing holes in members and condensation drains.

.13 Framing members and associated sealing shall combine to form airtight vapour barrier for entire interior skin of curtain wall system. Cooperate and coordinate with other sections to ensure continuous thermal and air barrier seal at interfaces with adjacent materials.

.14 Provide for vertical expansions and construction joints as necessary and install air cut-offs in continuous vertical members to prevent stack effect of enclosed air columns.

.15 Jointing and intersections of metals shall be accurately cut, fitted to a tolerance of 0.8 mm, in true planes with adequate concealed beads where required.

.16 Fabricate expansions joints between mullion sections with formed extruded aluminum internal sleeve sections, secure to permit joint function and maintain true alignment of sections.

.17 Fabricate sections to accommodate and interface with work of other trades by means of rabbets, interlocks, miscellaneous angles, trim and filler sections as required.

.18 Brake form parapet caps and sills out of 3 mm thick aluminum sheet.

.19 Reinforce mullions with structural steel sections where required with adequate anchorage to structure.

.20 Provide internal reinforcement in horizontal window mullions to satisfy wind loads and to maintain rigidity.

.21 Perform fitting and assembly of component parts in shop insofar as practicable. Work that cannot be permanently shop assembled shall be fitted, assembled, marked and disassembled to assure proper fitting in field. Identify shop assembled components on shop drawings for location and erection at site.

.22 Isolate aluminum in contact with other metals, masonry, concrete, plaster or mortar to prevent corrosion.

.23 Verify wall openings and adjoining air and vapour seal materials are ready to receive work of this section.

.24 Beginning installation means acceptance of site conditions.

.25 Provide airtight vapour seals in curtain wall framing.

2.7 FABRICATION – ENTRANCES

.1 Fabricate aluminum-framed glass entrance doors in sizes indicated. Include a complete system for assembling components and anchoring doors. Comply OBC 2024 criteria.

.2 Door hardware and keying: in accordance with Door Hardware Schedule. Additional miscellaneous hardware shall be manufacturer's heavy-duty commercial quality accessories and hardware as required for a complete installation.

.3 Fabricate aluminum-framed glass doors that are re-glazable without dismantling perimeter framing.

.4 Door corner construction shall consist of mechanical clip fastening, SIGMA deep penetration plug welds and 1-1/8" (29 mm) long fillet welds inside and outside of all four corners. Glazing stops shall be hook-in type with EPDM glazing gaskets reinforced with non-stretchable cord.

.5 Accurately fit and secure joints and corners. Make joints hairline in appearance.

.6 Prepare components with internal reinforcement for door hardware.

.7 Arrange fasteners and attachments to conceal from view.

.8 Door hardware to be supplied by door hardware contractor, to be installed by curtainwall contractor. Prepare curtainwall framing for installation of all door hardware and accessories.

.9 Provide all hardware of each type from one manufacturer.

.10 Keying: in accordance with Division 08 door hardware schedule and groups; provide removable / exchangeable construction cores and extra keys each lock for construction cores.

2.8 FINISHES

.1 Aluminum Finishes:

.1 Exposed Aluminum (Framing): anodic coating, meeting the requirements of the Aluminum Association DAF-45 and AAMA 611 for anodized architectural aluminum, in accordance with the Drawings, and as follows:

.1 Colour and Finish; as indicated on Door Schedule.

.2 Unexposed aluminum: Mill finish.

.2 Steel Finish: Hot-dip galvanized by the hot-dip method with a minimum zinc coating of 705 g/m^2 conforming to ASTM A123 for fabricated assemblies. ASTM A153 for all hardware (average zinc coating of 381 g/m^2). Thread dimensions to be such that nuts will thread over bolts without re-threading or chasing galvanized threads.

.3 Galvanize after fabrication where possible. Follow standard precautions to avoid making the base metal brittle by over-pickling or overheating during galvanizing.

.4 Colour appearance to be uniform with no variations detectable by the naked eye at a distance of 1525 mm under natural lighting.

.5 Shop and touch-up primer for ungalvanized steel components: SSPC 25 Paint red oxide.

.6 Touch-up primer for galvanized steel surfaces: SSPC 20 Paint zinc-rich.

.7 Concealed steel items: galvanized in accordance with ASTM A123 to 705 gm/m^2.

.1 Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

.8 Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

.1 Standard of Acceptance:

.1 C.R. Laurence bituminous paint or aerosol.

.2 or approved equivalent.

Part 3 Execution

3.1 EXAMINATION

.1 Inspect Work and conditions affecting the Work of this Section. Proceed only after deficiencies have been corrected.

.2 Ensure that all flashings built in or provided by others integrate with system to divert moisture to exterior.

.3 Ensure that all anchor blocks or inserts required to receive system are correctly located and installed.

.4 Ensure that all anchors and setting or installing components provided by this Section for installation are properly located and installed.

.5 Ensure that building air and vapour retarding membranes can be sealed to window units to maintain system integrity.

3.2 PREPARATION

.1 Coordinate dimensions, tolerances, and method of attachment with other work.

.2 Supply anchorage devices and inserts to the appropriate sections where required for building in or casting-in-place and instruct as to proper location and position. Anchors shall have three-way adjustments.

.3 Remove dust and other loose material from openings.

.4 Verify that surfaces are ready to receive work and floor-to-floor dimensions are as indicated on shop drawings.

3.3 INSTALLATION

.1 Compliance: comply with AAMA CWM-19 recommendations, and manufacturer’s published installation instructions, standard details as applicable, and data sheets.

.2 Use only concealed fasteners.

.3 Erect all work plumb and true and in proper alignment and relationship to established lines and grades.

.4 Devices for anchoring the frame assemblies shall have sufficient adjustment to permit correct and accurate alignment. After alignment, positively secure anchorage devices to prevent movement other than those designed for expansion and contraction. Take into consideration climatic conditions prevailing at time of installation.

.5 Perform welding and drilling of concrete as required to install fixings. Repair, concrete chipped by drilling or fixing operations.

.6 Provide thermal insulation and air/vapour barriers compatible and continuous with adjacent thermal and air/vapour barrier systems.

.7 Apply continuous butyl sealing tape between sheets at lap and between steel and other materials. Screw sheets to each other and metal framing with stainless steel sheet metal screws, 150 mm o.c. maximum. Continuously seal perimeter of panels with tape and sealant. Place type stainless steel washers over rubber washers under screw heads and cover with sealant to make fastenings air and vapour tight.

.8 Seal joints of metal, apertures and protrusions of any kind with specified sealant to produce homogeneous air/vapour barrier seal. Joints shall be air, water and weathertight.

.9 Apply silicone sealant and foam rubber joint plugs (end dams) as required at frame corners to fill and seal the joinery.

.10 Supply and install flexible, continuous gasket air/vapour barrier seals between work of this section and adjacent construction, and at deflection and expansion connections, where required. Prime substrates, apply gaskets to framing and to concrete and masonry with adhesive and retain with continuous aluminum or stainless-steel plates or bars and non-corrosive mechanical fasteners. Ensure a continuous permanent seal at joints.

.11 Provide airtight seals at penetrations in air/vapour barriers.

.12 Apply insulation to the cold in winter side of air/vapour barriers. Ensure tight butt joints.

.13 Adhere stick clips to metal air/vapour barriers at 300 mm o.c. both ways. As an alternative, gun weld pins to metal substrates in lieu of stick clips, provided clips do not easily break off and weld burn-through does not occur.

.14 Support adhesive-applied clips in place until adhesive has set.

.15 Isolate metal air/vapour barriers with thermal breaks and spacers.

.16 Locate vapour barrier on the warm-in-winter side of the insulation.

.17 Ensure a uniform, continuous thermal and vapour barrier effect. Where adjacent insulation and vapour barriers are to be provided under other sections, coordinate the work such that thermal and vapour barrier continuity is achieved. Ensure compatibility with adjacent thermal and air/vapour barrier systems. Ensure compatibility between tapes, sealants and air/vapour barriers.

.18 Foam-in-Place Sealant/Insulation: to Section 07 21 19.19 - Foam-in-Place Sealant.

.1 Install between aluminum framing and rough openings at exterior walls, at perimeter joints and penetrations at curtain wall and adjacent interior areas and where indicated.

.19 Cut insulation as required and fit snugly to penetrations, obstructions, openings and corners. Butt insulation boards tightly. Cut out back of board insulation as required to accommodate substrate irregularities and build up over cut out areas on the other side as required to ensure thermal barrier uniformity unless otherwise approved.

.20 Install insulation to thicknesses shown on the Drawings, or as required to achieve continuity of thermal insulation performance.

.21 Press insulation boards firmly to barrier or substrate impaling them on clips without bending clips. Butt insulation boards tightly. Install retainers to clips.

.22 Fill irregular shaped voids within assemblies with fibrous packing insulation to maintain continuity of thermal barrier.

.23 Gun-apply three continuous beads of sealant under extruded aluminum thresholds. Make bead diameter sufficient to ensure a full width seal. Remove excess sealant.

.24 Swing Doors and Frames:

.1 Comply with Drawings and manufacturer's printed installation instructions for installing aluminum swing entrance doors, hardware, accessories, and other components.

.2 Coordinate with electrical for power connection and wiring to automatic door operator and controls, security devices and other work to be incorporated.

.3 Install aluminum swing entrance doors level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

.4 Set sill threshold in bed of sealant, as indicated, for weather tight construction.

.5 Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.4 ERECTION TOLERANCES

.1 Design and install the curtain wall to accommodate tolerances of related work not included in this section. This requirement is in addition to building structure movements and deflections.

.2 Fabricate components to provide a plumb, square, level and true installation, and to accommodate allowable tolerances for work of other sections upon which work of this section depends.

.3 Erection tolerances for frame assemblies relate to the structural grid of the building, and apply to each individual assembly as follows:

.1 Vertical position: +3 mm;

.2 Horizontal position: +3 mm;

.3 Deviation from plumb: 3 mm maximum each plane;

.4 Racking of face: 6 mm maximum;

.5 Racking in elevation: Nil;

.6 Offset from true alignment between two identical members abutting end to end in line: 0.8 mm;

.7 Tolerances shall not be accumulative;

.8 Erection tolerances for operable elements: consistent with smooth operation and weatherproof performance.

3.5 COVERS, CLOSURES AND TRIMS.

.1 Provide covers, closures and trim as indicated and as required to provide complete and finished installation.

.2 Use concealed fastenings.

.3 Fabricate aluminum components in largest practical lengths. Where joints are required, provide flush slip joints at exterior components and flush hairline joints at interior components. Unless otherwise indicated, locate joints to align with adjacent mullions and as directed by Consultant. All exterior joints to have suitable backplates and be sealed watertight.

3.6 FIELD GLAZING

.1 Install glass and insulating glass units to Section 08 50 00 - Glazing.

3.7 SEALANTS

.1 General:

.1 Seal joints between frame assemblies and adjacent construction except where specified to be done under other sections, and within glazed assemblies where required to maintain water tightness and integrity of air/vapour barrier. Seal junctions in sheet metal air/vapour barriers and between air/vapour barriers and adjacent construction.

.2 Preparation:

.1 Ensure that joint conditions are suitable for the materials to be installed.

.2 Ensure that surfaces to be sealed are sound, dry, free from dirt, water, frost, loose scale, corrosion, or other contaminants which may adversely affect the performance of the sealant materials. Remove protective oil coatings and other oil or grease films.

.3 Perform cleaning to the extent required to achieve acceptable joint surfaces.

.4 Protect cleaned and primed surfaces from further contamination by oil, dust, rain, condensation and other materials detrimental to sealant bonding strength. Re clean and re prime contaminated surfaces.

.5 Install joint filler strips as backup for sealant to provide optimum joint profile, but not less than 6 mm depth of sealant bead. Provide bond breaker tapes where required.

.6 Mask areas adjacent to the joints to prevent contamination of adjacent surfaces. Remove masking promptly after the joint has been completed.

.7 If recommended by the manufacturer of the sealant materials, prime joints to prevent staining, or to assist the bond.

.8 Apply primer with a brush which will permit all joint surfaces to be primed. Perform priming immediately before installation of sealant.

.3 Installation:

.1 Obtain approval from the sealant manufacturer for the priming, cleaning and application techniques at commencement of the sealant installation.

.2 Before sealant installation is commenced, test the sealant for adhesion to substrates.

.3 Install materials in compliance with the recommendations of their manufacturers.

.4 Do not exceed shelf life and pot life of materials, nor installation times, as stated by the manufacturer. Ensure sealant manufacturer's on-site quality control procedures are maintained.

.5 Be familiar with the work life of the sealant to be used. Do not mix multiple component materials until required for use.

.6 Mix sealants thoroughly with a mechanical mixer without mixing air into the materials. Continue mixing until the material is a uniform colour and free from streaks of unmixed material.

.7 Before any sealing is commenced, test the materials for indications of staining or poor adhesion.

.8 Sealants shall be of gun grade or knife grade consistency to suit the joint condition. Use gun nozzles of the proper sizes to suit the joints and the sealant material.

.9 Install sealant with pressure operated guns.

.10 Use sufficient pressure to fill all voids and joints full. Sealants shall bond to all sides of joint except where filler or bond breaker material is used. Where filler or bond break material is used, sealant shall bond to both sides of joints and shall not adhere to the filler or bond break material.

.11 Ensure that the correct sealant depth is maintained. Superficial painting with a skin bead will not be accepted.

.12 Sealant installations shall be a full bead free from air pockets and embedded impurities and having smooth surfaces, free from ridges, wrinkles and sags.

.13 After joints have been completely filled, tool them neatly to a slightly concave surface.

.14 If joints are masked, remove masking immediately after tooling and before sealants begin to cure.

.15 Clean excess sealants from glass and framing surfaces immediately after installation.

.16 Cover all fasteners penetrating the air/vapour barriers with sealant.

.17 Immediately clean adjacent surfaces that have been soiled and leave work in a neat, clean condition. Remove excess materials and droppings using recommended cleaners and solvents.

3.8 FIELD QUALITY CONTROL

.1 Field Tests: conducted by Owner's third-party testing agency. Consultant will select portions of the installation to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.

.1 Testing: Testing shall be performed as follows:

.1 Sealant Adhesion Testing in general conformance with ASTM C1521-19(2020)

.2 Window Air Leakage Testing in general conformance ASTM E783-02(2018)

.3 Window Water Penetration Testing in general conformance with ASTM E1105-15(2023)

3.9 ADJUSTING

.1 Adjust operating entrances, hardware and accessories for a tight fit at contact points and weather stripping for smooth operation and weather tight closure. Lubricate hardware and moving parts.

.2 Replace defective materials and materials damaged due to faulty installation, careless handling or other causes resulting from work of this section.

.3 Upon completion of the work and just prior to final review, or at a time as directed, inspect units for damage and correct same immediately.

.4 Test and adjust hardware and replace or repair faulty items.

.5 Adjust weather-stripping to leave each opening unit in its most watertight position.

.6 Test operable elements and ensure easy and smooth operation.

3.10 CLEANING

.1 Cleaning of aluminum components shall be to AAMA 609.

.2 Remove protective material from pre-finished aluminum surfaces, interior and exterior.

.3 Remove, as work progresses, corrosive and foreign materials that may set or become difficult to remove at time of final cleaning or that may damage members. Inspect minimum monthly to ensure cleanliness.

.4 Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

.5 Wash exposed surfaces with a pre-approved cleaning solution approved by manufacturers of glass and aluminum. Take care to remove dirt from corners. Wipe surfaces clean.

.6 Select, apply and maintain cleaning and protective methods to ensure finishes will not become uneven or impaired as a result of unequal exposure to light and weathering conditions.

.7 Leave Work area clean at end of each day.

.8 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment. Perform cleaning after installation to remove construction and accumulated environmental dirt.

.9 Manage and dispose of demolition and construction waste materials.

.10 Cleaning shall include the interior/exterior surfaces of materials installed under this section.

.11 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

.12 Upon completion of the work of this section, remove debris, equipment and excess material resulting from the work of this section from the site.

.13 Provide the Owner with instructions for proper method and materials to be used in maintenance cleaning of finished surfaces.

3.11 PROTECTION

.1 Protect finished Work from damage.

3.12 SCHEDULE

.1 Install as indicated.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Refer to and coordinate with Division 01 of Contract.

.2 Section 06 10 00 - Rough Carpentry.

.3 Section 06 40 00 - Architectural Woodwork.

.4 Section 07 92 00 - Joint Sealants.

.5 Section 08 44 13 - Glazed Aluminum Framing Systems.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)

.1 ANSI Z97.1-2015 (R2020), Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.

.2 ASTM International (ASTM).

.1 ASTM C542-05(2024) Standard Specification for Lock-Strip Gaskets.

.2 ASTM C716-06(2020), Standard Specification for Installing Lock-Strip Gaskets and Infill Glazing Materials.

.3 ASTM C920-18(2024), Standard Specification for Elastomeric Joint Sealants.

.4 ASTM C964-20, Standard Guide for Lock-Strip Gasket Glazing.

.5 ASTM C1048-25, Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.

.6 ASTM C1172-24e1, Standard Specification for Laminated Architectural Flat Glass.

.7 ASTM D2240-15(2021), Standard Test Method for Rubber Property—Durometer Hardness.

.8 ASTM E119-24, Standard Test Methods for Fire Tests of Building Construction and Materials.

.9 ASTM-E2190-19, Standard Specification for Insulating Glass Unit Performance and Evaluation, and GANA Glazing Manual, International Year of Glass (IYOG) Edition.

.10 ASTM E330/E330M-14(2021), Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

.3 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-12.1-2022, Safety Glazing.

.2 CAN/CGSB-12.3-M91 (R2017), Flat, Clear Float Glass. (Withdrawn 2021)

.3 CAN/CGSB-12.8-2026, Insulating Glass Units.

.4 CSA Group (CSA).

.1 CAN/CSA A440-00/A440.1-00 (R2005), A440-00, Windows/Special Publication A440.1-00, User Selection Guide to CSA Standard A440-00, Windows. Includes Update NO. 1 (2000), Update No. 2 (2006), Update No. 3 (2006).

.2 CSA A440.2:22/A440.3:22, Fenestration energy performance/User guide to CSA A440.2:19, Fenestration energy performance.

.3 CSA A440.4:19 (R2024), Window, door, and skylight installation.

.4 CSA A500-16 (R2021), Building guards.

.5 CSA Certification Program for Windows and Doors.

.5 National Glass Association (GANA)

.1 GANA Glazing Manual, International Year of Glass (IYOG) Edition.

.6 UL Solutions (UL):

.1 UL-2761-11, Sustainability for Sealants and Caulking Compounds, 1st Edition.

1.3 PROJECT DRAWINGS AND DETAILS

.1 Project drawings and details are diagrammatic and are intended to show design concept, configuration, components and arrangements; they are not intended to identify nor solve completely the problems of structural movements, assembly framing, fixings and anchorages, size and shape of glazing pockets, and problems at the glass line associated with glass installation.

.2 Profiles, elevations and sizes shown on the drawings are approximate and show intent, but do not preclude the use of manufacturer's standard sections and glazing methods provided performance requirements are met.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications, standard details, and data sheets.

.2 Shop Drawings:

.1 Submit shop drawings for window and door glazing and include the following:

.1 Submit glass thermal and wind load stress analysis documenting adequate glass thickness and/or heat treatment to meet stresses generated. Thermal stress analysis to consider effects of external shading, conduction at glass edge, heat build-up and contribution of Low-E coatings.

.2 Shop drawings shall be signed and sealed by a professional engineer qualified in the province of the Work, and who was responsible for their preparation.

.3 Submit samples for initial selection:

.1 Submit 300 mm x 300 mm size of each glazing type. Consultant reserves the right to change colour of glass after review of submitted samples.

.2 Provide 300 mm x 300 mm sample of dual-sealed insulating glass unit with low-e coating on #2 surface.

.4 Certifications:

.1 Submit proof of IGMAC certification for insulating glass units, including component codes.

.2 Submit manufacturers' certification of compatibility of glass, glazing and sealant materials.

.3 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements

.5 Reports:

.1 Submit thermal simulation reports.

.6 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

.7 Warranties:

.1 Submit specified warranties.

.8 Closeout Submittals:

.1 Submit adequate written instructions for protection of completed work, for re-glazing, and for proper methods and materials to be used in cleaning for incorporation into manual.

1.5 QUALITY ASSURANCE

.1 Manufacturer’s technical recommendations:

.1 Perform glazing work in accordance with written recommendations from the glass manufacturer or glass fabricator.
.2 Certify glass compatibility with glazing materials (i.e. insulating glass sealants, structural sealants and silicones, gaskets, setting blocks, etc.)
.3 Designs to be analyzed for thermal stress.
.4 Provide shop inspection for glass.

.2 Tempered glass shall be heat soaked in accordance with EN 14179-1 and EN 14179-2 for the following applications: tempered glass panels, tempered glass panes 10 mm thick or thicker, and fabricated glass with cut outs, notches, holes or countersinks (tempering takes place after fabrication).

.1 Provide the manufacturer’s factory label on each unit confirming tempered glass has been heat soaked.

.3 Insulating glass units (IGU) shall be fabricated by manufacturer who has certified these units in accordance with the IGMAC Certification Program. Insulation glass units shall bear valid IGMAC Certification number. Insulating glass units shall be manufactured solely by an IGMA member in good standing.

.4 Single-source fabrication responsibility: All fabricated glass shall be processed and supplied by a single fabricator.

.5 Installer Qualifications: Installer shall have a minimum of five years’ experience in installing products comparable to those specified in this section.

.6 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.1 Provide shop inspection and testing for glass.

.7 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.8 Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follow:

.1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.
.2 Size glass to withstand wind loads, deck loads and positive and negative live loads acting normal to plane of glass to a design pressure of 75 kPa as measured in accordance with ANSI/ASTM E330.
.3 Limit glass deflection to 1/200 with full recovery glazing materials.

1.6 SITE CONDITIONS

.1 Environmental Requirements:

.1 Install glazing when ambient temperature is 10 °C minimum. Maintain ventilated environment for 24 hours after application.

.2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.7 WARRANTIES

.1 Provide manufacturers guarantee for the following types of glass listed, against defects in materials and workmanship for the period indicated, commencing from the date of Substantial Performance of Work.

.1 Flat Glass - General: Warrant that all flat glass products meet specified CGSB, ANSI, and ASTM standards, have been delivered to site with manufacturer's labels intact, and have been installed as required to meet or exceed OBC 2024 criteria.

.2 Sealed Glass Units: Replace units that exhibit failure of hermetic seal under normal use evidenced by the obstruction of vision by dust, moisture, or film on interior surface of glass: 10 Years.

.3 Coated Glass: Replace units that display peeling, cracking, and other deterioration in metallic coating under normal use: 10 Years.

.4 Warrant that glazing work is water and weather tight and free from distortion; that glazing materials will not be displaced, and will be free from permanent deformation under load; and that glass and insulating glass units will not be broken, cracked or scratched by causes resulting from defects in material, workmanship or design of glazing installation.

.5 Warrant that glazing materials will not deteriorate from exposure to the atmosphere and weather: 10 years.

.6 Cracked or scratched glass, shrinking, cracking, staining, hardening, sagging of glazing materials; loosening or rattling of glass; leaking of glazed joints will be considered defective work and Contractor shall replace with new Work at no cost to Contract.

Part 2 Products

2.1 DESIGN CRITERIA

.1 Design Requirements:

.1 Meet or exceed the requirements of the Ontario Building Code 2024.

.2 Meet or exceed the performance requirements.

.3 Size glass to withstand dead loads and positive and negative live loads as measured in accordance with ANSI/ASTM E330.

.4 Safety Glass: shall meet or exceed criteria and standards established by CGSB 12.1 and ANSI Z97.1 Class A.

.5 Glazing installation shall meet or exceed requirements of Ontario Building Code 2024, with deflection less than 1/175.

.2 Required Edge Treatments:

.1 Concealed edges: flat belt ground and seamed.

.2 Butt joined edges with silicone seal: flat ground with arris.

.3 Exposed edges: flat polish with arris.

2.2 FLAT GLASS MATERIALS

.1 Tempered Safety Glass: tempered glass to CAN/CGSB-12.1, heat-soaked, transparent, glazing quality, thickness as required to meet ANSI Z97.1 Class A but not less than 6 mm thick. At locations where full-height glass panes are used (e.g., panes ≥ 2200 mm in height), minimum thickness shall be 10 mm.

.1 Design: to meet or exceed the requirements of Ontario Building Code and amendments, and CSA A500.
.2 Type: 1-tempered; Class: B float.
.3 Category: ANSI Z97.1 Class A

2.3 LOW-EMISSIVITY COATING

.1 Edge delete LOW-e coating down to bare glass in accordance with manufacturer's written requirements. Deletion shall be continuous around the entire periphery of glass unit to minimum deletion width from edge of glass to at least 5-0% through the primary sealant bead width.

.2 Low-emissivity (LOW-e) coating factory-applied to 2nd surface:

.1 Standard of Acceptance:

.1 Vitro® Architectural Glass Solarban® 60 low-e coating on 2nd surface, or approved equivalent with same or better energy saving performance data.

2.4 DUAL-SEALED INSULATING GLASS UNITS

.1 Insulating Glass Units (IGU): to ASTM E2190-19, meet or exceed requirements of CAN/CGSB-12.8. Units shall be certified by the Fenestration and Glazing Industry Alliance (FGIA) (formerly Insulated Glass Manufacturers Alliance (IGMA)). Overall unit thickness shall be 1" (25 mm) using ¼" (6 mm) glass thickness for individual panes. Use two stage seal method of manufacture, as follows:

.1 IGU – Dual-Sealed Insulating Glass Units:

.1 Spacer: Super Spacer® TriSeal™ by Edgetech, or approved equivalent.

.2 Outboard pane: laminated tempered safety glass, polyvinyl butyral (PVB) interlayer (0.060" or 0.090") 6 mm glass thickness, clear; low-e coating (Cardinal LoĒ-366) on surface number 2.

.3 Inter-cavity space: 13 mm space.

.4 Inert gas fill: ≥ 95% argon filled when tested to ASTM E2269.

.5 Inboard pane: laminated tempered safety glass, polyvinyl butyral (PVB) interlayer (0.060" or 0.090") 6 mm glass thickness, clear.

.2 Tempered safety glass, to CAN/CGSB 12.1-2022, Safety Glazing.

.3 Laminating, to ASTM C1172-24e1, Standard Specification for Laminated Architectural Flat Glass.

2.5 INTERIOR TEMPERED GLASS SCREENS

.1 Clear tempered safety glass to CAN/CGSB-12.1, transparent, glazing quality, thickness as required to meet ANSI Z97.1 Class A but not less than 10 mm thick. At locations where full-height glass panes are used (e.g., panes ≥ 2200 mm in height), minimum thickness shall be 16 mm. Engineer thickness required for panel dimensions required.

.1 Performance Criteria: to meet or exceed the requirements of National Building Code 2020, and CSA A500.

.2 Type: 2 tempered; Class: B float.

.3 Category: ANSI Z97.1 Class A.

.4 Thickness: ≥ 10 mm.

2.6 ACCESSORIES

.1 Perimeter Joint Sealant: in accordance with Section 07 92 00 - Joint Sealants, compatible with secondary edge sealant.

.2 Setting blocks: Silicone or silicone-compatible EPDM setting blocks, 80-90 Shore A durometer hardness to ASTM D2240, to suit glazing method, glass lightweight and area. Obtain manufacturer's (IGU, curtain wall, and silicone sealant) letters and warranty terms outlining any performance risks and administrative consequences associated with the use of incorrect setting blocks.

.3 Spacer shims: Neoprene, 50-60 Shore A durometer hardness to ASTM D2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self-adhesive on one face.

.4 Glazing tape:

.1 Preformed butyl compound with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D2240; coiled on release paper; black colour.

.2 Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume 2%, designed for compression of 25%, to effect an air and vapour seal.

.5 Glazing splines: resilient polyvinyl chloride, extruded shape to suit glazing channel retaining slot, black colour.

.6 Glazing clips: manufacturer's standard type.

.7 Lock-strip gaskets: to ASTM C542.

.8 Other Glazing Accessories: to CAN/CSA A440.

.9 Screws, bolts and fasteners: ASTM F738M; Type 304 stainless steel.

.10 Glass presence markers: easily removable, non-residue depositing.

2.7 FABRICATION

.1 Verify glazing dimensions on Site.

.2 Clearly label each glass light with maker's name, weight, quality, type and certification number. Do not remove labels until after work has been reviewed by Consultant.

.3 Accurately size glass to fit openings allowing the clearances shown on the following tables:

.1 Minimum glass clearances:

Thickness	Edge Clearance	Face Clearance
2 mm	3 mm*	1.5 mm
3 mm	3 mm*	3 mm
4 mm	3 mm*	3 mm
5 mm	3 mm*	3 mm
6 mm	5 mm	3 mm
6 mm	6 mm	3 mm

Thickness	Edge Clearance	Face Clearance
over 6 mm	6 mm or 3/4 times the glass thickness, whichever is greater	

* = where any dimension of glass exceeds 760 mm increase minimum edge clearance by 1.5 mm.

.4 Bite of glass edge on stop:
.1 Up to 1270 mm united size: 6 mm minimum.
.2 1270 mm to 2540 mm united size: 10 mm minimum.
.3 Over 2540 mm united size: 13 mm minimum.

Part 3 Execution

3.1 COMPLIANCE

.1 Install work in accordance with the Quality Assurance provisions specified in this Section and manufacturer's printed instructions, data sheets, and standard details.

.2 Size glass to Ontario Building Code 2024 requirements, and verify glass for openings are correctly sized and are within allowable tolerances. Install glass with full contact and adhesion at perimeter. Maintain edge clearance recommended by glass manufacturer.

.3 Ensure weep drainage from all exterior glazing channels and framing.

.4 Adhere to the guidelines of the Insulating Glass Manufacturers Alliance (IGMA).

.5 Work shall meet or exceed requirements of CAN/CSA A440.4, GANA Glazing Manual, and GANA Laminated Glazing Reference Manual.

3.2 EXAMINATION

.1 Verify that openings for glazing are correctly sized and within tolerance.

.2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

.3 Commencement of work means acceptance of existing conditions.

3.3 PREPARATION

.1 Ensure all glazing rebates are smooth and true, free of projections nails, screws, with fastenings properly set to prevent contact with glass.

.2 Ensure all stops, splines, glazing accessories provided by others are accurately cut to length and proper size and type for specific glazing.

.3 Clean contact surfaces with solvent and wipe dry.

.4 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

.5 Prime surfaces scheduled to receive sealant.

3.4 GENERAL

.1 Remove and replace glazing stops in original locations, using original fasteners, securely set and undamaged.

.2 Use setting blocks, spacers and, for wet glazing, shims, as required to properly support the glass, centred in place in the glazing space independent of the glazing materials and to uniformly distribute its load.

.3 Use a minimum of 2 setting blocks, located at the quarter points. Locate spacers at jamb edges of glass, uniformly spaced at 600 mm o.c. maximum, and 300 mm maximum from top to bottom.

.4 Prevent nicks, abrasion and other damage likely to develop stress on edges.

.5 Set glass properly centred with uniform bite and face and edge clearance, free from twist, warp or other distortion likely to develop stress.

.6 Trim tape protruding more than 2 mm above stop.

.7 Leave labels on glass until it has been set and inspected and accepted. Leave glass whole and without cracks, scratches or other defects and with settings in perfect condition at completion. Remove rejected, broken or damaged glass due to defective materials or improper setting and replace with Standard of Acceptance. Units producing distorted vision shall be rejected and replaced at no cost to the Owner.

.8 Remove, dispose of, and replace broken, cut and abraded glass.

.9 Install glass presence markers in two cross stripes extending from diagonal corners. Maintain markers until final clean-up

3.5 INSTALLATION: EXTERIOR - DRY METHOD (PREFORMED GLAZING)

.1 Perform work in accordance with GANA Glazing Manual and GANA Laminated Glazing Reference Manual for glazing installation methods.

.2 Cut glazing spline to length; install on glazing light. Seal corners by butting spline and sealing junctions with sealant.

.3 Place setting blocks at ¼ points, with edge block maximum 150 mm from corners.

.4 Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.

.5 Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.

.6 Apply heel bead of sealant along intersection of stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapour seal.

.7 Trim protruding tape edge.

3.6 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services: Upon Consultant's written request provide periodic site visits by manufacturer's field service representative.

3.7 CLEANING

.1 Leave Work area clean at end of each day.

.1 Prevent overspray and/or splashes to adjacent surfaces.

.2 Clean spills, splashes and/or or overspray immediately using manufacturer’s recommended cleaners and procedures.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment. Perform cleaning after installation to remove construction and accumulated environmental dirt.

.3 Manage and dispose of demolition and construction waste materials.

3.8 PROTECTION

.1 Protect installed products and components from damage during construction. After installation, mark light with an "X" by using removable plastic tape or paste. Do not mark heat absorbing or reflective glass units.

.2 Repair damage to adjacent materials caused by Work of this Section.

3.9 SCHEDULE

.1 The following table establishes minimum glass thicknesses for interior glass sidelights, screens, windows and doors, or as otherwise required by NBC 2020 as amended. Where glass thickness is indicated on Drawings, the indicated thickness is the minimum thickness required.

Table A

Area	Framed Panel	Free Standing Glass or Glass Located within 1067 mm of floor.
$\leq 3.7\ m^2$	6 mm annealed float glass	6 mm tempered
$3.7\ m^2$ to $5.5\ m^2$	6 mm annealed float glass	10 mm tempered
$5.5\ m^2$ to $11.1\ m^2$	10 mm annealed float glass	13 mm tempered
$> 11.1\ m^2$	Design glass on an individual basis.	

.2 Schedule: as specified herein and as indicated on Drawings.

.3 All exterior windows, entrances, doors, and curtain wall framing shall have dual glazed insulating glass units (IGU).

.4 All interior screens shall be single pane tempered safety glass; minimum thicknesses as noted in **Table A** above, and as indicated on the Drawings.

.5 Coordinate requirements with Section 08 44 13.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Work of this section comprises of the supply and application of privacy films on the existing washroom windows, as indicated on Drawings.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)

.1 ANSI Z97.1-2015 (R2020), Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.

.2 Consumer Product Safety Commission Publications (CPSC)/Code of Federal Regulations (CFR)

.1 CPSC, 16 CFR 1201 CAT I.
.2 CPSC, 16 CFR 1201 CAT II.

.3 General Services Administration (GSA)

.1 GSA-TS01-2003, Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings.

.4 International Window Film Association (IWFA)

.1 WFA Visual Quality Standard for Applied Window Film 1999.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals shall meet the requirements of Section 01 33 00 - Submittal Requirements.

.2 Submit product data, including data sheets, installation instructions, standard details, and specifications.

.3 Submit samples:

.1 Submit one 20” x 20” (500 x 500 mm) sample of glazing film of each product colour specified.

.4 Submit warranty.

.5 Submit Closeout Submittals in accordance with Section 01 78 10 - Closeout Submittals and Requirements.

.1 Provide operation and maintenance data for window film for incorporation into manual specified in Section 01 78 10 - Closeout Submittals and Requirements.

.2 Follow manufacturers written instructions for care and maintenance of privacy film.

.3 Use only cleaning solution recommended by manufacturer for regularly scheduled cleaning of privacy film.

1.4 QUALITY ASSURANCE

.1 Film installation Subcontractor to be factory approved and have a minimum of 3 years’ documented experience on not less than 5 similar installations.

.2 Comply with requirements of the International Window Film Association (IWFA).

.3 Use adequate numbers of skilled workmen, thoroughly trained and experienced in the installation of this film system.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Product Requirements.

.2 Provide and maintain dry, off-ground weatherproof storage.

.3 Store rolls of film flat on cross supports. Do not stand rolls of film on end.

.4 Remove from storage, in quantities required for same day use.

.5 Store materials in accordance with manufacturers written instructions.

1.6 WARRANTY

.1 Contractor hereby warrants that Privacy Film will stay in place without delaminating, peeling, or blistering for 10 years from date of Substantial Performance.

.2 Ensure warranty includes items as follows:

.1 Maintaining adhesion properties without blistering, bubbling, or delaminating from glass surface.

.2 Maintaining appearance without discolouration.

.3 Removing, replacing, and reapplying defective materials.

Part 2 Products

2.1 PRIVACY FILM:

.1 Optically Frosted Privacy Window Film: polyester film adhered to face of glass, with the following minimum performance characteristics and material properties:

.1 Adhesive Colour: Clear.

.2 Adhesive Type: Pressure-sensitive.

.3 Applications: Glass surfaces.

.4 Application Temperature (C): +10°C minimum (air and substrate).

.5 Manufacturer's Warranty: 15 years.

.6 Opacity: Translucent, White.

.7 Removability: Permanent.

.8 Removal Method: removable with a heat gun at 80°C - 100°C.

.9 Surface Finish: Matte.

.10 Surface Type: Flat.

.11 Minimum Thickness (film): 50 µm.

.12 Acceptable Materials:

.1 Refer to **09 60 00 FINISH SCHEDULE.**

.2 Approved equivalents by:

.1 3M Company.

.2 Llumar.

2.2 GLAZING FILM ACCESSORIES

.1 Adhesives, tools and accessories: supply as recommended by glazing film manufacturer.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions are acceptable for product installation in accordance with manufacturer's written instructions.

.1 Check and verify that no irregularities exist that would affect quality of execution of work specified.

.2 Inform Consultant of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's printed preparation and installation instructions, technical datasheets, and specifications.

3.3 PREPARATION

.1 A thorough cleaning of the glazing and frame systems before applying film and attachment is required to remove all foreign matter and contaminants such as adhesives, grease, oil, dust, water, surface dirt, old sealant or glazing compounds by using 3M Citrus Base Cleaner, alcohol or commercial cleaning solution. Detergent or soap and water treatments are not recommended for this step.

.2 Assess the type of glazing stop and with an Olfa knife, trim as much of the rubber as possible without disturbing the window seal or allowing the rubber to fall into the glazing channel.

.3 Spray the glazing bead, glass and frame surface with an appropriate cleaning product and remove with a lint free cloth. Repeat If necessary to remove all foreign materials from the glass and inside window frame surfaces. If the area is particularly dirty, a light scrub with a 3M 0000 Super Fine Synthetic Steel Wool Pad is recommended to loosen contaminates. Finish with a final cleaning if needed.

.4 Spray the glass with 3M Foaming Glass Cleaner or a soap and water solution. Flush the glazing bead to glass area starting at the top and working down to drain or remove any remaining contaminant from the area. Scrape the glass with a razor to remove all foreign matter. Thoroughly clean the glass a final time with soapy water and a window cleaning squeegee. Wipe around the glazing bead and frame area one final time to remove all of the soap and water solution.

3.4 PRIVACY FILM INSTALLATION

.1 Where privacy/graphics film is indicated, install the graphics film on the inboard surface (room side) for interior single pane glass. Refer to Drawings for locations.

.2 Install privacy/graphics film in accordance with the manufacturer’s published preparation and installation instructions, specifications and guidelines.

.3 Field installation of privacy/graphics film:

.4 Install film in the same manner as tested.

.5 Remove any window stops and window sealing device.

.6 Ensure no deleterious material adheres to glass by scraping surface of glass using industrial razors.

.7 Ensure dust, grease, and chemical residue are removed from surface of glass before installation of film.

.8 Install glazing film to glass windows ensuring no blisters, bubbles, scratches or distortions.

.9 Cut film edges straight and square.

.10 Cut edges 1/8”(3 mm) maximum from edge of glass sealing device in accordance with manufacturers written instructions.

.11 Apply and attach film to glass in accordance with manufacturer's written instructions.

.12 Splicing:

.13 Splice film only when glass is greater in width than film.

.14 Splice film only after receipt of written approval from Consultant.

.15 Use butt factory edges only.

.16 Install with no gaps or overlaps.

.17 Use only water and film slip solution on glass to facilitate positioning of film.

.18 Ensure removal of excess water from between film and glass.

.19 Remove left over material form work area and return work area to original condition.

3.5 APPLICATION PRECAUTIONS

.1 Do not overlap the films. The product will be out of warranty in case of overlapping application.

.2 Striking the film surface with hard objects could damage it. Do not scratch it with metal or other objects.

.3 Do not apply stickers or seals to the film or write on it with markers.

.4 When jointing films, there could be a slight difference in appearance in colour, etc., depending on the product lot, so do not use products from different lots next to each other.

.5 The surface of the film could be damaged by burrs on the ruler used during joint. Be sure to use a ruler that has no burrs. Further, take such measures as putting masking tape on the back of the ruler. Especially for black films, the scratches on them are highly visible.

3.6 INSTALLER'S INSPECTION

.1 Visual Inspection: in accordance with IWFA - Visual Quality Standard for Applied Window Film.

.2 Remove and replace film that continues to show blisters, bubbles, tears, scratches, edge defects, or vision distortion in film when viewed under natural daylight from 6’-6” (2 m) minimum after 30-day period.

3.7 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning and Waste Management. 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 00 - Cleaning and Waste Management. Perform cleaning after installation to remove construction and accumulated environmental dirt.

.1 Wash interior and exterior of each window, glass panel and film using cleaning solution recommended by glazing film manufacturer.

.3 Manage and dispose of demolition and construction waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

3.8 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by Work of this Section.

3.9 SCHEDULE

.1 Install glazing films as inidicated.

END OF SECTION

Part 1 General

1.1. GENERAL REQUIREMENTS

.1 Read and be governed by conditions of the Contract and sections of Division 01.

1.1 SUMMARY

.1 This Section includes requirements for supply of equipment and services necessary for mechanical preparation of existing substrates to receive new flooring finishes.

1.2 RELATED REQUIREMENTS

.1 Section 03 35 00 - Concrete Finishing.

.2 Section 09 05 23 - Common Work Results for Flooring Preparation: Floor levelling and toppings required for improved floor flatness tolerances relating to applied finishes.

1.3 REFERENCES

.1 ASTM International (ASTM)

.1 ASTM D4258-23, Standard Practice for Surface Cleaning Concrete for Coating.

.2 ASTM D4259-24, Standard Practice for Preparation of Concrete by Abrasion Prior to Coating Application.

.2 International Concrete Repair Institute (IRCI)

.1 IRCI Technical Guideline No. 310.2R-2013, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate work of this Section with requirements of floor levelling and topping materials specified in Section 09 05 23 - Common Work Results for Flooring Preparation for surface profile.

.2 Pre-Construction Meetings: Conduct a pre-construction meeting to discuss existing concrete slab condition, procedures proposed for substrate preparation, location of required on-site mock-ups and surface profile requirements for installation of levelling products in accordance with Division 01 requirements, attended by Consultant, Contractor, Subcontractor and other Subcontractors or Suppliers affected by work of this Section.

.3 Scheduling: Schedule work of this Section to occur during non-work hours in occupied buildings to minimize disturbance to adjacent spaces.

1.5 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit in accordance with requirements of Section 01 33 00 - Submittal Procedures.

.2 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Product Data: Submit product data sheets describing mechanical preparation methods and cleaning methods and equipment proposed for use on project.

.3 Informational Submittals: Provide the following submittals before starting any work of this Section:

.1 Dust and Water Control Plan: Submit written description of materials and procedures used to control and remove dust and water from work area, methods

to prevent spread of dust and water to adjacent occupied spaces and to prevent contamination of HVAC systems.

1.6 QUALITY ASSURANCE

.1 Qualifications: Provide proof of qualifications when requested by Consultant:

.1 Installer: Use installer having experience in preparation of flooring substrates of similar extent and complexity as required for this Project, using equipment and methods to reduce risk of damage to substrates.

.2 Mock-Ups:

.1 Provide required Mock-Up in accordance with requirements of Section 01 45 00 - Quality Control, and as follows:

.1 Notify Consultant and others affected by work of this Section a minimum of 48 hours in advance of installation of work described in this Section.

.2 Mock-up minimum 5 m^2 area indicating typical surface preparation required for the Project, at location as directed by Consultant and agreed upon in advance; create a separate mock-up for each different surface profile required by floor levelling.

.3 Allow 24 hours for review of mock-up by Consultant and others affected by work of the Section before completing work of this Section.

.4 Mock-up will be reviewed for consistency of surface profile required by floor levelling.

.5 Accepted mock-up will serve as standard for remainder of the Work required for the Project.

.1 Correct mock-up and request additional review by Consultant when changes are required.

.2 Mock-up will remain in place and serve as minimum acceptable standard for work of this Section and related Sections when accepted by Consultant.

Part 2 Products

2.1 EQUIPMENT

.1 Surface Preparation Equipment: Use equipment of type recommended by Subcontractor that minimizes dust and water generation, and that provides surface profiles required by subsequent floor levelling, and as follows:

.1 CSP 2 through CSP 4 Surface Profiling: Abrasive blast or grinding type equipment with vacuum recovery systems to control dust and collect surface aggregate.

.2 CSP 3 through CSP 8 Surface Profiling: Dry shot blast type equipment with vacuum recovery systems to contained blast materials and collect surface aggregate.

.3 CSP 2 through CSP 10 Surface Profiling: Mechanical impact or high or ultra-high pressure water jet type equipment with aggregate and effluent recovery system.

.2 Limitations: Notify and obtain acceptance from Consultant where surface profiling required by floor levelling use of high or ultra-high pressure water jet, or mechanical impact methods that have moderate to high potential to cause microcracking before starting work of this Section:

.1 Consultant may consider alternate methods of floor preparation when less damaging methods are not practical based on site conditions or timing of work required by this Section.

Part 3 Execution

3.1 EXAMINATION

.1 Verify that work of others affected by this Section, or work required by this Section is complete before starting mechanical preparation and surface profiling and as follows:

.1 Confirm degree of floor profile require for installation of floor levelling specified in other Sections before starting work of this Section.

.2 Starting work of this Section denotes acceptance of site conditions and implementation of surface profile required of floor levelling required by other Sections.

3.2 PREPARATION

.1 Use methods that reduce potential for microcracking of concrete substrates, and that minimize the amount of water or residue clean-up.

.2 Prepare concrete substrate and create surface profile in accordance with ASTM D4259; clean concrete in accordance with ASTM D4258 using methods compatible with levelling, and as follows:

.1 Prepare surface profiles required by levelling in accordance with ICRI Technical Guideline No. 310.2.

.2 Acceptable substrate surfaces will be free of laitance, oil, grease, flooring adhesive, paint, and other surface contaminates capable of affecting bond of specified floor finishes to concrete substrate.

.3 Prepare surfaces to receive Self-Levelling Underlayment as specified in Section 09 05 23 - Common Work Results for Flooring Preparation to minimum CSP 3 or as otherwise required by Self-Levelling Underlayment manufacturer.

3.3 SITE QUALITY CONTROL

.1 Testing and Inspection Agency: Owner will appoint inspection and testing agency as follows:

.1 Notify Consultant, and inspection and testing agency with sufficient timing to allow reasonable opportunity for review; provide assistance and access to the Work.

.2 Inspection and testing will include visual inspection of completed substrate preparation to verify that contamination is removed, and specified ICRI surface profile is achieved using ICRI standard rubber mold for visual comparison.

.2 Non-Conforming Work: Repair work that does not meet specified ICRI surface profile at no additional expense to the Owner.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning and Waste Management. 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 78 10 - Closeout Submittals and Requirements. Perform cleaning after installation to remove construction and accumulated environmental dirt.

.3 Manage and dispose of demolition and construction waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

3.5 PROTECTION

.1 Protect prepared substrates from contamination; re-clean substrates that are contaminated by construction operations prior to installation of specified floor levelling.

END OF SECTION

Part 1 General

1.1. GENERAL REQUIREMENTS

.1 Read and be governed by conditions of the Contract and sections of Division 01.

1.1 SUMMARY

.1 This Section includes requirements for preparation of concrete slabs to receive applied flooring for installation required flatness, and levelness. This Sections applies as follows:

.1 Concrete slabs that meet the requirements specified in Section 03 35 00 - Concrete Finishing but require further preparation to meet substrate requirements for flooring finishes specified in various Division 09 Specification Sections.

1.2 RELATED REQUIREMENTS

.1 Division 03 Concrete Finishing: Coordination with minimum requirements for flatness and levelness for acceptance before additional finishing required for specific flooring installations.

.2 Section 09 05 13 - Mechanical Preparation of Flooring Substrates: Preparation of concrete substrates to receive self-levelling underlayments.

.3 Section 09 30 13 Tiling: Coordination with minimum requirements for substrate flatness, levelness and patching of surface imperfections that prevent achieving specified installation.

.4 Section 09 65 66 Resilient Sports Flooring: Coordination with minimum requirements for substrate flatness, levelness and patching of surface imperfections that prevent achieving specified installation.

.5 Division 22 Plumbing: Coordination of pipes and pipe fittings and other materials penetrating floor assemblies.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate compatibility of products specified in this Section with adhesive products specified in Section 09 30 13 - Tiling, and Section 09 65 66 - Resilient Sports Flooring; submit Compliance Certification in accordance with items below.

.2 Pre-Construction Meetings: Arrange for Pre-Construction Meeting in accordance with Section 01 31 00 - Project Managing and Coordination with Contractor, Subcontractors, or suppliers affected by the Work of this Section, and Consultant to discuss installation requirements and site reviews required by the Consultant.

.3 Provide minimum 72 hours to Consultant before starting Work of this Section; increase notice period where time period spans weekends or statutory holidays.

1.4 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Provide required information in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data: Submit product data for products specified indicating physical properties, performance characteristics, acceptability of substrates, application limitations and test results.

1.5 QUALITY CONTROL

.1 Qualifications: Provide proof of qualifications during the course of the Work of this Section:

.1 Manufacturer: Obtain specified products through one source from a single manufacturer or using materials from a secondary source that are acceptable to the manufacturer.

.2 Installer: Install using personnel experienced in installation of flooring preparation products specified in this Section who are trained, licensed, or otherwise approved by the manufacturer.

.2 Certifications: Provide proof of the following during the course of the Work:

.1 Compliance Certification: Provide letter from flooring adhesive manufacturers stating that product selected from Acceptable Products specified in this Section is compatible with flooring adhesives specified in Sections listed in Related Requirements.

1.6 SITE CONDITIONS

.1 Ambient Conditions: Maintain air temperature and substrate temperature in accordance with manufacturer's printed installation instructions.

Part 2 Products

2.1 MANUFACTURERS

.1 Acceptable Products Manufacturers: Subject to compliance with requirements specified in this Section; where multiple listings of manufacturers occur, use any of the following listed manufacturers' Products:

.1 Ardex Engineered Cements.

.2 Custom Building Products,

.3 MAPEI Canada Inc.

.4 Sika Canada Ltd.

.5 W.R. Meadows of Canada.

.2 Unsolicited Substitutions: Consultant may consider additional manufacturers having similar products to Acceptable Products Manufacturers listed above during the construction period, provided they meet the performance requirements established by the named Products and provided they submit requests for substitution, Standard Documents Package, before starting any work of this Section:

.1 Do not use substitute materials to establish Bid Price.

.2 Apparent Substitutions that appear as a part of the Project without review and acceptance by the Consultant will be rejected and replaced with one of the specified Products.

2.2 PERFORMANCE REQUIREMENTS

.1 Substrate Surface Flatness Tolerances: the slab flatness requirements of Section - 03 35 00 is the starting flatness for work of this Section; final measurement for flatness and levelness using patching or self-levelling screed Products provided by this Section will be measured in same manner as specified in Section 03 35 00, as required to achieve the following:

.1 Small Format Floor Tile: Tiles having dimensions less than 100 mm x 100 mm require floor flatness as specified in Section 03 35 00 - Concrete Finishing.

.2 Large Format Floor Tile: Tiles having dimensions 400 mm x 400 mm and larger require floor flatness measured to a minimum of FF50; equivalent to 3 mm with no more than two gaps under 3000 mm straightedge measurement.

.3 Other Flooring Types: provide floor flatness as specified by the flooring manufacturer for each flooring type to be installed.

2.3 PATCHING AND LEVELLING MATERIALS

.1 Underlayment / Topping for Sloping to Floor Drain Locations: rapid setting, rapid hardening, polymer modified, pre-blended, cement based mortar bed and sloping mortar for leveling and ramping up to 3" on horizontal substrates; up to 5" thick in confined areas such as trenches. Product shall be designed to set to a walkable hardness within 1 to 2 hours after application.

.1 Standard of Acceptance:

.1 CUSTOM® SpeedSlope® - Rapid Setting Sloping Mortar, by Custom® Building Products, or approved equivalent sloping cementitious underlayment.

.2 Underlayment: Cementitious, self-levelling, single component, polymer modified underlayment with manufacturer’s recommended primer and crack repair materials; for application thicknesses to a minimum feather edge to 13 mm; interior grade and as follows:

.1 Acceptable Materials:

.1 K 15 Premium Self Levelling Underlayment, Ardex.

.2 CustomTech TechLevel 150, Custom Building Products

.3 Novoplan® 2 Plus, MAPEI.

.4 Sikafloor Level 125, Sika.

.5 Sure-Flo ST, W.R. Meadows.

.3 Patching and Flash Patching Materials: Cementitious based, polymer modified, fine aggregate, single component, rapid curing, early strength floor patching compounds having high adhesion with manufacturer’s recommended primer and surface profile; for application in thicknesses from 4 mm to 25 mm, and as follows:

.1 Acceptable Materials:

.1 SD-P, Ardex.

.2 CustomTech TechPatch MP, Custom Building Products

.3 Mapecem 101, MAPEI.

.4 SikaQuick 1000, Sika.

.5 Sealtight Meadow-Crete H, W.R. Meadows.

.4 Fine Finish Flash Patching Materials: Cementitious based, polymer modified, fine aggregate, single component, ultra-fast drying, early strength floor patching compounds having high adhesion with manufacturer’s recommended primer and surface profile; for application in thicknesses from 0 mm to 6 mm, and as follows:

.1 Acceptable Materials:

.1 SD-F Feather Finish®, Ardex.

.2 CustomTech Silk Patch, Custom Building Products

.3 Planipatch®, MAPEI.

.4 Sika® Level SkimCoat CA, Sika.

.5 Sealtight Meadow-Patch® T1, W.R. Meadows.

2.4 ACCESSORIES

.1 Primer: Product compatible with and as recommended by patching and levelling product manufacturer.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: Verify concrete substrates before beginning of installation of Products specified in this Section.

.1 Ensure concrete floors are dry by using test methods recommended by flooring manufacturer, and exhibit negative alkalinity, carbonization or dusting.

.2 Installation of products specified in this Section will denote acceptance of site conditions.

3.2 PREPARATION

.1 Surface Preparation – General:

.1 All substrates must be structurally sound, dry, solid and stable.

.2 Substrate must be clean and free of dust, dirt, oil, grease, paint, curing agents, concrete sealers, latex compounds, loosely bonded toppings, loose particles, laitance, adhesive residue, and any other substance or condition that may prevent or reduce adhesion.

.3 Ensure substrates are sound, level, free of cracks greater than 3 mm in width, and changes in elevation that may adversely affect installation.

.4 Ensure concrete is free of any negative hydrostatic pressure and excessive moisture.

.2 Surface Preparation – Underlayments and Overlayments:

.1 Prepare and mechanically profile concrete slabs in accordance with Section 09 05 13 - Mechanical Preparation of Flooring Substrates.

.1 Ensure substrate and ambient room temperatures are between 10°C and 35°C before application and for 72 hours after application.

3.3 INSTALLATION – UNDERLAYMENTS

.1 Mixing:

.1 Mix in a clean mixer in accordance with manufacturer’s written instructions. Use appropriate mixing and delivery method in accordance with area to receive underlayment.

.2 If pump mixing is being used, periodically clean pump in accordance with manufacturer’s written instructions.

.1 Do not overwater.

.2 Thoroughly mix with high-speed mixer (at about 1100 rpm) to a homogenous, smooth, lump-free consistency.

.3 Do not overmix; which could cause air to become trapped, shortening the pot life or cause pin holing during application and curing.

.3 Application:

.1 Place Product in a ribbon pattern to achieve a continuous flow of wet material to avoid trapping air or creating a cold joint.

.2 Set width of pour that is ideal for maintaining a wet edge throughout placement; adjust width of pour to maintain wet edge.

.3 Immediately after placing Product, spread with gauge rake; smooth surface after achieving required thickness.

.4 Protection:

.1 The poured underlayment must be protected from wind until set has occurred, or a minimum of 4 hours after placing material. Light foot traffic can occur after this time; normal trade traffic can resume the next day.

3.4 SLOPING MORTAR INSTALLATION AT INTERIOR AREA FLOOR DRAINS

.1 Surface Preparation:

.1 Surfaces must be structurally sound, clean, dry and free from grease, oil, dirt, curing compounds, efflorescence, sealers, adhesives or any other contaminant that would prevent a good bond. Glossy or painted surfaces must be sanded, stripped and cleaned of waxes, dirt or any contaminants. Concrete must be cured 28 days and accept water penetration. Concrete must not be subject to hydrostatic pressure. Concrete slabs should have a broomed or brushed finish or be mechanically prepared to enhance the bond. Expansion joints should never be bridged with setting or mortar bed materials. Do not sand flooring materials containing asbestos. Ambient temperature, surfaces and materials should be maintained at a temperature above 50° F (10° C) or below 90° F (32° C) for 72 hours.

.2 Bonding to Concrete Surfaces:

.1 For sloping or patching over rough profiled concrete, mix to a plastic consistency up to 4qts water with 50lbs mortar. Scrub coat mixture onto clean, dry concrete surface and apply mortar while scrub coat is still wet. Apply mortar uniformly with pressure to key into the substrate before applying to final finished thickness. Float and/or screed material to appropriate thickness.

.2 Do not sponge or spray water to slick surface as this will weaken the mortar surface.

.3 Movement Joint Placement:

.1 Expansion joints and cold joints, as described in ANSI A108.01, should never be bridged with setting material. They must be brought through the tile work and filled with an appropriate elastomeric sealant, to Section 07 92 00 - Joint Sealants.

.4 Mixing Procedures:

.1 Plastic Sloping Mortar - Combine 50lbs of product powder with 3.5-4.0 quarts of water in a clean mixing vessel and mix to a uniform lump free consistency. Mix with a Hole Hawg with a square cage mixing paddle until lump free - approximately 2 minutes. High gear is needed to properly mix dry-pack and plastic consistencies. Alternatively, a mortar mixer may be used with typical mix times of 2-3 minutes, but do not over mix. Rinse paddle between batches.

.5 Product Application:

.1 Prior to application to absorptive substrates, damp sponge the area to prevent excessive moisture loss to the substrate. Do not saturate the surface or leave standing water. Alternatively, porous substrates may be primed using manufacturer's approved primer according to published directions.

.6 Curing Times:

.1 Allow for 4 hours in project schedule after installing underlayment before permitting foot or trade traffic and work.

3.5 INSTALLATION – PATCHING AND FLASH PATCHING PRODUCTS

.1 Mixing:

.1 Mix in clean container in accordance with manufacturer’s written instructions.

.2 Do not overwater.

.3 Thoroughly mix with low-speed mixer (at about 300 rpm) to a smooth, lump-free consistency.

.4 Do not mix more material than can be applied within eight to ten minutes.

.5 Avoid air entrapment and prolonged mixing, which will shorten pot life.

.2 Application:

.1 Select appropriate flat-edge steel trowel.

.2 Immediately apply mixed patching and levelling products to substrate, according to desired thickness. Do not exceed manufacturer’s maximum single-coat thickness.

.3 Blend into surrounding area and finish to required smoothness.

3.6 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning and Waste Management. 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 78 10 - Closeout Submittals and Requirements. Perform cleaning after installation to remove construction and accumulated environmental dirt.

.3 Manage and dispose of demolition and construction waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

3.7 PROTECTION

.1 Protect from traffic dirt or dust from other trades until final installation of floor covering.

.2 Allow for extended periods of cure and protection when temperatures drop below 16°C and/or when relative humidity is higher than 70%.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 22 00 - Concrete Masonry Units.

.2 Section 06 10 00 - Rough Carpentry.

.3 Section 07 92 00 - Joint Sealants.

.4 Section 08 31 00 - Access Doors and Panels.

.5 Section 09 30 13 - Tiling.

.6 Section 09 91 00 - Painting.

.7 Section 10 25 00 - PVC Panels.

1.2 REFERENCES

.1 Aluminum Association (AA):

.1 AA DAF-45-2003(R2009), Designation System for Aluminum Finishes.

.2 American Society for Testing and Materials International, (ASTM):

.1 ASTM A653/A653M-20, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM C423-17, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

.3 ASTM C475/C475M-17, Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

.4 ASTM C514-04(2020), Specification for Nails for the Application of Gypsum Board.

.5 ASTM C635/C365M-17, Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

.6 ASTM C645-18, Standard Specification for Nonstructural Steel Framing Members.

.7 ASTM C840-20, Standard Specification for Application and Finishing of Gypsum Board.

.8 ASTM C954-18, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm to 0.112 in. (2.84 mm) in Thickness.

.9 ASTM C1002-20, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

.10 ASTM C1047-19, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

.11 ASTM C1178/C1178M-18, Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel.

.12 ASTM C1278/C1278M-17 Standard Specification for Fiber-Reinforced Gypsum Panel.

.13 ASTM C1325-19, Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units.

.14 ASTM C1396/C1396M-17, Standard Specification for Gypsum Board.

.15 ASTM C1658/C1658M-19, Standard Specification for Glass Mat Gypsum Panels.

.16 ASTM D3273-16, Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

.17 ASTM D5420-21, Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact).

.18 ASTM E84-21, Standard Test Method for Surface Burning Characteristics of Building Materials.

.19 ASTM E90-09(2016), Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

.20 ASTM F1267-18, Standard Specification for Metal, Expanded, Steel.

.3 Association of the Wall and Ceilings Industries International (AWCI)

.4 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-71.25-M88, Adhesives, for Bonding Drywall to Wood Framing and Metal Studs. (Withdrawn)

.5 Gypsum Association (GA):

.1 GA-214-2021 Levels of Finish for Gypsum Panel Products.

.6 South Coast Air Quality Management District (SCAQMD), California State:

.1 SCAQMD Rule 1168-17, Adhesives and Sealants Applications.

.7 Underwriters' Laboratories of Canada (ULC):

.1 ULC 102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies. (ULC S102)

.2 ULC 114, Standard Method of Test for Determination of Non-Combustibility in Building Materials (ULC S114)

1.3 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures:

.1 Submit manufacturer's printed product literature, specifications and data sheet for each product specified.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Deliver materials in original packages, containers or bundles bearing manufacturers brand name and identification.

.2 Store materials inside, level, under cover. Keep dry. Protect from weather, other elements and damage from construction operations and other causes.

.3 Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal accessories and trim from being bent or damaged.

.4 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

1.5 SITE CONDITIONS

.1 Maintain temperature minimum 10 degrees C, maximum 21 degrees C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.

.2 Apply board and joint treatment to dry, frost free surfaces.

.3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

Part 2 Products

2.1 MANUFACTURERS

.1 Acceptable Manufacturers:

- .1 CertainTeed Gypsum Canada Inc.
- .2 CGC Inc.
- .3 Georgia-Pacific Canada, Inc.

2.2 GYPSUM MATERIALS

.1 Standard board: to ASTM C1396/C1396M and as follows:

- .1 Type: regular.
- .2 Size: 1220 mm x maximum practical length.
- .3 Thickness: as indicated on Drawings.
- .4 Ends: square cut.
- .5 Edges: tapered.
- .6 Acceptable Materials:
  - .1 Wallboard (Type X), CertainTeed.
  - .2 Sheetrock (Firecode), CGC Inc.
  - .3 Toughrock Gypsum Wallboard (Fireguard), Georgia-Pacific Canada, Inc.

.2 Sag Resistant Gypsum Board: to ASTM C1396/C1396M and as follows:

- .1 Type: regular.
- .2 Thickness: as indicated on Drawings.
- .3 Acceptable Materials:
  - .1 Interior Ceiling Board, CertainTeed.
  - .2 Sheetrock Interior Ceiling Board, CGC Inc.
  - .3 CD Ceiling Board, Georgia-Pacific Canada, Inc.

.3 Mould-resistant glass mat faced paperless board (MRGWB): as follows:

- .1 Type: regular – refer to Drawings for Shower Rooms.
- .2 Size: 1220 mm x maximum practical length.
- .3 Thickness: as indicated on Drawings.
- .4 Standard of Acceptance:
  - .1 DensArmor Plus® Interior Panels, Georgia-Pacific Canada, Inc.
  - .2 Gold Bond® eXP® Interior Extreme® Gypsum Panel, Gold Bond Building Products, LLC.
  - .3 GlasRoc® Interior Drywall, CertainTeed.

.4 Mould resistant board: to ASTM C1396/C1396M and as follows:

- .1 Type: regular.
- .2 Size: 1220 mm x maximum practical length.
- .3 Thickness: as indicated on Drawings.
- .4 Acceptable Materials:

.1 M2Tech Moisture & Mould Resistant Gypsum Board, CertainTeed.

.2 Sheetrock Mold Tough, CGC Inc.

.3 ToughRock Mold-Guard, Georgia-Pacific Canada, Inc.

.4 Quietrock ES-MR, Pabco Gypsum.

.5 Cementitious board: to ASTM C1325 and as follows:

.1 Size: 1220 mm x maximum practical length.

.2 Thickness: as indicated on Drawings.

.3 Acceptable Materials:

.1 Durock® Brand Cement Board with EdgeGuard™, CGC Inc.

.2 WonderBoard® Backerboard, Custom Building Products Ltd.

2.3 FRAMING MATERIALS

.1 Metal furring runners, hangers, tie wires, inserts, anchors.

.2 Drywall furring channels: 0.75 mm core thickness galvanized steel channels for screw attachment of gypsum board.

.3 Ceiling Grid Suspension System: direct-hung system composed of interlocking main beams and cross-furring members, to ASTM C645 and follows:

.1 Protective Coating:

.1 to ASTM C645 and ASTM A653/A653M Z120. Z180 hot dipped galvanized.

.2 to ASTM C645 and ASTM A653/A653M Z180 hot dipped galvanized for shower rooms, change rooms and adjacent washrooms.

.3 ZF120 galvannealed products are not acceptable.

.2 Concrete Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to five times design load indicated in ASTM C635/C635M, Table one, Direct Hung. Select from one of the following types:

.1 Cast-in-place anchors.

.2 Post installed expansion anchors.

.3 Chemical anchors.

.4 Powder actuated fasteners, except that they shall be sized for ten times the design load indicated above.

.3 Rod and Flat Hanger: Mild steel, zinc coated.

.4 Hangers, Braces and Ties: steel wire, galvanized minimum 2.78 mm (12 ga.) Ø or greater as required for support of ceiling components.

.5 Tee Bar Grid Size: Double web construction, minimum 0.45 mm thickness x 38 mm face width x 43 mm high, and 24 mm face width x 38 mm high as appropriate to manufacturer's standard details, having a knurled flange [and pre-cut facets at 203 mm $^{O}/_{C}$ for radiused installations].

.6 Wall Mouldings:

.1 Hemmed Angle Moulding: 32 mm high with 32 mm flange.

.2 Unhemmed Channel Moulding: 19 mm x 40 mm x 32 mm flange.

.7 Clips: Include adaptor clips, gypsum board attachment clips, angle clips, [radius clips,] cross tee clips and other mouldings and trims necessary for a complete installation.

.8 Screws and Fasteners: Bugle head screws in accordance with thickness of material used and the provisions of Section 09 21 16 - Gypsum Board Assemblies.

.9 Structural Classification: rated for rated as heavy duty load carrying performance in accordance with ASTM C635/C635M and as follows:

.1 Deflection of fastening suspension system supporting light fixtures, ceiling grilles, access doors, verticals and horizontal loads shall have a maximum deflection of L/360 of the span.

.10 Acceptable Materials:

.1 CTC Drywall Suspension System, CertainTeed Ceilings.

.2 Drywall Suspension System Flat Ceilings, CGC Inc.

2.4 FINISHES

.1 Paint: in accordance with Section 09 91 00 - Painting.

.2 Tiling: in accordance with Section 09 30 13 - Tiling.

2.5 ACCESSORIES

.1 Nails: to ASTM C514.

.2 Steel drill screws: to ASTM C1002.

.3 Stud adhesive: to CAN/CGSB-71.25-M88.

.4 Laminating compound: as recommended by manufacturer, asbestos-free.

.5 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, ABS, 0.5 mm base thickness, perforated flanges, one piece length per location.

.6 Sealants: in accordance with Section 07 92 00 - Sealants.

.7 Joint Treatment Materials: Provide joint compound and accessory materials in accordance with ASTM C475/C475M and as follows:

.1 Joint Tape:

.1 Interior Gypsum Board: Paper.

.2 Interior Mould Resistant Gypsum Board: Fibreglass mesh tape.

.3 Tile Backing Panels: As recommended by panel manufacturer.

.2 Joint Compound for Interior Gypsum Board: Vinyl based, non-asbestos, low dusting type compatible with other compounds applied on previous or for successive coats, and as follows:

.1 Pre-filling: Setting type taping compound.

.2 Embedding and First Coat: Drying type compound.

.3 Fill Coat: Drying type compound.

.4 Finish Coat: Drying type, sandable topping compound.

.5 Acceptable Materials:

.1 CertainTeed Dust Away.

.2 CGC Dust Control.

.3 Joint Compound for Tile Backing Panels:

.1 Gypsum based tile backing board: Use setting type taping and setting type, sandable topping compounds.

.4 Joint Compound for Interior Mould Resistant Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

.1 Pre-filling: Setting type joint compound.
.2 Embedding and First Coat: Setting type joint compound.
.3 Fill Coat: Setting type, sandable topping compound.

Part 3 Execution

3.1 ERECTION

.1 Perform application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.

.2 Perform application of gypsum sheathing in accordance with ASTM C1280.

.3 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C840 except where specified otherwise.

.4 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.

.5 Install work level to tolerance of 1:1200.

.6 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles.

.7 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.

.8 Furr gypsum board faced vertical bulkheads within and at termination of ceilings.

.9 100% back butter all cementitious board at time of installation for tiling.

3.2 APPLICATION

.1 Do not apply gypsum board until bucks, anchors, blocking, sound attenuation, electrical and mechanical work are approved.

.2 Apply single layer cementitious board to concrete block surfaces, where indicated, using laminating adhesive.

.1 Comply with manufacturer's recommendations.
.2 Brace or fasten board until fastening adhesive has set.
.3 Mechanically fasten board at top and bottom of each sheet.

.3 Apply mould-resistant gypsum board and at locations as indicated. Apply mould-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.

.4 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.

.5 Install gypsum board with face side out.

.6 Do not install damaged or damp boards.

.7 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

3.3 INSTALLATION

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre

and fit corners accurately, free from rough edges. Secure at 150 mm on centre or using contact adhesive for full length.

.2 Install casing beads where ceilings abut dissimilar materials.

.3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.

.4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.

.5 Install shadow mould at gypsum board/ceiling juncture as indicated. Minimize joints; use corner pieces and splicers.

.6 Construct control joints of preformed units or two back-to-back casing beads set in gypsum board facing and supported independently on both sides of joint.

.7 Provide continuous polyethylene dust barrier behind and across control joints.

.8 Locate control joints where indicated and at changes in substrate construction at approximate 10 m spacing on long corridor runs at approximate 15 m spacing on ceilings.

.9 Install control joints plumb, square, straight and true.

.10 Construct expansion joints at building expansion and construction joints. Provide continuous dust barrier.

.11 Install expansion joints plumb, square, straight and true.

.12 Splice corners and intersections together and secure to each member with three screws.

.13 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.

.14 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with Association of the Wall and Ceiling Industries (AWCI) International Recommended Specification on Levels of Gypsum Board Finish and GA-214:

.1 Levels of finish (at locations below or as indicated on drawings)

.1 Level 0: No taping, finishing or accessories required for areas of temporary construction.

.2 Level One: Embed tape for joints and interior angles in joint compound. Surfaces to be free of excess joint compound; tool marks and ridges are acceptable. Use at plenum areas above ceilings, in attics, or in concealed spaces.

.3 Level Two: Embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable. Use when gypsum is used as a substrate for tile.

.4 Level Three: Embed tape for joints and interior angles in joint compound and apply two separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges and where areas are to receive a heavy coating of textured material.

.5 Level Four: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges and where light textures or wall coverings are to be applied.

.15 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

.16 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.

.17 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.18 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

.19 Mix joint compound slightly thinner than for joint taping.

.20 Apply thin coat to entire surface using trowel or drywall broadknife to fill surface texture differences, variations or tool marks.

.21 Remove ridges by light sanding or wiping with damp cloth.

.22 Provide protection that ensures gypsum drywall work will remain without damage or deterioration at time of substantial completion.

3.4 INSTALLATION: GYPSUM CEILING GRID SUSPENSION SYSTEM

.1 Install metal clips, concrete inserts, steel bar joist or steel deck using chemical or mechanical fasteners, or power actuated fasteners where accepted by Consultant in writing; coordinate placement of clips, inserts and supports to suit hanger wire layout as required for expected ceiling loads and layout.

.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.

.2 Install hanger wire as required to support ceiling load requirements; provide additional wires at light fixtures, grilles, and access doors; tie wire using a pigtail knot with three tight wraps at top and bottom fastening locations.

.3 Add additional wire as needed when using clips and accessories.

.4 Main beams shall be suspended from the overhead construction with hanger wire, paced as required for expected ceiling loads, along the length of the main beams.

.4 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. Typical cross tee spacing:

.1 406 mm on center with 13 mm gypsum board.

.2 610 mm on center with 16 mm gypsum board.

.5 For light fixtures, use secondary framing cross tees as required to frame opening.

.6 Use channel moulding or angle moulding to interface with suspended grid system to provide perimeter attachment or to obtain drop soffits, vertical, slopes, etc.

.7 Interior Applications:

.1 Install main beams and cross tees at on centre spacing required for ceiling loading, and location of in-ceiling services.

.2 Provide additional bracing as required by Authorities Having Jurisdiction.

3.5 CONTROL, EXPANSION AND RELIEF JOINTS

.1 General:

.1 Install joints in gypsum board assemblies to coincide with building construction joints (that is, expansion, seismic, and/or building control joints).

.2 The maximum control joint spacing for walls and ceilings without perimeter relief joints is 9-metres. With perimeter relief, the maximum recommended control joint spacing is 15-metres. Control joints must be included in the layout and construction of gypsum board wall, bulkhead and ceiling systems; install joints as required.

.3 Location, configuration and construction of control joints shall be in accordance with the recommendations of GA-216 Application and Finishing of Gypsum Panel Products.

.4 For interior ceilings without perimeter relief, control joints shall be installed so that linear dimensions between control joints shall not exceed 9-metres and the total area between control joints does not exceed 84 square metres.

.5 Control joints or intermediate blocking shall be installed where ceiling framing members change direction.

.6 Install control joints where desired or incorporated as a design accent or architectural feature in accordance with the Drawings.

.2 Control joints:

.1 Provide continuous polyethylene dust barrier behind and across control joints.

.2 Provide control joints set in gypsum board facing. Support control joints with studs or furring channels on both sides of joint.

.3 Provide control joints where indicated, where directed by Consultant, and as follows:

.1 Ceilings: 10 m on centre, maximum.

.4 In addition, provide control joints in locations, in consultation with Consultant, where:

.1 Ceiling abuts a structural element, dissimilar wall or partition or other vertical penetration;

.2 Construction changes within the plane of the partition or ceiling;

.3 Partition or furring run exceeds 10 m (30’);

.4 Ceiling dimensions exceed 15 m (50’) in either direction with perimeter relief, 10 m (30’) in either direction without.

.5 Wings of “L”, “U”, and “T” shaped ceiling areas are joined;

.5 Line up control joints with joints in other construction or with center lines of mullions, columns, piers, or similar building elements, and where accepted by Consultant.

.6 Install control joints straight and true.

.3 Expansion joints:

.1 Provide expansion joints in gypsum board elements located at building expansion joints.

.2 Unless otherwise shown, form expansion joint by terminating gypsum board edged with casing bead on both sides of joint and backed by minimum 2.5 mm thick aluminum plate fastened on one side only. Fabricate to align with adjacent floor expansion joint cover.

.4 Relief joints:

.1 Provide relief joints where indicated and where gypsum board assemblies about dissimilar construction.

.2 Where indicated, provide other mouldings, reveals, and feature strips. Install in accordance with manufacturer's directions, plumb, level, accurately aligned at joints, and securely fastened to supporting work.

.3 At exterior wall, where gypsum board abuts curtainwall, window, and door frames, provide isolation tape between casing bead and frame.

3.6 NON-CONFORMING WORK

.1 Touch-up minor damage to finishes in accordance with manufacturer's instructions; remove and replace ceiling components that cannot be successfully cleaned and repaired.

3.7 CLEANING

.1 Clean exposed surfaces of acoustic panel ceilings, including trim, edge mouldings, and suspension system members in accordance with manufacturer's instructions.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Division 03 - Cast-In-Place Concrete.

.2 Section 03 35 00 - Concrete Finishing.

.3 Section 07 92 00 - Joint Sealants.

.4 Section 09 05 13 - Mechanical Preparation of Flooring Substrates.

.5 Section 09 05 23 - Common Work Results for Flooring Preparation.

.6 Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)

.1 Specifications For The Installation Of Ceramic Tile.

.2 ANSI A108/A118/A136.1:2024, American National Specifications for the Installation of Ceramic Tile.

.3 ANSI A137.1:2022, American National Standards Specifications for Ceramic Tile.

.2 ASTM International (ASTM)

.1 ASTM C144-18, Standard Specification for Aggregate for Masonry Mortar.

.2 ASTM C207-18, Standard Specification for Hydrated Lime for Masonry Purposes.

.3 ASTM C979/C979M-16, Standard Specification for Pigments for Integrally Coloured Concrete.

.3 International Standards Organization (ISO)

.1 ISO 10545-3:2018, Ceramic tiles -- Part 3: Determination of water absorption, apparent porosity, apparent relative density and bulk density.

.2 ISO 10545-6:2010, Ceramic tiles -- Part 6: Determination of resistance to deep abrasion for unglazed tiles.

.3 ISO 10545-12, Ceramic tiles -- Part 12: Determination of frost resistance.

.4 ISO 10545-14:2015, Ceramic tiles -- Part 14: Determination of resistance to stains.

.5 ISO 13006:2018, Ceramic tiles -- Definitions, classification, characteristics and marking.

.6 ISO/TR 17870-1:2015, Ceramic tiles - Guidelines for installation - Part 1: Installation of ceramic wall and floor tiles.

.7 ISO/TR 17870-2:2015, Ceramic tiles - Guidelines for installation - Part 2: Installation of thin ceramic wall and floor tiles and panels.

.4 Terrazzo Tile and Marble Association of Canada (TTMAC)

.1 Specification Guide 09 30 00,Tile Installation Manual, most recent published edition.

.2 Hard Surface Maintenance Guide

.5 Tile Council of North America (TCNA)

.1 2019 TCNA Handbook for Ceramic, Glass, and Stone Tile Installation.

.6 Underwriters Laboratories Canada (ULC)

.1 ULC 102.2-18, Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies (ULC S102.2-18).

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Convene pre-installation meeting 1 week prior to beginning work of this Section and on-site installation, with Contractor's Representative and Consultant in accordance with Section 01 31 00 - Project Managing and Coordination to:
- .1 Verify project requirements.
- .2 Review installation and substrate conditions.
- .3 Coordination with other construction subtrades.
- .4 Review manufacturer's written installation instructions and warranty requirements.

.2 Sequencing: sequence with other work in accordance with Section 01 31 00 - Project Managing and Coordination. Comply with manufacturer's written recommendations for sequencing construction operations.

.1 Ceramic tile work shall be performed after painting and sealant applications are finished in affected areas. Install ceramic tile after work that may stain or damage installation. Protect from construction damage.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures:

.2 Product Data: prior to ordering materials submit manufacturer's information for review and initial selection by Consultant for the following:

- .1 Ceramic tile, marked to show each type, size, and shape required.
- .2 Chemical resistant mortar and grout (Epoxy and Furan).
- .3 Cementitious backer unit.
- .4 Dry-set cement mortar and grout.
- .5 Divider strip.
- .6 Reinforcing tape.
- .7 Levelling compound.
- .8 Latex cement mortar and grout.
- .9 Commercial cement grout.
- .10 Organic adhesive.
- .11 Slip resistant tile.
- .12 Waterproofing isolation membrane.
- .13 Fasteners.

.3 Provide Shop Drawings:

- .1 Indicate tile layouts, patterns, colour arrangement, perimeter conditions, junctions with dissimilar materials, thresholds, and setting details.
- .2 Locate and detail movement joints.

.4 Samples:

.1 Base tile: submit duplicate, 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.

.2 Floor tile: submit duplicate, 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.

.3 Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, colour, and size.

.4 Adhere tile samples to 11 mm thick plywood and grout joints to represent project installation.

1.5 QUALITY ASSURANCE

.1 Comply with the guidelines and industry recommendations of the Terrazzo, Tile and Marble Association of Canada (TTMAC).

.2 Obtain each type of tile material required from single source. For colour consistency, ensure the supplier has capacity to provide products from the same production run, dye lot, calibre and batch number.

.3 Obtain setting and grouting materials from one manufacturer to ensure compatibility.

.4 Installer Qualifications: Specializing in tile work having minimum of 5 years successful documented experience with work comparable to that required for this project. Installer must be registered as a member in good standing with the Terrazzo, Tile and Marble Association of Canada.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - 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 specified materials from damage that may impair appearance, performance or durability of installation.

.3 Replace defective or damaged materials with new.

1.7 SITE CONDITIONS

.1 Surfaces for tile installation must be clean, dimensionally stable, cured, level, plumb and free of contaminants such as oil, sealers and curing compounds.

.2 Maintain air temperature and structural base temperature at ceramic tile installation area above 12°C for 48 hours before, during, and 48 hours after, installation.

.3 Do not install tiles at temperatures less than 12°C or above 38°C.

.4 Do not apply epoxy mortar and grouts at temperatures below 15°C or above 25°C.

1.8 MAINTENANCE

.1 Extra Materials:

.1 Provide maintenance materials of ceramic tile flooring, base and adhesive in accordance with Section 01 78 10 - Closeout Submittals and Requirements.
.2 Provide minimum 3 square metres of each colour, pattern and type flooring material required for this project for maintenance use.
.3 Extra materials from same production run as installed materials.
.4 Identify each container of floor tile and each container of adhesive.
.5 Deliver to Owner, upon completion of the work of this section.
.6 Store where directed by Owner.

1.9 WARRANTY

.1 Contractor agrees to correct any deficiencies in the Work performed for a period of 2-years from date of Substantial Performance.

.2 Submit manufacturer's warranty in accordance with the requirements of Section 01 78 10 - Closeout Submittals and Requirements, made out in Owner's name, for each Product specified.

Part 2 Products

2.1 STANDARD OF ACCEPTANCE

.1 Specific colour selection within each Series by Consultant from vendor's standard range.

.1 Refer to **09 60 00 FINISH SCHEDULE.**

.2 Factory blend tile that exhibits colour variations within the ranges selected and package so tile units taken from one package show the same range in colours as those taken from other packages.

.3 Provide tile products manufactured in accordance with ANSI A108.1 and 2019 TCNA Handbook for Ceramic, Glass, and Stone Tile Installation, as appropriate to the colour and texture specifications established by the general design concept for the project.

2.2 TILES FOR WET ROOMS SUCH AS SHOWERS

.1 Tiles shall meet or exceed ANSI A137.1 and be specified by the manufacturer for use in the environment and conditions intended.

2.3 MORTAR, GROUT, AND ADHESIVE MANUFACTURERS

.1 Acceptable Manufacturers: Subject to compliance with requirements herein, provide products from one of the following manufacturers:

.1 Custom Building Products.
.2 Flextile Ltd.
.3 Laticrete International Inc.
.4 Mapei Corporation Inc.

.2 General:

.1 Colours: as scheduled; refer to Drawings, and as determined by Consultant.

2.4 MORTAR AND ADHESIVE MATERIALS

.1 Thick Set Beds: Portland Cement Mortar; where required to slope to drain, accommodate rough or uneven substrates, and at 90-degree transitions that need to be accommodated by the mortar:

.1 Description: Site mix of Portland cement, sand and water.

.2 Acceptable Products:

.1 226 Thick Bed Mortar by Laticrete.

.2 Topcem Premix by Mapei.

.3 Thick Bed Bedding Mortar, by Custom Building Products.

.3 Portland Cement: to CSA A3000, white.

.4 Sand: to ASTM C144.

.5 Hydrated Lime: to ASTM C207, Type SA.

.6 Waterproofing Compound: to ANSI A118.10.

.7 Water: clean and potable.

.2 Thin-Set Interior Floor and Wall Mortar: unmodified mortar to ANSI A118.1.

.1 Standard of Acceptance:

.1 Custom Building Products PremiumPlus Thin-Set Mortar Gray.

.2 MAPEI Floor & Wall Tile Mortar.

.3 Quick Setting Thin Set mortar: fast-setting, one-component dry set mortar for large format tile (> 305 mm x305 mm). Meets or exceeds the requirements of ANSI A118.4, ANSI A118.11 and ANSI A118.15.

.1 Standard of Acceptance:

.1 ProLite RS Premium Rapid Setting LFT Mortar, Custom Building Products.

.4 Shower Rooms:

.1 All tile in the identified rooms shall be installed with a dry-set cement mortar meeting the requirements of ANSI A118.15. The mortar shall be applied using the thin-set method directly to the waterproofing membrane.

.2 Standard of Acceptance:

.1 Custom Building Products MegaLite® Ultimate Crack Prevention Mortar or ProLite® Premium Large Format Tile Mortar.

.2 Mapei Granirapid System.

2.5 GROUT

.1 Colours: Refer to legends on Drawings.

.2 Colouring Pigments:

.1 Pure mineral pigments, limeproof and nonfading, complying with ASTM C979.

.2 Colouring pigments to be added to grout by manufacturer.

.3 Job coloured grout not acceptable.

.3 Unsanded Latex Portland Cement Grout for Wall Joints 3 mm or less and Glass Tile: latex-modified, factory blended, mildew resistant, non-sanded grout consisting of Portland cement and additives; exceeding ANSI A118.6.

.1 Latex Additive: Type as recommended by latex mortar manufacturer.

.2 Colour: confirm colour with Consultant prior to ordering.

.3 Acceptable Products:

.1 Polyblend Non-Sanded Tile Grout by Custom Building Products.
.2 White Dry Tile Grout by Custom Building Products.
.3 644 White Dry-Set Grout mixed with 17765 Grout Admix Plus by Laticrete.
.4 1600 Series Tri-Poly Fortified Non Sanded Grout by Laticrete.
.5 Keracolor U polymer-modified unsanded grout by Mapei.

.4 Fast-Curing, Polymer-Modified Colourfast Sanded Grout: Cement/sand compound, factory blended, polymer-modified, fast-curing efflorescence free grout; comply with ANSI A118.7 and ISO 13007 Classification CG2WAF.

.1 Compressive Strength: 3000 psi at 24 hours.

.2 Colour: as selected by Consultant, confirm colour with Consultant prior to ordering materials.

.3 Acceptable Materials:

.1 Prism Ultimate Performance Grout, Custom Building Products.
.2 1600 RSG Fast Setting PM Sanded Grout, Flextile Ltd.
.3 Permacolor Select, Laticrete International Inc.
.4 Ultracolor Plus FA fast-curing, colorfast HCT Grout, MAPEI Inc.

.5 Grout for Wet Areas such as Showers:

.1 Sanded Grout: Multi-component, factory-prepared, polymer-modified grout, exceeding ANSI A118.7; joint widths ≥3 mm; For residential and commercial, floor and wall surfaces, interior and exterior, in dry or wet applications. For swimming pool, spas, water fountain applications, after fully cured.

.2 Colour: confirm colour with Consultant prior to ordering.

.3 Standard of Acceptance:

.1 CEG-Lite 100% Solids Commercial Epoxy Grout by Custom Building Products.

2.6 CRACK ISOLATION MEMBRANE

.1 Provide for all large format tile locations and at existing cracks in concrete slabs.

.2 Acceptable Materials:

.1 Crack Buster Pro Crack Prevention Mat with Peel & Stick Primer, Custom Building Products.
.2 Flexilastic 1000 Crack Isolation Membrane with 4000 Primer, Flextile Ltd.
.3 Fracture Ban, Laticrete International Inc.
.4 Mapeguard 2, MAPEI Inc.

.3 Accessories: supply all primers and accessories as required for a complete installation.

2.7 WATERPROOFING MEMBRANE SYSTEM

.1 Waterproofing Membrane: Sheet membrane.

.1 Acceptable Materials:

.1 RedGard Fabric Membrane, Custom Building Products.
.2 Hydro Ban Sheet Membrane, Laticrete International Inc.
.3 Mapeguard WP 200, MAPEI Inc.

.4 DITRA, Schluter Systems.

.5 Kerdi, Schluter Systems.

.2 Waterproofing Membrane: Liquid rubber with fabric reinforcing.

.1 Acceptable Materials:

.1 Custom 9240 Waterproofing and Crack Prevention Membrane, Custom Building Products.

.2 WP900 or WP980 WP/Crack Isolation Membrane, Flextile Ltd.

.3 9235 Waterproofing Membrane, Laticrete International Inc.

.4 Mapelastic AquaDefense, MAPEI Inc.

.3 Backer Board: to Section 09 21 16 - Gypsum Board Assemblies.

2.8 ACCESSORIES

.1 Thresholds, Reducer Strips, Divider Strips, Edge protection and Transition Profiles: brushed stainless steel, sized to suit tile thickness, profiles as selected by Consultant from manufacturer's full range.

.1 Conform to applicable requirements of adjoining floor and wall tile.

.2 Use slip-resistant trim shapes for horizontal surfaces of showers, overflow ledges, recessed steps, shower curbs, drying area curbs, and stools.

.3 Use trim shapes sizes conforming to size of adjoining field wall tile, including existing spaces, unless specified otherwise.

.4 Colours as determined by Consultant.

.5 Profiles as determined by Consultant.

.1 Mortar Bed Joint Profiles:

.2 Inside Wall Corners and Floor/Wall Coved Transitions:

.3 Standard Movement Joint Profile (6mm):

.4 Perimeter Joint Profiles:

.6 Sa me-Height Transitions:

.2 Joint Sealant: in accordance with Section 07 92 00 - Joint Sealants.

2.9 PATCHING AND LEVELLING MATERIALS

.1 **Materials: refer to** Section 09 05 23 - Common Work Results for Flooring Preparation.

2.10 CLEANING COMPOUNDS

.1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.

.2 Materials containing acid or caustic material are not acceptable.

2.11 TEMPORARY FLOOR PROTECTION

.1 Standard of Acceptance:

.1 Ram Board Plus®, by Ram Board, Inc., plus manufacturer’s recommended accessories.

.2 Equivalent temporary protection mat.

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 CONCRETE SUBSTRATES

.1 Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with epoxy flooring.

.1 Roughen concrete substrates as follows:

.1 Mechanically profile surfaces with an apparatus that abrades the concrete surface to a profile as specified by system application guide.

.2 Comply with ASTM C811 requirements unless manufacturer's written instructions are more stringent.

.2 Repair damaged and deteriorated concrete according to tile manufacturer's written instructions.

.3 Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.

.1 Perform anhydrous calcium chloride test, ASTM F1869. Proceed with application of epoxy flooring only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) of slab area in 24 hours.

.2 Perform plastic sheet test, ASTM D4263. Proceed with application only after testing indicates absence of moisture in substrates.

.3 Perform relative humidity test using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75% relative humidity level measurement.

.4 Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.

3.3 PREPARATION

.1 Wall Surfaces:

.1 Roughen previously painted surfaces having hard glossy finish by sandpaper or other abrasive medium, and completely remove finishes which are not compatible with compounds specified under this section, and that are to be in contact with such objectionable finishes.

.2 Remove all foreign matter such as loose mortar, plaster, visible laitance, cement, form release agents, dust and the like which would otherwise impede bonding of leveling coat or mortars.

.3 Prime very dry gypsum, wood or porous concrete with primer, brush or roller applied at full strength in accordance with adhesive manufacturer's recommendations.

.4 Provide a leveling coat over substrate as required to eliminate surface irregularities and provide for a uniform, smooth and plumb tiled wall surface, within required tolerances.

.2 Floor Surfaces:

.1 Prepare surface to receive flooring systems in accordance with manufacturer's published instructions, the requirements of Section 09 05 13 - Mechanical Preparation of Flooring Substrates, and Section 09 05 23 - Common Work Results for Flooring Preparation.

3.4 INSTALLATION – GENERAL

.1 Do tile work in accordance with TTMAC Tile Installation Manual except where specified otherwise in this Section.

.2 Apply tile or backing coats to clean and sound surfaces.

.3 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.

.4 Maximum surface tolerance 1:800.

.1 After 2-day cure-period, Consultant will measure flatness of applications for adherence to specified tolerances using standard straight edge method; non-compliant work shall be re-done as required by Contractor at Contractor’s expense.

.5 Make joints between tile parallel, uniform and approximately 1.5 mm wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.

.6 Lay out tiles so perimeter tiles are minimum 1/2 size.

.7 Provide mortar bed to slopes and thicknesses required to meet level of adjacent floors

.8 Bond tiles to substrate in accordance with mortar/adhesive manufacturer’s directions. All floor tiles are to be 100% back buttered.

.9 Sound tiles after setting and replace hollow-sounding units to obtain full bond.

.10 Make internal angles square, external angles rounded.

.11 Use bullnose edged tiles at termination of wall tile panels, except where panel abuts projecting surface or differing plane.

.12 Install divider strips at junction of tile flooring and dissimilar materials.

.13 Allow minimum 24 hours after installation of tiles, before grouting.

.14 Clean installed tile surfaces after installation and grouting cured.

.15 Provide tile manufacturer's standard trim pieces at changes in direction and at terminations. Unless otherwise indicated provide the following corner and edge conditions:

.1 Internal horizontal corners: coved.

.2 External vertical and horizontal corners and edges: Bull nose.

.3 Internal vertical corners and unexposed edges: Square butt joint.

.16 Provide metal edge trim at wall tile outside corners (vertical) and exposed edges of wall tiles.

.17 Install prefabricated control and movement joints in tile Work in accordance with applicable TTMAC details to suit installation indicated, and as follows:

.1 Locate expansion joints at expansion joints in structure.

.2 Locate movement joints as per ANSI A108/A118/A136.1 and the following table, unless specifically indicated otherwise on the Contract Drawings:

Environment	Minimum	Maximum	Joint Width
Interior	4880 mm	6100 mm	6 mm
Interior/Sunlight	3660 mm	4880 mm	6 mm

.3 Provide movement joints at inside corners and where tile abuts dissimilar materials.

.4 Keep building control and movement joints free of mortar and grout.

.5 Interior Movement Joint Widths:

.1 At perimeter joints at perimeter walls, joint width shall be minimum 6 mm.

.2 At other perimeter and movement joints, preferred joint width shall be at a least 6 mm but never less than 3 mm.

.3 At changes in plane, preferred joint width shall be at least 6 mm but never less than 3 mm.

3.5 CRACK ISOLATION MEMBRANE INSTALLATION

.1 Provide crack isolation membrane at following locations;

.1 900 mm wide strip over cracks in floor slabs to receive ceramic tile.

.2 Install in accordance with manufacturer's instructions.

.3 Prepare substrate in accordance with manufacturer's instructions.

3.6 WATERPROOFING MEMBRANE SYSTEM - GENERAL INSTRUCTIONS

.1 Install waterproofing membrane system in accordance with ANSI A108.13 and manufacturer's printed preparation and installation instructions and illustrations as required to produce membrane system fully 100% bonded securely to substrate.

.2 Install complete waterproofing membrane system, including accessories and components as required, in accordance with manufacturer's printed installation instructions, standard and site-specific details, and data sheets, to produce membrane of uniform thickness bonded securely to substrate.

.3 Install waterproofing membrane at tiled floors, walls, and ceiling locations, including corners, transitions and penetrations at shower rooms.

.4 Prepare substrate in accordance with manufacturer's instructions. Remove dust, dirt, oil, grease, paint, laitance, efflorescence, curing compounds, sealers, water repellents and other materials that prevent bond. Metal plumbing pipe penetrations and fixtures must be clean of oil, grease, rust and other potential bond breakers; abrade metal surfaces with sandpaper or wire brush.

.5 Dampen hot, dry surfaces and sweep off excess water.

.6 Apply thick mortar bed, bonded to substrate with thin-set mortar adhesive, to patch, pitch and form slopes to drains, level, plumb or smooth substrates.

.7 Pre-treat cracks and joints, coves and floor/wall transition, drains and penetrations. Drains must be of the clamping ring type, with weepers.

.8 Install waterproofing membrane to achieve full contact and to remove air pockets.

.9 Provide strips of waterproofing membrane where required to span expansion joints or terminate waterproofing into movement joint type tile setting accessories, in accordance with manufacturer's instructions.

.10 Seal waterproofing at penetrations and terminations in accordance with manufacturer's installation instructions.

.11 Install waterproof membrane system over entire surfaces to be tiled. Flash waterproof membrane up over pre-treated coves and corners.

3.7 INSTALLATION WALL TILE

.1 Install tile on gypsum board or cement board as indicated, to TTMAC details 305W and/or 306W as applicable to conditions.

.2 100% back butter all tile at time of installation.

.3 Grout tile as specified.

3.8 INSTALLATION BASE TILE

.1 Install as Indicated.

.2 100% back butter all tile at time of installation.

.3 Grout tile as specified.

3.9 INSTALLATION OF FLOOR TILE – GENERAL

.1 Install tile on concrete floor substrates to TTMAC detail 311F.

3.10 SPECIAL ACCESSORIES

.1 Install transitions, edge protection, control joints, and other accessories in the tile work in accordance with manufacturer's specifications. Use longest lengths practical.

3.11 FIELD QUALITY CONTROL

.1 After 2-day cure-period, Consultant will sound tiles, and any hollow-sounding tiles shall be replaced at Contractor’s expense.

.2 After 2-day cure-period, Consultant will measure flatness of applications for adherence to specified tolerances using standard straight edge method; non-compliant work shall be re-done as required by Contractor at Contractor’s expense.

.3 Manufacturer's Field Services:

.1 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.

3.12 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning and Waste Management. 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 00 - Cleaning and Waste Management. Perform cleaning after installation to remove construction and accumulated environmental dirt.

.3 Manage and dispose of demolition and construction waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

3.13 PROTECTION

.1 Protect installed products and components from damage during construction.

.1 Keep surface dry for a minimum of 48 hours after application.

.2 Allow 72 hours before heavy traffic is permitted.

.3 Protect floor with breathable floor covering until after Substantial Performance.

.2 Protect installed products and components from damage during construction. Cover flooring, after Consultant has reviewed the application, with breathable floor covering until after Substantial Performance.

.3 Repair damage to adjacent materials caused by Work of this Section.

3.1 SCHEDULE

.1 Refer to Drawings and install tile as indicated.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes: Materials and application of acoustical units for direct application or for application and installation within a suspended ceiling.

1.2 RELATED SECTIONS

.1 Section 05 50 00 - Metal Fabrications.

.2 Section 09 21 16 - Gypsum Board Assemblies.

.3 Section 09 54 00 - Wood Plank Ceilings.

.4 Division 23 - Mechanical.

.5 Division 26 - Electrical.

1.3 REFERENCES

.1 ASTM International (ASTM)

.1 ASTM C423-09a, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

.2 ASTM C635/C635M-13a, Standard Specifications for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.

.3 ASTM C636/C636M-13, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.

.4 ASTM E1264-08e1, Standard Classification for Acoustical Ceiling Products.

.5 ASTM E1477-98a(2013), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.

.6 ASTM F1667-13, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-92.1-M89, Sound Absorptive Prefabricated Acoustical Units.

.3 Underwriter's Laboratories of Canada (ULC)

.1 CAN/ULC S101-14, Standard Methods of Fire Endurance Tests of Building Construction and Materials.

.2 CAN/ULC S102-10, Surface Burning Characteristics of Building Materials and Assemblies.

.3 CAN/ULC S102.3-07, Standard Method of Fire Test of Light Diffusers and Lenses.

1.4 SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit manufacturer's printed product literature, specifications and data sheet for each product specified.

.2 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit duplicate full size samples of each type of acoustical unit.

.2 Include accessories and mitered interior and exterior corners of wall moulding.

.3 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.1 Shop Drawings: Layout and details of acoustical ceilings. Show locations of items which are to be coordinated with, or supported by the ceilings.

.4 Certifications: submit manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material shall carry an approved independent laboratory classification of NRC, CAC, and AC.

.5 Submit warranties.

1.5 QUALITY ASSURANCE

.1 Single-Source Responsibility: Provide perimeter trim components, panels and grid components by a single manufacturer.

.2 Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

.3 Regulatory Requirements:

.1 Fire-resistance rated floor/ceiling and roof/ceiling assembly: certified by Canadian Certification Organization accredited by Standards Council of Canada.

.4 Regulatory Requirements:

.1 Fire-resistance rated floor/ceiling and roof/ceiling assembly: certified by Canadian Certification Organization accredited by Standards Council of Canada.

.1 Fire-rated materials shall be approved by Underwriters' Laboratories of Canada, for Fire Hazard Classifications per National Building Code and National Fire Code 2010 editions.

.2 Surface Burning Characteristics, to CAN/ULC S102 or other standard as accepted in writing by authorities having jurisdiction:

.1 Flame Spread: 25 or less

.2 Smoke Developed: 50 or less

.5 Mock-up:

.1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.

.2 Construct mock-up 10 m^2 minimum of each type acoustical panel, tile ceiling including one inside corner and one outside corner.

.3 Construct mock-up where directed.

.4 Allow 24 hours for inspection of mock-up by Consultant before proceeding with ceiling work.

.5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of the finished work.

.6 Health and Safety:

.1 Construction occupational health and safety: to Section 01 35 23 - Health and Safety.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Protect on site stored or installed absorptive material from moisture damage.

.2 Store extra materials required for maintenance, where directed by Consultant.

.3 Waste Management and Disposal:

.1 Separate and divert waste materials from landfill in accordance with Section 01 74 00 - Cleaning and Waste Management.

1.7 ENVIRONMENTAL REQUIREMENTS

.1 Permit wet work to dry before beginning to install.

.2 Maintain uniform minimum temperature of 15 °C and humidity of 20-40% before and during installation.

.3 Store materials in work area 48 hours prior to installation.

1.8 EXTRA MATERIALS

.1 Provide extra materials of acoustic units in accordance with Section 01 78 10 - Closeout Submittals and Requirements.

.2 Provide acoustical units amounting to 5% of gross ceiling area for each pattern and type required for project.

.3 Ensure extra materials are from same production run as installed materials.

.4 Clearly identify each type of acoustic unit, including colour and texture.

.5 Deliver to Owner upon completion of the work of this section.

1.9 WARRANTIES

.1 Submit manufacturer’s standard warranty for each material incorporated into the Work.

.2 Contractor agrees to correct any deficiencies of labour or material found in the work performed for a period of 2 years from the date of Substantial Performance.

Part 2 Products

2.1 MANUFACTURERS

.1 Acceptable Manufacturers: Subject to compliance with requirements specified in this Section, and as established by the Basis-of-Design Materials, manufacturers offering products that may be incorporated into the Work includes the following:

.1 Acoustic Panels and Suspension Systems:

.1 Armstrong World Industries Canada Ltd.

.2 CeloTex.

.3 CertainTeed.

.4 CGC Interiors, A USG Company.

2.2 PERFORMANCE/DESIGN CRITERIA

.1 Maximum deflection: 1/360th of span to ASTM C635 deflection test.

2.3 MATERIALS

.1 Standard of Acceptance: refer to **09 60 00 FINISH SCHEDULE:**

.1 Classification: Type III, Form 1.

.2 Surface Texture: medium, non-directional.

.3 Sizes: as scheduled.

.4 Edge: square.

.5 Colour: as scheduled.

.6 Noise Reduction Coefficient (NRC): 0.55.

.7 Flame Spread: Class A.

.8 Ceiling Attenuation Class (CAC): 35.

.9 Light Reflectance (LR): 0.83.

.10 Acceptable Materials:

.1 Armstrong Dune/Cortega 823 Fire Guard

.2 Approved alternates.

2.4 SUSPENSION SYSTEMS

.1 Components: All main beams and cross tees shall be commercial quality hot-dipped galvanized steel, to ASTM A653. Main beams and cross tees shall be double-web steel construction with 15/16-inch type exposed flange design. Exposed surfaces shall be factory-chemically cleansed, capping pre-finished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.

.2 Structural Classification: Intermediate Duty, to ASTM C635.

.3 Rated for high humidity locations, as indicated on Drawings or as recommended by acoustic tile manufacturer based on room function and use.

.4 Acceptable Materials: materials to match products specified, use only materials from same manufacturer of panel products (colour: to match tiles, or as otherwise selected by Consultant from manufacturer's full range), and as follows:

.1 Acceptable Materials:

.1 DX/DXL, CGC, A USG Company.

.2 15/16" Classic, CertainTeed.

.3 Prelude XL, Armstrong.

.5 Attachment Devices: Size for five times design load indicated in ASTM C635, Table 1, Direct Hung unless otherwise indicated.

.6 Hanger wire: galvanized soft annealed steel wire:

.1 3.6 mm diameter for access tile ceilings.

.2 2.78 mm diameter for other ceilings.

.7 Hanger inserts: purpose-made.

.8 Accessories: splices, clips, wire ties, retainers and wall moulding to complement suspension system components, as recommended by system manufacturer.

.9 Edge Mouldings and Trim: Metal or extruded aluminum of types and profiles indicated, or if not indicated, manufacturer's standard molding for edges and penetrations, including light fixtures, which fit type of edge detail and suspension system indicated. Provide moldings with exposed flange of the same width as exposed runner.

.1 Provide Axiom Classic Trim and accessories, as indicated, by Armstrong, or similar with same appearance and function, and same or better physical properties and performance characteristics.

.2 Provide edge mouldings fabricated to diameter required to fit circular penetrations exactly.

.3 Provide edge mouldings and trims that match width and configuration of exposed runners including the following configurations:

.1 Sheet Metal Fillers: Light zinc coated sheet steel finished to match T-bar

.2 Wall Mould: Channel or angle shape with a 25 mm or 22 mm exposed face

.10 System Accessories:

.1 Hold-Down Clips for Wind Uplift (at or near entrances and where panels may be subject to wind uplift, as directed by Consultant): Provide hold down clips spaced 610 mm O/C on all cross tees for interior ceilings consisting of acoustic panels weighing less than 4.88 kg/m^2.

.2 Impact Clips (at areas where panels may be subject to impact based on intended room use, as directed by Consultant): provide manufacturer's standard impact clip system designed to absorb impact forces against acoustic panels.

.3 Sealant: to Section 07 92 00, for use in exposed locations, colour to match ceiling grid.

.4 Movement and expansion joints: "Z" shaped metal trim pieces.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's printed installation instructions, data sheets, standard details, and specification guidelines.

3.2 EXAMINATION

.1 Do not install acoustical panels and tiles until work above ceiling has been inspected by Consultant, and electrical and mechanical work has been completed.

.2 Do not proceed with installation until all wet work such as concrete, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.

3.3 PREPARATION

.1 Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

.2 Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors for installation by other trades.

.1 Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.4 INSTALLATION

.1 Lay out centre line of ceiling both ways, to provide balanced borders at room perimeter, with border units not less than 50% of standard unit width; comply with reflected ceiling plan.

.2 Install suspension system and panels in accordance with the manufacturer's working drawings, and in compliance with ASTM C636, and with the authorities having jurisdiction.

.3 Suspend main beam from overhead construction with hanger wires along the length of the main runner. Install hanger wires plumb and straight.

.4 Install hangers spaced at maximum 1200 mm centres and within 150 mm from ends of main tees.

.5 Ensure suspension system is coordinated with location of related components.

.6 Install wall moulding to provide correct ceiling height.

.7 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers grilles and speakers.

.8 Support at light fixtures and diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.

.9 Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.

.10 For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.

.11 Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings. Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.

.12 Finished ceiling system shall be square with adjoining walls and level within 1:1000.

.13 Expansion or movement joints:

.1 Supply and install "Z" shaped metal trim pieces at each side of expansion joint. Design to accommodate plus or minus 25 mm movement and maintain visual closure. Finish metal components to match adjacent exposed metal trim. Provide backing plates behind butt joints.

3.5 INTERFACE WITH OTHER WORK

.1 Coordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, etc., to be built into acoustical ceiling components.

3.6 ADJUSTING AND CLEANING

.1 Replace damaged or broken panels.

.2 Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 06 10 00 - Rough Carpentry.

.2 Section 09 51 13 - Acoustical Panel Ceilings.

.3 Division 23 Mechanical: HVAC.

.4 Division 26 Electrical: Lighting.

1.2 REFERENCES

.1 ASTM International (ASTM)

.1 ASTM A641/A641M-19(2025), Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

.2 ASTM A653/A653M-25a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.3 ASTM A1008/A1008M-24, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable.

.4 ASTM C423-23e1, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by Reverberation Room Method.

.5 ASTM C635/C635M-22, Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

.6 ASTM C636/C636M-19, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.

.7 ASTM E84-24, Standard Test Method for Surface Burning Characteristics of Building Materials.

.8 ASTM E1264-23, Standard Classification of Acoustical Ceiling Products.

.2 Underwriter’s Laboratories of Canada (ULC)

.1 ULC 102-18, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies (ULC S102).

.2 ULC 702.1-21, Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification (ULC-S702.1).

.3 ULC 702.2-15, Mineral Fibre Thermal Insulation for Buildings, Part 2: Application Guidelines (ULC S702.2-15).

.3 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)

.1 North American Architectural Woodwork Standards, (NAAWS 4.0), including Errata Through December 01, 2021.

.4 Ceilings and Interior Systems Construction Association (CISCA)

.1 CISCA Ceiling Systems Installation Handbook.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate ceiling work with installers of related work including, but not limited to gypsum board, acoustic ceilings, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals shall comply with requirements of Section 01 33 00 - Submittal Procedures.

.2 Datasheets:

.1 Submit manufacturer's product data sheets for ceiling units and suspension system including manufacturer's written installation instruction.

.3 Shop Drawings:

.1 Wood Plank Ceiling Connections to Structure: Submit engineered shop drawings for each ceiling type, designed and sealed by a Professional Engineer licenced to practice in Ontario showing details of construction and attachment to structure sufficient to withstand loads calculated to OBC criteria.

.4 Samples.

.1 Submit 150 mm sample of each specified finished wood material (planks) and 200 mm long samples of exposed wall mouldings and suspension system, including main runner.

1.5 EXTRA MATERIALS

.1 Ceiling Unit: Provide full-sized unit equal to 5% of amount installed.

.2 Exposed Suspension System Components: Provide exposed suspension components equal to 2% of amount installed.

.3 Ensure extra materials are from same production run as installed materials.

.4 Clearly identify each type of acoustic unit, including colour and texture.

.5 Deliver to Consultant, upon completion of the work of this section.

1.6 QUALITY ASSURANCE

.1 Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to applied fireproofing, insulation, gypsum board, light fixtures, mechanical systems, electrical systems, sprinklers and painting.

.2 Installers: Use installers having proven experience in completing acoustical wood ceilings having similar material, design, and complexity as that required for this project and having a record of successful in-service performance for the previous 2-years.

.3 Manufacturers: Obtain materials from one source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties.

1.7 MOCK-UPS

.1 Construct mock-up 5 m^2 minimum of each type acoustical wood ceiling including one inside corner and one outside corner

.2 Construct mock-up where directed.

.3 Allow 24-hours for inspection of mock-up by Consultant before proceeding with ceiling work.

.4 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of the finished work.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Store materials in original, undamaged containers or wrapping with manufacturer's seals and labels intact.

.2 Store materials in a dry interior location at room temperature and in a flat horizontal position.

.3 Handle units to avoid chipped edges.

1.9 ENVIRONMENTAL REQUIREMENTS

.1 Perform installation when heating and cooling systems are operational, and temperature and humidity closely approximate the interior operating conditions required for the final construction; allow wood materials to acclimate and stabilize to site conditions a minimum of 72 hours before installation when site is free of wet and dusty work, and above ceiling work including lighting and other electrical and mechanical devices are completely installed.

1.10 WARRANTY

.1 Submit manufacturer's warranty in accordance with the requirements of Section 01 78 10 - Closeout Submittals and Requirements, made out in Owner's name, for each Product specified.

Part 2 Products

2.1 INTERIOR WOOD CEILINGS

.1 Standard of Acceptance: Refer to **09 60 00 FINISH SCHEDULE**.

.1 Material: Fire-retardant particle board.
.2 Edge: Panel - 19mm reveal 24mm.
.3 Thickness: 19mm.
.4 Shape: Plank.
.5 Plank width: Nominal 4" or 6" wide planks unperforated, selected by Consultant.
.6 Panel length: 2440mm (nominal) with 19mm reveal panel to panel at length and width.
.7 Texture: Smooth.
.8 Surface Finish: Utra-violet clear semi-gloss coating.
.9 Weight: 2.49 lbs/sqft.
.10 Fire performance: Class A.
.11 Face profile: 24mm.
.12 Real wood veneer colour and grain: Selected by Consultant.

.2 Suspension System (Interiors):

.3 Heavy-duty Armstrong 15"/16"Prelude® XL® HD T-bar grid system or Donn DX/DXL 15"/16" Suspension System, to ASTM C635/ASTM C635M; hot dip galvanized, and powder coated matte black; complete grid, including main runners, cross-tees, wall angles and other related hardware and accessories as required for a complete installation.

.4 Attachment Devices: Size for five times design load indicated in ASTM C635, Table 1, direct hung unless otherwise noted.

.5 Hanger wire: galvanized soft annealed tight 3-wrap steel wire:

.1 Minimum wire performance requirements:
.1 Wire: manufactured to ASTM A641.
.2 Tight 3 wrap wire, to ASTM C636: wire tie failure / pullout load: ≥ 160 kilogram-force.
.3 Yields: ≥ 190 kilogram-force.
.4 Ultimate load: ≥ 250 kilogram-force.
.5 Tensile strength: maximum 80 Ksi.
.2 3.6 mm diameter for access tile ceilings.
.3 2.6 mm diameter for other ceilings.
.4 Hanger inserts: purpose-made.
.5 Anchors: suitable to substrate and load requirements. Powder-actuated fasteners in concrete or steel not permitted.

.6 Suspension grid components shall be powder coated black. Remaining suspension system shall be painted matte black, to Section 09 91 00 - Painting.

2.2 ACCESSORIES

.1 Matching perimeter trim.

.2 Manufacturer’s recommended fasteners.

.3 Touch-up paint.

.4 Wood backer clips.

.5 Anchors of type to suit substrate (expansion type or chemical anchor system).

.6 Dielectric Separator / Isolation Coating.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's printed installation instructions, technical datasheets, details and specifications.

.2 Comply with OBC and requirements of authority having jurisdiction.

3.2 EXAMINATION

.1 Examine substrates and structural framing for compliance with requirements specified in this and other work that affect ceiling installation, anchorage, and other conditions affecting performance of wood panel ceiling.

.2 Installation of ceiling system indicates acceptance of conditions.

3.3 PREPARATION

.1 Measure each ceiling area and establish layout of wood panels to balance border widths at opposite edges of each ceiling:

.1 Install wood panel ceilings in accordance with layout indicated on reflected ceiling plans.

.2 Avoid using panels less than ½ width at borders.

3.4 ISOLATION COATING

.1 Apply isolation coating to contact surfaces in contact with cementitious materials, wood materials, and dissimilar metals.

3.5 INSTALLATION

.1 Install wood plank ceilings and wood slat soffits in accordance with manufacturer's published installation instructions and specifications.

.2 Install ceiling and soffit suspension systems in accordance with ASTM C636 and OBC.

.3 Secure hangers to overhead structure using attachment methods in accordance with engineered, stamped shop drawings, Ontario Building Code requirements, and to the acceptance of authorities having jurisdiction.

.4 Suspend suspension system from overhead construction with anchors and hanger wires spaced maximum 914 mm centres and within 150 mm from ends of main tees. Comply with engineered, stamped shop drawings.

.5 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.

.6 Install access panels as per manufacturer's instructions in locations indicated on drawings.

.7 Coordinate with electrical and mechanical fittings, fixtures and products that penetrate the ceiling/soffit and need to be supported by structure. Treat all cut-outs to match finished of exposed wood.

3.6 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning and Waste Management. 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 00 - Cleaning and Waste Management. Perform cleaning after installation to remove construction and accumulated environmental dirt.

.3 Manage and dispose of demolition and construction waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

3.7 PROTECTION

.1 Protect installed products and components from damage during construction.

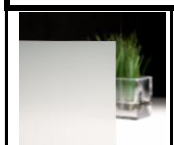
.2 Repair damage to adjacent materials caused by Work of this Section.

END OF SECTION

WALTERFEDY

09 60 00 FINISH SCHEDULE

Project Name:	KCI - HEALTH AND PHYSICAL EDUCATION RENOVATION PHASE 1	Date:	2025-04-02
Location:	787 King St. W, Kitchener, ON N2G 2G5	Issued For:	Issued for Bid & Permit
Project No.:	2025-4029-10		

COLOUR SWATCH	TAG	MATERIAL TYPE	MFR.	PRODUCT LINE/NUMBER	COLOUR	SIZE	NOTES
06 40 00 ARCHITECTURAL WOODWORK							
	W1	SOLID WOOD	HOMESTEAD WOODWORKS	VISIBLE HARDWOOD: WHITE OAK FREE OF KNOTS, CRACKS, OR VOIDS. INTERNAL SUPPORT: POPLAR OR SPRUCE	MEDIUM - DARK BROWN STAIN TO MATCH EXISTING IN LEVEL 02 FOYER	REFER TO DRAWINGS	LOCATION: MILLWORK IN MAIN FOYER 406 MATCH STYLE AND FINISH TO EXISTING MILLWORK IN SCHOOL FOYER AND MAIN OFFICE
	W2	SOLID WOOD	CUSTOM	CUSTOM	STAINED TO MATCH: FORMICA DANISH MAPLE	N/A	LOCATION: BENCHES FINISH: STAINED AND SEALED FOR MAXIMUM DURABILITY.
	PL1	PLASTIC LAMINATE	FORMICA	8906-58	DANISH MAPLE	REFER TO DRAWINGS	LOCATION: MILLWORK IN WEIGHT ROOM
08 87 00 GLAZING SURFACE FILMS							
	FLM1	3M	FASARA GLASS FINISHES	NATURAL PYRGOS SH2MAGL	WHITE	REFER TO DRAWINGS	LOCATION: CHANGE ROOM
09 30 13 TILING							
	PTF1	PORCELAIN FLOOR TILE	OLYMPIA TILE	VENEZIA SERIES	BIANCO	24" x 48"	LOCATION: REFER TO FINISH PLAN. GROUT LINES TO BE HAIRLINE JOINTS (1/16")

WALTERFEDY

09 60 00 FINISH SCHEDULE

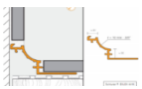
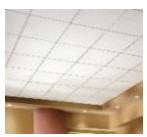
Project Name:	KCI - HEALTH AND PHYSICAL EDUCATION RENOVATION PHASE 1	Date:	2025-04-02
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Project No.:	2025-4029-10		

COLOUR SWATCH	TAG	MATERIAL TYPE	MFR.	PRODUCT LINE/NUMBER	COLOUR	SIZE	NOTES
	PTB1	PORCELAIN TILE BASE	OLYMPIA TILE	VENEZIA SERIES	BIANCO	6"	LOCATION: REFER TO FINISH PLAN. GROUT LINES TO BE HAIRLINE JOINTS (1/16")
	GR1	GROUT	MAPEI	N/A	27 SILVER	N/A	USED WITH PTF1
	PTF2	PORCELAIN FLOOR TILE	OLYMPIA TILE	REGAL	SHELL WHITE	12" x 12"	LOCATION: REFER TO FINISH PLAN. GROUT LINES TO BE HAIRLINE JOINTS (1/16")
	PFB2	PORCELAIN TILE BASE	OLYMPIA TILE	REGAL	SHELL WHITE	6"	LOCATION: REFER TO FINISH PLAN. GROUT LINES TO BE HAIRLINE JOINTS (1/16")
	GR2	GROUT	MAPEI	N/A	221 MOONBEAM	N/A	USED WITH PTF2, CTW1, CTW2
	CTW1	CERAMIC WALL TILE	OLYMPIA TILE	COLOUR AND DIMENSION	BONE	4" x 16"	LOCATION: REFER TO FINISH PLAN. PATTERN: STACKED VERTICALLY GROUT LINES TO BE HAIRLINE JOINTS (1/16")
	CTW2	CERAMIC WALL TILE	OLYMPIA TILE	COLOUR AND DIMENSION	GOLD	4" x 16"	LOCATION: REFER TO FINISH PLAN. PATTERN: STACKED VERTICALLY GROUT LINES TO BE HAIRLINE JOINTS (1/16")

WALTERFEDY

09 60 00 FINISH SCHEDULE

Project Name:	KCI - HEALTH AND PHYSICAL EDUCATION RENOVATION PHASE 1	Date:	2025-04-02
Location:	787 King St. W, Kitchener, ON N2G 2G5	Issued For:	Issued for Bid & Permit
Project No.:	2025-4029-10		

COLOUR SWATCH	TAG	MATERIAL TYPE	MFR.	PRODUCT LINE/NUMBER	COLOUR	SIZE	NOTES
	TR1	FINISHING EDGE / TRANSITION (WALL)	SCHLUTER	SCHLUTER JOLLY	ANODIZED ALUMINUM BRUSHED NICKLE	TO MATCH TILE THICKNESS	FINISH ALL EXPOSED EDGES OF TILE ON WALLS. TYPICAL ALL LOCATIONS.
	TR2	COVED SHAPED TRANSITION (WALL TO FLOOR)	SCHLUTER	SCHLUTER DILEX-AHK	ANODIZED ALUMINUM BRUSHED NICKLE	TO MATCH TILE THICKNESS	CERAMIC WALL TILE TO PORCELAIN FLOOR TILE. TYPICAL ALL LOCATIONS
09 51 00 ACOUSTIC CEILINGS							
	C-1	ACOUSTIC CEILING TILE	ARMSTRONG	OPTIMA	WHITE	2' x 4'	LOCATION: REFER TO RCP
09 54 00 WOOD PLANK CEILING							
	C-5	WOOD PLANK CEILING	ARMSTRONG	WOODWORKS LINEAR VENEERED PANELS	TO MATCH W1	REFER TO DRAWINGS	LOCATION: REFER TO RCP
09 65 13 RESILIENT BASE							
	RB	RUBBER BASE	TARKETT	TIGHTLOCK WALL BASE	TO MATCH EXISTING	TO MATCH EXISTING	LOCATION: REFER TO FINISH PLAN.
09 65 66 RESILIENT FLOORING							
	SP1	SHEET FLOORING	ADVANTAGE SPORT	DEKO INTERLOCK RUBBER FLOORING	TO MATCH EXISTING	TO MATCH EXISTING	LOCATION: REFER TO FINISH PLAN.

WALTERFEDY

09 60 00 FINISH SCHEDULE

Project Name:	KCI - HEALTH AND PHYSICAL EDUCATION RENOVATION PHASE 1	Date:	2025-04-02
Location:	787 King St. W, Kitchener, ON N2G 2G5	Issued For:	Issued for Bid & Permit
Project No.:	2025-4029-10		

COLOUR SWATCH	TAG	MATERIAL TYPE	MFR.	PRODUCT LINE/NUMBER	COLOUR	SIZE	NOTES
09 66 13.10 TERRAZZO RESTORATION							
	TF1	TERRAZZO FLOOR	SIKA OR SIMILAR	TO MATCH EXISTING	TO MATCH EXISTING	INFILL AS REQUIRED	LOCATION: REFER TO FINISH PLAN
	TB1	TERRAZZO BASE	SIKA OR SIMILAR	TO MATCH EXISTING	TO MATCH EXISTING	INFILL AS REQUIRED	LOCATION: REFER TO FINISH PLAN
09 90 00 PAINTS AND COATINGS							
	PT1	PAINT	SHERWIN WILLIAMS	TBD BY OWNER	TBD BY OWNER	N/A	COLOUR TBD BY OWNER LOCATION:MAIN FIELD PAINT, REFER TO FINISH PLANS
	PT2	PAINT	SHERWIN WILLIAMS	TBD BY OWNER	TBD BY OWNER	N/A	COLOUR TBD BY OWNER LOCATION: DOORS AND FRAMES
	PT3	PAINT	SHERWIN WILLIAMS	TBD BY OWNER	TBD BY OWNER	N/A	COLOUR TBD BY OWNER LOCATION: CEILINGS

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 22 00 - Concrete Masonry Units.

.2 Section 09 65 66 - Resilient Sports Flooring.

.3 Section 09 91 00 - Painting.

.4 Refer to Drawings.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Samples:

.1 Submit 3 - 305mm (12") long samples of each colour and type of base material. Include outside corner of base.

.3 Mock-up:

.1 Provide inside and outside corner mock-ups plus 6’-6” (2 m) of straight run.

.4 Data Manual:

.1 Provide maintenance instructions per Section 01 78 10 - Closeout Submittals and Requirements.

1.3 QUALITY ASSURANCE

.1 Qualifications: Provide work of this section, executed by competent installers with minimum 5 years experience in application of Products, systems and assemblies specified and with approval and training of Product manufacturers.

.2 Conduct a per-installation meeting in accordance with 01 31 19.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - 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:

.4 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

Part 2 Products

2.1 ACCEPTABLE MANUFACTURERS

.1 Armstrong Flooring.

.2 Forbo.

.3 nora® by Interface.

.4 Tarkett.

2.2 MATERIALS

.1 Standard of Acceptance: refer to **09 60 00 FINISH SCHEDULE.**

.1 Gauge: 1/8” (3 mm).

.2 Height: selected by Consultant.

.3 Colour: selected by Consultant.

.4 Profile: Straight toe.

.2 Block Wall Filler: Latex filler, "S-180" by Armstrong Cork Canada Ltd., or "Planicrete 20" by Mapei Canada Ltd., "87 Latex Underlayment" by Flextile Ltd. or waterproof filler recommended by flooring manufacturer.

.3 Adhesive: as recommended by manufacturer.

.4 Sealant: clear silicone, as manufactured by Tremco, CGE, or Dow Corning.

Part 3 Execution

3.1 EXAMINATION

.1 Examine substrate to ensure clean lines, correct level and freedom from cracks, ridges, dusting, scaling and carbonation.

.2 Examine walls in advance of application of base to ensure that surfaces are protected against entry of water and moisture. Perform compatibility test with primer/adhesive and substrate.

3.2 INSTALLATION OF RESILIENT BASE

.1 Allow coiled wall base to lay flat for at least 24 hours at 18 °C (65 °F) prior to installation and maintain this temperature during installation.

.2 Begin installation after adjacent work has been completed at walls and overhead areas.

.3 Spread adhesive to the ribbed surface (back) of the wall base with a 3 mm (1/8") square- notched trowel; allow slight set-up, then bring base into contact. Ensure full and secure adhesion of base to substrate. The adhesive should cover 80% of the back surface. Leave a 6 mm (1/4") uncovered space at the top of the wall base to prevent the adhesive from oozing onto the wall above the base when installed.

.4 Position wall base on wall surface and roll with hand roller. Always roll back to starting point to prevent stretching the wall base.

.5 Set base to ensure installation over finished flooring material is free of gaps.

.6 Install base in longest lengths possible. Accumulated short lengths not permitted. Adhere toe of base to substrate and ensure edge of toe is straight.

.7 Install straight and level to variation of 1:1000.

.8 At corners, field cut and mitre base, bond with adhesive at seam.

.9 Install base to substrate as scheduled and/or detailed and in accordance with manufacturer's recommendations.

.10 Ensure that substrate is solid and free of voids, gaps, or other defects which will preclude adequate adhesion, or will ghost or telegraph through finished base installation.

.11 Scribe and fit to door frames and other obstructions.

.12 Joints shall be tightly fitted, straight and vertical, and not less than 610 mm (24") from corners.

.13 Provide joints in base over substrate control joints.

.14 Include cutting off top edge of base where required to suit recess height at base of lockers, cabinet work, and as required.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning and Waste Management.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning and Waste Management.

.3 Manage and dispose of demolition and construction waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

3.4 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by Work of this Section.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This document specifies the installation of a synthetic floor system comprised of a base mat laid in adhesive and a polyurethane surface that is field applied in a seamless monolithic application.

1.2 RELATED REQUIREMENTS

.1 Section 03 35 00 - Concrete Finishing.

.2 Section 07 92 00 - Joint Sealants.

.3 Section 09 05 13 - Mechanical Preparation of Flooring Substrates.

.4 Section 09 05 23 - Common Work Results for Flooring Preparation.

1.3 REFERENCES

.1 ASTM International (ASTM)

.1 ASTM F710-22, Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

.2 Underwriters Laboratories of Canada (ULC):

.1 ULC 102.2-18, Method of Test for Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies (ULC S102.2).

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit one copy of product data for each type of product specified.

.2 Submit three (3) copies of Recommendations for correct preparation, finishing and testing of concrete subfloor surfaces to receive to receive granulated base mat and polyurethane floor system.

.3 Provide samples:

.1 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long base, nosing, feature strips, treads, edge strips.

.4 Closeout Submittals:

.1 Provide manufacturer’s printed recommendations for general maintenance, including cleaning instructions and guidelines for use of waxes and other protective coatings and appearance enhancers in accordance with Section 01 78 10 - Closeout Submittals and Requirements.

.2 Submit warranties.

1.5 EXTRA MATERIALS

.1 Provide extra materials of resilient sheet flooring and adhesives in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide 2% of each colour, pattern and type flooring material required for project for maintenance use.

.3 Extra materials one piece and from same production run as installed materials.

.4 Clearly identify each roll of sheet flooring and each container of adhesive.

.5 Deliver to Consultant upon completion of the work of this section.

.6 Store where directed by Consultant.

1.6 QUALITY ASSURANCE

.1 Qualifications: Provide work of this section, executed by competent installers with minimum 5 years experience in application of Products, systems and assemblies specified and with approval and training of Product manufacturers.

.2 Conduct a pre-installation meeting in accordance with Section 01 31 00 - Project Managing and Coordination.

.3 Quality control shall be in accordance with Section 01 45 00 Quality Control.

.1 Manufacturer shall provide field review in accordance with Section 01 45 00 - Quality Control.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Product Requirements.

.2 Material shall not be delivered or installed until all masonry, painting, plastering, and tile work are completed and all overhead mechanical work, lighting, are installed. Room temperature shall be at least 55 degrees Fahrenheit, and ambient relative humidity shall be 75% or less. In-slab relative humidity shall be 80% or less.

.3 Area where materials are to be stored should be maintained at least 55 degrees Fahrenheit and under 75% relative humidity by the Contractor.

1.8 JOB CONDITIONS

.1 Do not install floor system until concrete has been cured 60 days.

.2 Ensure that spark-proof electrical equipment is provided, and smoking is prohibited, in areas where flammable adhesives are used. Store materials to prevent spontaneous combustion.

.3 Concrete floors are to be dry, and exhibit negative alkalinity, carbonization, or dusting. Maximum percentage of moisture acceptable is 3 lb/1000 ft^2 in a 24 hour period, unless otherwise specified by manufacturer's printed literature. Surface of concrete slabs shall be maximum pH of 9.

.4 Testing requirements:

.1 Test for moisture vapour transmission in accordance with ASTM F1869.

.2 Test for surface pH.

.3 For each test type: Perform 3 tests for flooring applications less than 2000 square feet in area, and 1 test per additional 186 m^2 (1000 square feet).

.4 Testing shall be by independent inspection and testing company and in accordance with Section 01400.

.5 Concrete shall be prepared utilizing ASTM F710, Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.

.6 Concrete shall be smooth to a tolerance of 3 mm in 3000 mm (1/8" in 10') radius.

.7 In areas that are exposed to intense or direct sunlight, Products shall be protected during the conditioning, installation, and adhesive curing periods, by covering the light source.

.8 Contractor is responsible to ensure slab is clean and free of all dirt and debris prior to floor installation beginning.

.9 Permanent heat, light and ventilation shall be installed and operating during and after installation.

.10 Install materials of this section only when surfaces and air temperatures have been maintained between 18 °C and 32 °C for 48 hours preceding installation, and will be so maintained during installation and for 48 hours thereafter. Maintain a minimum temperature of 13 °C after above period.

.11 After floors are finished, area to be kept locked by Contractor to allow curing time for the paint and finish system(s). No other trades are to be allowed on floor until it is accepted in writing by Owner or Owner's authorized agent.

1.9 WARRANTIES

.1 Provide Manufacturer's Warranty for product to be free from manufacturer's defects for a period of 5 years from date of Substantial Performance.

.2 Contractor agrees to correct any deficiencies of labour or material found in the work performed for a period of 5 years from date of Substantial Performance.

Part 2 Products

2.1 MATERIALS

.1 Standard of Acceptance: refer to **09 60 FINISH SCHEDULE**.

.1 Total thickness: 10.0 mm.

.2 Edge: Square.

.3 Colours: selected by Consultant from manufacturer's full range.

.4 Surface hardness, to ISO 48-4: 80 Shore A.

.5 Residual indentation (after static loading); to EN ISO 24343-1: 0.18 mm.

.6 Flexibility, to EN ISO 24344 method A: no fissuring.

.7 Dimensional stability, to EN ISO 23999: ≤ .04%.

.8 Abrasion resistance, to ISO 4649 method A vertical load 5 N: 90 mm^3.

.9 Colour fastness to artificial light, ISO 105-B02 method 3: blue scale ≥ 6; grey scale ≥ 3.

.10 Effect of castor chair, to EN ISO 4918: no surface change except dullness; suitable with wheels type W.

.11 Dynamic coefficient of friction, to EN 13893: ≥ 0.3.

.12 Installation: Glue-down.

2.2 INSTALLATION MATERIALS

.1 Trowelable Levelling and Patching Compounds: Latex-modified, Portland-cement-based or blended hydraulic-cement-based formulation.

.2 Adhesives: As recommended by manufacturer to meet site conditions.

2.3 ACCESSORIES

.1 Sub-floor filler and leveller: 2-part latex-type filler requiring no water as recommended by flooring manufacturer for use with their product.

.2 Primers and adhesives: of types recommended by resilient flooring manufacturer for specific material on applicable substrate, above, on or below grade.

.3 Adhesive: maximum VOC limit 50 g/L to SCAQMD 1168.

.4 Transition joint strip with integral perforated anchoring leg for setting the strip into the setting materials:

.1 Standard of Acceptance:

.1 Schlüter®-Vinpro-U; stainless steel.

.2 Location: at transition between tile flooring and resilient sports flooring.

2.4 TEMPORARY FLOOR PROTECTION

.1 Standard of Acceptance:

.1 Ram Board Plus®, by Ram Board, Inc., plus manufacturer’s recommended accessories.

.2 Equivalent temporary protection mat.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's printed installation instructions, data sheets, specifications, and standard and job-specific details.

3.2 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.

3.3 PREPARATION

.1 Prepare substrates according to manufacturer’s printed instructions as required to meet warranty requirements.

Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

.2 Remove substrate paint, coatings and other substances that are incompatible with adhesives or contain soap, wax, oil, solvents, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

.3 Mechanically remove contamination on the substrate that may cause damage to the resilient athletic flooring material. Permanent and non-permanent markers, pens, crayons, paint, etc., shall not be used to write on the back of the flooring material or used to mark the substrate as they could bleed through and stain the flooring material.

.4 Prepare Substrates according to ASTM F710 including the following:

.1 Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

.2 Perform anhydrous calcium chloride test, ASTM F1869. Results shall not exceed 5 lbs. Moisture Vapor Emission Rate per 1,000 sq. ft. in 24-hours.

- or -

.1 Perform relative humidity test using in situ probes, ASTM F2170. Shall not exceed 80%.

.3 A pH test for alkalinity shall be conducted. Results shall range between 7 and 9. If the test results are not within the acceptable range of 7 to 9, the installation shall not proceed until the problem has been corrected.

.4 Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.

.5 Fill cracks, holes, depressions and irregularities in the substrate with good quality Portland cement-based underlayment leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

.6 Floor covering shall not be installed over expansion joints.

.7 Do not install resilient products until they are same temperature as the space where they are to be installed.

.8 Move resilient products and installation materials into spaces where they will be installed at least 48-hours in advance of installation.

.9 Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.4 RESILIENT ATHLETIC FLOORING INSTALLATION

.1 Comply with manufacturer's written instructions for installing resilient athletic flooring.

.2 Resilient Athletic Rubber Mat Flooring:

.1 Install with manufacturer’s adhesive specified for the site conditions and follow adhesive label for proper use.

.2 Roll the flooring in both directions using a 100 pound three-section roller.

3.5 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 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.

3.6 CLEANING

.1 Comply with manufacturer's written instructions for cleaning and protection of resilient products.

.2 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning and Waste Management. Leave Work area clean at end of each day.

.1 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.

.2 Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

.1 No traffic for 24-hours after installation.

.2 No heavy traffic, rolling loads, or furniture placement for 72-hours after installation.

.3 Wait 72-hours after installation before performing initial cleaning

.3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning and Waste Management. Perform cleaning after installation to remove construction and accumulated environmental dirt.

.4 Manage and dispose of demolition and construction waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

3.7 PROTECTION

.1 Contractor responsible for maintenance program until final completion.

.2 Protect installed products and components from damage during construction.

.3 Protect floors until Substantial Performance by covering with breathable protection mat.

.4 Repair damage to adjacent materials caused by Work of this Section.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 The work of this section includes removal and replacement of existing terrazzo flooring:

.1 Cut out damaged area, with square-cut corners and 90-degree angles, and replace with a Portland Cement Terrazzo mix that matches the existing as closely as possible, grind, polish, and seal to match adjacent terrazzo. Replacement terrazzo to match adjacent terrazzo flooring in sheen, colour and aggregate sizes as closely as possible.

1.2 REFERENCE STANDARDS

.1 Terrazzo, Tile and Marble Association of Canada (TTMAC)

.1 TTMAC Hard Surface Maintenance Guide.

.2 TTMAC 09 66 00 Terrazzo Installation Manual.

.2 CSA Group

.1 CSA A23.1:24/A23.2:24, Concrete materials and methods of concrete construction/Test Methods and Standard Practices for concrete.

.2 CSA A3000:23, Cementitious materials compendium.

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.4 South Coast Air Quality Management District (SCAQMD)

.1 SCAQMD Rule 1168-22, Adhesive and Sealant Applications.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Construction Meetings: Meet on site at the location of required demolitions and repairs in accordance with Section 01 31 00 - Project Managing and Coordination before ordering materials to review existing conditions affecting work of this Section, determine removal, patching and repair procedures and protection of existing interior components and installed new Work from damage during construction, attended by the following:

.1 Consultant.

.2 Contractor.

.3 Related trade(s).

.2 Coordinate work of this section with work of related trades.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature, and technical datasheets for cleaning and sealing products.

.2 Submit 4 copies of TTMAC Hard Surface Maintenance Guide for inclusion in operations and maintenance manual prepared and submitted in Section 01 78 10 - Closeout Submittals and Requirements.

.3 Provide two copies of WHMIS MSDS in accordance with Section 01 35 23 - Health and Safety. WHMIS MSDS acceptable to Labour Canada and Health and Welfare Canada for concrete floor treatment materials. Indicate VOC content in g/L.

1.5 CLOSEOUT SUBMITTALS

.1 Provide maintenance data as set out in TTMAC publications for terrazzo work for incorporation into manual specified in Section 01 78 40 - Maintenance Requirements.

1.6 QUALITY ASSURANCE

.1 The restoration of existing terrazzo floors shall be performed by a member in good standing with Terrazzo, Tile and Marble Association of Canada, providing materials meeting the minimum standards of TTMAC.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions and Section 01 61 00 - Product Requirements.

.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 and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse and return by manufacturer of crates, packaging materials, padding, and/or pallets in accordance with Section 01 74 00-Cleaning and Waste Management.

1.8 SITE CONDITIONS

.1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of materials.

.2 Ventilation:

.1 Provide continuously during and after installation. Run system 24-hours per day during installation; provide continuous ventilation for 7-days after completion of work of this Section.

.2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.

.3 Ambient Conditions:

.1 Maintain air temperature and structural base temperature at terrazzo installation area above 12 degrees C for 24 hours prior to, during, and for 24 hours following installation.

Part 2 Products

2.1 MATERIALS

.1 Provide all materials and labour as required to perform terrazzo floor restorations that provide a flooring equal or better in quality to the existing original terrazzo flooring.

2.2 REMOVAL AND REPLACEMENT

.1 The scope of removal and replacement includes the application/patching of the terrazzo floor where existing flooring/concrete is to be removed. Refer to Drawings for locations.

.2 Cement:

- .1 To CSA A3000.
- .2 Type 10, grey for underbed.
- .3 For topping, colour to match existing.
- .4 6 % air-entrainment.

.3 Sand, fine and coarse aggregates:

- .1 To CSA A23.1/A23.2.
- .2 Clean, washed, locally available.
- .3 Oval aggregate.

.4 Water: potable.

.5 Marble chips:

- .1 Graded in accordance with TTMAC standard.
- .2 Abrasion resistance to ASTM C241/C241M.
- .3 No deleterious or foreign matter.
- .4 To closely match existing terrazzo flooring.

.6 Pigments:

- .1 Compatible with Portland cement.
- .2 Alkali-resistant, colour-stable.
- .3 Lime-proof mineral.

.7 Epoxy bonding agent (for epoxy bonded systems): two components, epoxy resin and epoxy hardener conforming to following performance properties after cure schedule of 28 days at 25 degrees C.

- .1 Viscosity: mixed viscosity not less than 0.04 Pa.s or more than 0.5 Pa.s.
- .2 Gel time: not less than half hour at 20 degrees C.
- .3 Flexibility: Gardiner flexibility test, passes bending over 12 mm mandrel, without cracking.
- .4 Elongation: ASTM D2370, minimum 10%.
- .5 Bond strength: 2 MPa, with 100% concrete failure at minimum coverage, test concrete specimen minimum compressive strength 20 MPa.
- .6 Coverage: 0.3 L/m 2 mm.

.8 Divider strips: metal to match existing.

.9 Accessories: separator strips, purpose made and of same material to match divider strips.

.10 Reinforcing steel: billet steel, grade plain bars.

.11 Welded steel wire fabric: to 50 x 50 x 1.6 x 1.6 mm wire, galvanized, in flat sheets only.

.12 Slip sheet: polyethylene sheet to CAN/CGSB-51.34, Type 2, 0.05 mm thick.

.13 Curing compound: to manufacturer's standard.

.14 Cleaning compound: to TTMAC standards.

.15 Sealers:

.1 To CAN/CGSB-25.20.

.2 Sealers:

.1 Maximum VOC limit 50 g/L to SCAQMD Rule 1168.

.2 Sheen to match existing.

.3 Slip resistant.

.16 Finishing compound: to TTMAC standard 3001.

.1 Sealer.

2.3 MIXES

.1 Slurry coat: cement and water mixed to creamy paste.

.2 Underbed: 1 part cement to 4 parts sand by volume.

.3 Terrazzo topping: To closely match existing. Provide samples of chips of colours for Consultant's selection.

Part 3 Execution

3.1 REMOVAL AND REPLACEMENT

.1 Examination

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for Portland cement terrazzo flooring installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Consultant.

.2 Inform Consultant of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

.2 Inspection

.1 Examine area to receive terrazzo for defects in prior work which will affect proper execution of terrazzo work.

.2 Ensure tolerances of concrete slab work do not deviate from tolerance set for finished terrazzo floor.

.3 Terrazzo contractor to start work only when all defects are corrected.

.3 Installation

.1 Do terrazzo work in accordance with TTMAC 09 66 00 Terrazzo Installation Manual.

.2 Cut out damaged area, with square-cut corners and 90-degree angles and clean thoroughly.

.3 Install divider strips true and level to detailed pattern.

.4 Install covers at building expansion joints.

.5 Install control joints above control joints in subfloor.

.6 Produce terrazzo finished surfaces to match existing terrazzo flooring.

.1 Floors:

.1 Monolithic terrazzo: provide 16 mm minimum terrazzo topping bonded to concrete base slab.

.2 Bonded terrazzo: to TTMAC detail No. 1.

.3 Epoxy bonded terrazzo: provide 16 mm maximum topping and epoxy concrete adhesive underbed bonded to concrete base slab.

.2 Use biodegradable, phosphate-free terrazzo cleaners, with neutral ph.

.3 Apply non-discolouring sealer with neutral ph.

3.2 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 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.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning and Waste Management.

.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 and Waste Management.

.3 Waste Management: manage, divert from landfill, and dispose of waste in accordance with Section 01 74 11 - Cleaning and Waste Management.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 SCHEDULE

.1 Refer to Drawings for locations of replacement and new terrazzo flooring. Confirm locations with Consultant.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 22 00 - Concrete Unit Masonry.

.2 Section 07 92 00 - Joint Sealants.

1.2 REFERENCES

.1 ASTM International (ASTM)

.1 ASTM E84-24, Standard Test Method for Surface Burning Characteristics of Building Materials.

.2 ASTM E90-23, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

.3 ASTM G21-15(2021)e1, Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

.2 The International Accreditation Service (IAS)

.3 International Organization for Standardization (ISO)

.1 ISO 9001:2015, Quality management systems - Requirements.

.4 International Organization for Standardization (ISO) / International Electrotechnical Commission (IEC)

.1 ISO/IEC 17025:2017, General requirements for the competence of testing and calibration laboratories.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Action Submittals:

.1 Submit Product Data:

.1 Submit manufacturer’s printed product literature, specifications and data sheets.

.1 Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sound barrier wall end cap system.

.2 Submit Shop Drawings:

.1 Include typical dimensioned cross-section(s) at the location where drywall partition terminates at the perimeter curtain wall, indicating:

.1 Dimensions.

.2 Finish.

.3 Submit Samples for each exposed product and for each color and texture specified:

.1 Size: 6 inch (152 mm) sound barrier mullion trim cap sample and 2” x3-1/2” (51 mm x 89 mm) custom color paint sample.

.4 Submit closeout data:

.1 Submit maintenance instruction for incorporation into the Operation and Maintenance Manual.

.3 Informational Submittals:

.1 Qualification Data: for Installer.

.2 Product Test Reports: for each sound barrier mullion trim cap assembly, for ASTM E 90 tests performed by a qualified third party testing agency.

1.4 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Manufacturer of aluminum extrusions and anodizing shall be ISO-9001 certified.

.2 Installer Qualifications: An entity that employs installers and supervisors who are approved by manufacturer.

.3 Testing Agency Qualifications: ASTM E90 testing to be performed by laboratory accredited by IAS as complying with ISO/IEC Standard 17025

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Storage and Handling Requirements:

.1 Do not deliver sound barrier mullion trim caps until spaces to receive them are clean, dry, and ready for their installation.

.2 Store sound barrier mullion trim caps in original undamaged packaging inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.6 WARRANTY

.1 Manufacturer's Warranty: Manufacturer agrees to repair or replace sound barrier mullion trim caps that fail in materials or workmanship within specified warranty period.

.1 Warranty Period: Ten years limited warranty from date of Substantial Performance.

.2 Limited warranty does not cover adjacent products or improper installation.

Part 2 Products

2.1 MANUFACTURERS

.1 Products: Subject to compliance with requirements, provide the following:

.1 MULL-it-OVER Products; Sound barrier mullion trim cap systems.

.1 Tel: (616) 730-2162

.2 url: www.mullitoverproducts.com

.2 or approved equivalent.

2.2 SYSTEM DESCRIPTION

.1 General: Provide sound barrier mullion trim caps of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.

.2 Furnish units in lengths of sufficient additional length to allow for field trimming to required length to match variations in construction tolerances of adjacent systems.

2.3 PERFORMANCE REQUIREMENTS

.1 Sound Transmission:

.1 Double-Sided Installations: STC 55 or higher.

.2 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

.1 Mullion trim cap to be sized to accommodate thermal movement.

2.4 SOUND BARRIER TRIM CAP

.1 Sound Barrier Mullion Trim Cap:

.2 Products: MULL-it-OVER Products; Mullion Trim Cap.

.3 Profile: 55 Classic Mullion Trim Cap, and 60 Classic-1HR Mullion Trim Cap for rated partitions.

2.5 COMPONENTS

.1 Aluminum Extrusions:

.1 Thickness: 0.125 inches.

.2 Profile: As selected and approved by Architect to allow solid attachment and fastening to the partition wall framing.

.2 Sound Absorbing Foam:

.1 Resistant to smoke, flame, and microbial growth.

.2 Fire Rating: ASTM E84 Class 1.

.3 Fungi Resistance: Zero rating per ASTM G21.

.3 Compressible Foam: Between edge of extrusion and interior face of curtain wall glass.

.1 Thickness: Standard 1/2 inch (12.7 mm), ¾" (19.1 mm), 1 inch (25.4 mm) or 1-1/2" (38.1 mm) as required to accommodate mullion deflection.

.2 Color: Light gray.

.4 Fasteners:

.1 Self Tapping or appropriate threaded fastener.

.2 Compatible with all materials fasteners will contact with and not causing galvanic corrosion.

.5 Snap Cover: Snap-on fastener cover.

.6 Acoustical Sound Sealant: Acrylic latex based.

2.6 ACCESSORIES

.1 Provide all accessories as required for a complete installation.

.2 Provide necessary and related parts and tools to complete installation.

2.7 FABRICATION

.1 Extrusions and generic profiles to be shipped in custom lengths as required to meet project requirements or shipped in standard incremental foot lengths and cut to exact length on jobsite.

2.8 FINISHES

.1 Exposed surfaces of exposed aluminum extrusion: finish and colour as selected by Consultant.

Part 3 Execution

3.1 COMPLIANCE

.1 Comply with manufacturer's datasheets, published installation instructions, guide specifications and standard details.

3.2 EXAMINATION

.1 Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

.2 Examine walls and adjacent curtain wall for suitable conditions where sound barrier wall end cap will be installed.

.3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

.1 Measure and cut sound barrier wall end cap to proper lengths.

.2 Notch around horizontal mullions, sills, or other obstructions leaving appropriate gap for differential movement between the sound barrier wall end cap and the obstruction.

.3 Apply continuous bead of acoustical sealant to the unexposed side of extruded aluminum surface that will be in contact with the wall edge.

.4 Place sound barrier wall end cap on the vertical surface of the wall and loosely install fasteners in the top and bottom slotted holes of the wall end cap.

.5 Plumb the wall end cap leaving recommended gap spacing between the interior glass surface and the wall end cap. Foam gasket to be in contact with glass.

.6 Tighten top and bottom fasteners to secure end cap.

.7 Install additional fasteners at 12 inches on center, minimum.

.8 Install snap cover to conceal fasteners.

.9 Apply color matched sealant at joints of dissimilar materials as desired.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning and Waste Management. 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 00 - Cleaning and Waste Management. Perform cleaning after installation to remove construction and accumulated environmental dirt.

.3 Manage and dispose of demolition and construction waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by Work of this Section.

3.6 SCHEDULE

.1 Install where wall intersects with a vertical window mullion as indicated.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 22 00 - Concrete Masonry Units.

.2 Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCES

.1 American Society of Testing and Materials (ASTM):

.1 ASTM D16-24, Standard Terminology for Paint, Related Coatings, Materials, and Applications.

.2 ASTM E84-26, Standard Test Method for Surface Burning Characteristics of Building Materials.

.2 Department of Justice Canada (Jus):

.1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.

.3 Environmental Protection Agency (EPA):

.1 Method 24 – 2020, Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings.

.2 SW-846, Hazardous Waste Test Methods

.4 Green Seal:

.1 Standard GS-11, Paints, Coatings, Stains and Sealers, 2015.

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS):

.1 SDS - Safety Data Sheets.

.6 Master Painters Institute (MPI):

.1 MPI Architectural Painting Specifications Manual.

.7 South Coast Air Quality Management District (SCAQMD), California State:

.1 SCAQMD Rule 1113-16, Architectural Coatings.

.8 Society for Protective Coatings (SSPC):

.1 SSPC Painting Manual, Volume 2.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meeting:

.1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations in accordance with Construction Progress Schedule.

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Coordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

.2 Scheduling

.1 Submit work schedule for various stages of painting to Consultant for review. Submit schedule minimum of 48 hours in advance of proposed operations.

.2 Obtain written authorization from Consultant for changes in work schedule.

.3 Schedule painting operations to prevent disruption of and by other trades.

.4 Schedule painting operations to prevent disruption of occupants.

.3 Health and Safety:

.1 Do construction occupational health and safety in accordance with Health and Safety Requirements.

1.4 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit product data and instructions for each paint and coating product to be used.

.2 Submit product data for the use and application of paint thinner.

.3 Submit electronic copy of Workplace Hazardous Materials Information System WHMIS SDS - Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOCs during application and curing.

.2 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit full range colour sample chips to indicate where colour availability is restricted.

.2 Submit duplicate 200 x 300 mm sample panels of each paint with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:

.1 3 mm plate steel for finishes over metal surfaces.

.2 50 mm concrete block for finishes over concrete or concrete masonry surfaces.

.3 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.

.3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.

.3 Manufacturer's Instructions:

.1 Submit manufacturer's installation and application instructions.

.4 Submit quality assurance submittals in accordance with Section 01 45 00 - Quality Control.

.1 Test reports: submit certified test reports for paint from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.

.1 Lead, cadmium and chromium: presence of and amounts.

.2 Mercury: presence of and amounts.

.3 Organochlorines and PCBs: presence of and amounts.

.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.5 CLOSEOUT SUBMITTALS

.1 Submit maintenance data for incorporation into manual specified in Section 01 78 10 - Closeout Submittals and Requirements include following:

.2 Product name, type and use.

.3 Manufacturer's product number.

.4 Colour numbers.

.5 MPI Environmentally Friendly classification system rating.

1.6 QUALITY ASSURANCE

.1 Contractor: minimum of five years proven satisfactory experience. Provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.

.2 Journeymen: qualified journeymen who have "Tradesman Qualification Certificate of Proficiency" engaged in painting work.

.3 Apprentices: working under direct supervision of qualified trades person in accordance with trade regulations.

.4 Mock-Ups:

.1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.

.1 Provide 3 m x 3 m mock-up. Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements, with specified paint or coating showing selected colours, gloss/sheen, textures.

.2 Mock-up will be used to judge workmanship, substrate preparation, operation of equipment and material application and workmanship to MPI Architectural Painting Specification Manual standards.

.3 Locate where directed.

.4 Allow 24 hours for review of mock-up before proceeding with work.

.5 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Packing, Shipping, Handling and Unloading:

.1 Pack, ship, handle and unload materials in accordance with Section 01 61 00 - Product Requirements and manufacturer's written instructions.

.2 Acceptance at Site:

.1 Identify products and materials with labels indicating:

.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.

.3 Remove damaged, opened and rejected materials from site.

.4 Storage and Protection:

.1 Provide and maintain dry, temperature controlled, secure storage.

.2 Store materials and supplies away from heat generating devices.

.3 Store materials and equipment in well ventilated area with temperature range 7 degrees C to 30 degrees C.

.5 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.6 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to clean condition.

.7 Remove paint materials from storage only in quantities required for same day use.

.8 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 Ontario Building Code requirements.

.9 Separate waste materials for recycling in accordance with Section 01 74 00 - Cleaning and Waste Management.

.10 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal, regulations.

.11 Ensure emptied containers are sealed and stored safely.

.12 Unused paint materials must be disposed of at official hazardous material collections site as approved by Consultant.

.13 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are regarded as 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.

.14 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.15 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.16 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground follow these procedures:

.1 Retain cleaning water for water-based materials to allow sediments to be filtered out.

.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 approved legal manner in accordance with hazardous waste regulations.

.5 Empty paint cans are to be dry prior to disposal or recycling (where available).

.17 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

.18 Set aside and protect surplus and uncontaminated finish materials. Deliver to or arrange collection by individuals or organizations for verifiable re-use or re-manufacturing.

.19 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

1.8 SITE CONDITIONS

.1 Heating, Ventilation and Lighting:

.1 Ventilate enclosed spaces.

.2 Provide heating facilities to maintain ambient air and substrate temperatures above 10 degrees C for 24 hours before, during and after paint application until paint has cured sufficiently.

.3 Provide continuous ventilation for seven days after completion of application of paint.

.4 Coordinate use of existing ventilation system with Consultant and ensure its operation during and after application of paint as required.

.5 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.

.6 Provide minimum lighting level of 323 Lux on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Unless pre-approved written approval by Consultant and product manufacturer, perform no painting when:

.1 Ambient air and substrate temperatures are below 10 degrees C.

.2 Substrate temperature is above 32 degrees C unless paint is specifically formulated for application at high temperatures.

.3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.

.4 The relative humidity is over 85% or when the dew point is more than 3 degrees C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 degrees C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.

.5 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.

.2 Perform painting work when maximum moisture content of the substrate is below:

.1 12% for concrete and masonry (clay and concrete brick/block).

.2 15% for wood.

.3 12% for plaster and gypsum board.

.4 Allow new concrete and masonry to cure minimum of 28 days.

.3 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".

.4 Test concrete, masonry and plaster surfaces for alkalinity as required.

.3 Surface and Environmental Conditions:

.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.

.3 Apply paint when previous coat of paint is dry or adequately cured.

.4 Additional interior application requirements:

.1 Apply paint finishes when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.

.2 Apply paint in occupied facilities during silent hours only. Schedule operations to approval of Consultant such that painted surfaces will have dried and cured sufficiently before occupants are affected.

.5 Additional exterior application requirements:

.1 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.

.2 Do not apply paint when:

.1 Temperature is expected to drop below 10 degrees 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.

.3 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.

.4 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.

.5 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

Part 2 Products

2.1 MATERIALS

.1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.

.2 Provide paint materials for paint systems from single manufacturer.

.3 Only qualified products with E2 "Environmentally Friendly" ratings are acceptable for use on this project, Use E3 rated products where available.

.4 Conform to latest MPI requirements for all painting work including preparation and priming.

.5 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI - Architectural Painting Specification Manual "Approved Product" listing.

.6 Linseed oil, shellac, and turpentine: highest quality product from approved manufacturer listed in MPI Architectural Painting Specification Manual, compatible with other coating materials as required.

.7 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids:

.1 Use water-based coatings where available.

.2 Non-flammable.

.3 Manufactured without compounds which contribute to ozone depletion in the upper atmosphere.

.4 Manufactured without compounds which contribute to smog in the lower atmosphere.

.5 Do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.

.8 Formulate and manufacture water-borne surface coatings with no aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.

.9 Flash point: 61.0 degrees C or greater for water-borne surface coatings and recycled water-borne surface coatings.

.10 Ensure manufacture and process of both water-borne surface coatings and recycled water-borne surface coatings does not release:

.1 Matter in undiluted production plant effluent generating 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to natural watercourse or sewage treatment facility lacking secondary treatment.

.2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to natural watercourse or a sewage treatment facility lacking secondary treatment.

.11 Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes to meet minimum "Environmentally Friendly" E2 rating.

.12 Recycled water-borne surface coatings must not contain:

.1 Lead in excess of 600.0 ppm weight/weight total solids.

.2 Mercury in excess of 50.0 ppm weight/weight total product.

.3 Cadmium in excess of 1.0 ppm weight/weight total product.

.4 Hexavelant chromium in excess of 3.0 ppm weight/weight total product.

.5 Organochlorines or polychlorinated biphenyls (PCBS) in excess of 1.0 ppm weight/weight total product.

.13 Colours: as indicated on Drawings.

.14 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.2 MIXING AND TINTING

.1 Unless otherwise specified or pre-approved, all paint shall be ready-mixed and pre-tinted. Re-mix all paint in contained prior to and during application to ensure break-up of lumps, completed dispersion of settled pigment, and colour and gloss uniformity.

.2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.

.3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.

.4 Thin paint for spraying in accordance with paint manufacturer's instructions.

2.3 GLOSS/SHEEN RATINGS

.1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

	Gloss @ 60 degrees	Sheen @ 85 degrees
Gloss Level 1 - Matte Finish (flat)	Max. 5	Max. 10
Gloss Level 2 - Velvet-Like Finish	Max.10	10 to 35
Gloss Level 3 - Eggshell Finish	10 to 25	10 to 35
Gloss Level 4 - Satin-Like Finish	20 to 35	min. 35

	Gloss @ 60 degrees	Sheen @ 85 degrees
Gloss Level 5 - Traditional Semi-Gloss Finish	35 to 70	
Gloss Level 6 - Traditional Gloss	70 to 85	
Gloss Level 7 - High Gloss Finish	More than 85	

.2 Gloss level ratings of painted surfaces as indicated on **09 60 00 FINISH SCHEDULE**.

2.4 EXTERIOR SURFACES

.1 Unless otherwise specified, all exterior painting work to be in accordance with MPI Premium Grade finish requirements.

.2 Concrete Vertical Surfaces: (including horizontal soffits):

.1 EXT 3.1A – Latex, gloss level as directed.

2.5 INTERIOR SURFACES

.1 Unless otherwise specified, all interior painting work to be in accordance with MPI Premium Grade finish requirements.

.2 Concrete Vertical Surfaces: including ceilings.

.1 INT 3.1C - High performance architectural latex; gloss level as directed by Consultant.

.3 Galvanized metal: doors, frames, railings, misc. steel, pipes, overhead decking, and ducts:

.1 INT 5.3M - High performance architectural latex gloss level as directed.

.4 Plaster and gypsum board: gypsum wallboard, drywall, "sheet rock" type material, and textured finishes:

.1 INT 9.2B - High performance architectural latex; finish as selected by Consultant.

.5 Acoustic panels and tiles (touch up paint):

.1 INT 9.3A - Latex flat finish.

.6 Bituminous coated surfaces: cast iron pipe, concrete, etc.:

.1 INT 10.2A - Latex semi-gloss level finish.

2.6 SOURCE QUALITY CONTROL

.1 Perform following tests on each batch of consolidated post-consumer material before surface coating is reformulated and canned. Testing by laboratory or facility which has been accredited by Standards Council of Canada.

.1 Lead, cadmium and chromium are to be determined using ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) technique no. 6010 as defined in EPA SW-846.

.2 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.

.3 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.

Part 3 Execution

3.1 GENERAL

.1 Perform preparation and operations for [interior and exterior painting in accordance with MPI - Architectural Painting Specifications Manual except where specified otherwise.

.2 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

.3 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.2 EXAMINATION

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Consultant damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

.2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

.3 Maximum moisture content as follows:

.1 Stucco, plaster and gypsum board: 12%.

.2 Concrete: 12%.

.3 Wood: 15%.

.4 Clay and Concrete Block/Brick: 12%

3.3 PREPARATION

.1 Protection:

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Consultant.

.2 Protect items that are permanently attached such as Fire Labels on doors and frames.

.3 Protect factory finished products and equipment.

.4 Protect building occupants in and about the building.

.2 Surface Preparation:

.1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.

.2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

.3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Consultant.

.3 Clean and prepare surfaces in accordance with MPI - Architectural Painting Specification Manual requirements and coating manufacturer's recommendations. Refer to MPI Manual in regard to specific requirements and as follows:

.1 Remove dust, dirt, and other 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 other surface contaminants.

.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.

.4 Allow surfaces to drain completely and allow to dry thoroughly.

.5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.

.6 Use trigger operated spray nozzles for water hoses.

.7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.5 Where possible, prime non-exposed surfaces of wood surfaces before installation. Use same primers as specified for exposed surfaces.

.1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.

.2 Apply wood filler to nail holes and cracks.

.3 Tint filler to match stains for stained woodwork.

.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.

.7 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes, blowing with clean dry compressed air, or vacuum cleaning.

.8 Touch up of shop primers with primer as specified.

.9 Do not apply paint until prepared surfaces have been accepted by Consultant.

3.4 APPLICATION

.1 Method of application to be as approved by Consultant. Apply paint by brush, roller, air sprayer or airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.

.2 Brush and Roller Application:

.1 Apply paint in uniform layer using brush and/or roller type 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 free of roller tracking and heavy stipple.

.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 atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.

.2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.

.3 Apply paint in uniform layer, with overlapping at edges of spray pattern. Back roll first coat application.

.4 Brush out immediately all runs and sags.

.5 Use brushes and rollers to work paint into cracks, crevices and places which are not adequately painted by spray.

.4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.

.5 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.7 Sand and dust between coats to remove visible defects.

.8 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.5 REPAINTING OF EXISTING FINISHES

.1 Refer to MPI Maintenance Repainting Manual for repainting of existing finishes.

.2 Use finish coat of respective new surface paint system for minor repair of existing finishes. Use system primer where existing finishes are damaged down to bare surface.

3.6 MECHANICAL/ELECTRICAL EQUIPMENT

.1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as indicated.

.2 Boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.

.3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.

.4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

.5 Do not paint over nameplates.

.6 Keep sprinkler heads free of paint.

.7 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.

.8 Paint fire protection piping red except where noted on Drawings.

.9 Paint disconnect switches for fire alarm system and exit light systems in red enamel.

.10 Paint natural gas piping yellow except where noted on Drawings.

3.7 SITE TOLERANCES

.1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.

.2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.

.3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

3.8 FIELD QUALITY CONTROL

.1 Where "special" painting, coating or decorating system applications (i.e. elastomeric coatings) or non-MPI listed products or systems are to be used, paint or coating manufacturer shall provide as part of this work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to Consultant.

.2 Advise Consultant when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.3 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Consultant.

3.9 CLEANING

.1 Proceed in accordance with Section 01 74 00 - Cleaning and Waste Management.

.2 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

3.10 SCHEDULE

.1 Refer to 0**9 60 FINISH SCHEDULE**.

.2 Fill in schedule and submit to Consultant for review.

MASTER PAINTERS INSTITUTE PAINT SCHEDULE					
Company:			Phone:		
Contact:			Facsimile:		
			Email:		
Specified Quality:					
Master Painters Institute			**2021 Approved Paint Products**		
Substrate	MPI#	MPI Name	Manufacturer	Product	Code

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 22 00 - Concrete Unit Masonry.

.2 Section 05 50 00 - Metal Fabrications.

.3 Section 09 30 13 - Tiling.

.4 Refer to Drawings.

1.2 REFERENCES

.1 ASTM International (ASTM)

.1 ASTM A240/A240M-25a, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

.2 ASTM A666/A666M-24, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

.3 ASTM A743/A743M-21, Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application.

.4 ASTM B86-23, Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings.

.5 ASTM B221-21, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

.6 ASTM E84-25, Standard Test Method for Surface Burning Characteristics of Building Materials.

.2 CSA Group (CSA)

.1 CSA / ASC B651:23, Accessible Design for the Built Environment, Includes Errata (2023) and Errata (2025).

1.3 PRE-INSTALLATION MEETINGS

.1 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section and on-site installation, with Construction Manager and Trade contractor's representative and Consultant in accordance with Section 01 32 18 – Construction Schedule to:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Coordination with other building trades.

.4 Review manufacturer's installation instructions.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures:

.1 Submit manufacturer's printed product literature for partitions and components, specifications and datasheets, and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures:

.1 Indicate fabrication details, plans, elevations, hardware, installation details, and mounting details. Indicate locations where blocking is required.

.3 Submit samples in accordance with Section 01 33 00 - Submittal Procedures:

.1 Submit samples of manufacture's full range of colours for Consultant's initial selection.

.2 Submit duplicate 100 x 100 mm samples showing finish on both sides, two finished edges and core construction.

.3 Submit duplicate representative samples of each hardware item, including brackets, fasteners, coat hooks and trim.

.4 Manufacturer's Instructions:

.1 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

.5 Submit test reports and certificates specified.

.6 Manufacturer's field reports: submit manufacturer's written reports within 3 days of review, verifying compliance of Work.

.7 Submit closeout data in accordance with Section 01 78 10 - Closeout Submittals and Requirements:

.1 Provide manufacturer's printed recommendations for general maintenance, including cleaning instructions and recommended spare parts list.

.2 Submit warranty.

1.5 QUALITY ASSURANCE

.1 Manufacturer Qualifications manufacturer with minimum 5 years' experience in the manufacture of compartments. Manufacturers seeking approval must submit the following in accordance with Section 01 33 00 - Submittal Procedures:

.1 Product data, including test data from qualified independent testing agency indicating compliance with requirements.

.2 Samples of each component of product specified.

.3 List of successful installations of similar products available for evaluation by Consultant.

.2 Installers Qualifications: Experienced Installer regularly engaged in installation of compartments for minimum 3 years.

.3 Source Limitations: Obtain compartment components and accessories from single manufacturer.

.4 Accessibility Requirements: Comply with requirements of CSA / ASC B651, and with requirements of authorities having jurisdiction

.5 Surface-Burning Characteristics: As determined by testing identical products according to ASTM E84 by qualified testing agency. Identify products with appropriate markings of applicable testing agency.

.1 Flame-Spread Index: 30.

.2 Smoke-Developed Index: 110.

.6 Test Reports: certified test reports showing compliance with specified requirements.

.7 Certificates: product certificates signed by manufacturer certifying materials comply with requirements.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Do not deliver compartments to site until building is enclosed and HVAC systems are in operation.

.2 Deliver, handle, and store units in accordance with manufacturer’s instructions.

.3 Store units on raised wood pallets protected from the elements and corrosive materials.

.4 Do not remove from crates or other protective covering until ready for installation.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

1.8 WARRANTY

.1 Manufacturer's Warranty: Provide manufacturer's standard warranty in which manufacturer agrees to repair or replace products that fail in materials or workmanship during the following period after substantial completion:

.2 Special Manufacturer’s Warranty: Provide manufacturer's standard form in which manufacturer warrants against defects in materials and workmanship during the following period:

.1 Phenolic-Core Partitions: 25 years.

Part 2 Products

2.1 PERFORMANCE REQUIREMENTS

.1 Surface-Burning Characteristics: Comply with ASTM E84; Class A, tested by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

.1 Flame-Spread Index: 25 or less.

.2 Smoke-Developed Index: 450 or less.

.2 Accessibility Requirements: Comply with the OBC requirements and applicable provisions in the CSA /ASC B651, Accessible Design for the Built Environment, for change room compartments designated as accessible.

2.2 MATERIALS

.1 Phenolic Core: Compressed cellulose impregnated with phenolic resins. Provide smooth material, without creases or ripples.

.2 Zinc Aluminum Magnesium and Copper Alloy (Zamac): to ASTM B86.

.3 Stainless Steel Sheet: to ASTM A240 or A666, 300 series.

.4 Stainless Steel Castings: to ASTM A743/A743M.

.5 Aluminum: to ASTM B221.

2.3 PHENOLIC CORE CHANGE ROOM COMPARTMENTS

.1 Panel Construction: solid phenolic core, composed of compressed cellulose fibers impregnated with resins. The surface laminate shall be fused to the resin-impregnated core. All edges shall be machined and finished smooth with a 45-degree beveled edge. Material shall not delaminate even under extreme conditions. Materials shall be non-absorbent, impact and graffiti resistant. Materials shall be impervious to steam, soaps and detergents and will not mildew.

.1 Provide exposed surfaces free of pitting, visible seams and fabrication marks, stains, telegraphing of core material, or other imperfections.

.2 Core Material: Manufacturer's standard solid resin core of thickness required to provide finished thickness for doors, panels and pilasters.

.2 Privacy Style Partitions: No sightlines with gap-free interlocking doors and pilasters routed 0.300 inches (7.6 mm) from the edge to allow for 0.175 inch (4.4 mm) overlap to prevent line-of-sight into the changeroom compartment. Privacy strips fastened or adhered onto the partition material are not acceptable.

.3 Mounting Configuration:

.1 Pedestal-mounted, overhead-braced with anodized aluminum headrails, 1 inch (25 mm) by 1.75 inch (44 mm), #4 brushed finish, extruded aluminum with anti-grip design. Minimum 0.060-inch (1.5 mm) wall thickness. Securely attach to wall and pilasters with manufacturer’s fittings to make a rigid installation.

.1 Pilaster Maximum Height: 92 inches (2337 cm).

.4 Finished Thickness:

.1 Pilasters and Doors: 3/4 inch (19 mm).

.2 Panels and Screens: 1/2 inch (13 mm).

.5 Pilasters: pedestal-anchored pilasters furnished with threaded rods.

.1 Leveling Devices: 7 gauge, 3/16 inches (5 mm) thick, corrosion-resistant, chromate-treated, double zinc-plated steel angle leveling bar bolted to pilaster; furnished with 3/8 inch (10 mm) diameter threaded rods, hex nuts, lock washers, flat washers, spacer sleeves, expansion anchors, and shoe retainers.

.2 Pedestals: 4” (102 mm) high, Type 304 stainless steel, # 4 brushed finish.

.6 Wall Posts: Pre-drilled for door hardware, 18-8, Type 304, 16 gauge (1.6 mm) stainless steel with satin finish; 1 inch (25 mm) x 1-1/2 inches (38 mm) x 58 inches high (1473 mm).

.7 Anchors: Expansion shields and threaded rods at floor connections as applicable.

.8 Hardware:

.1 Compliance: Operating force of less than 5 lb (2.25 kg).

.2 Emergency Access: Hinges, latch allow door to be lifted over keeper from outside compartment on inswing doors.

.3 Materials: 18-8, Type 304, heavy-gauge stainless steel with # 4 brushed finish.

.4 Combined Coat hooks and Doorstops: Prevents inswinging doors from swinging out beyond pilaster; on outswing doors, doorstop prevents door from swinging in beyond pilaster. Projecting no more than 1-1/8 inch (29 mm) from face of door.

.1 Inswing Doors: Stamped stainless steel door hook, Grade 304 stainless steel, #4 brushed finish, combined coat hook and bumper.

.2 Outswing Doors: Stainless steel flat coat hook, Grade 304 stainless steel, #4 brushed finish.

.5 Fastening: Hardware is secured to door and pilaster with pin-in-head Torx stainless steel machine screws. Hinges, latch and optional door stops secured to door with pin-in-head Torx stainless steel machine screws into factory-installed, threaded brass inserts. Fasteners for hinges, latch and optional door stops secured directly into core not acceptable.

.1 Threaded Brass Inserts: Factory-installed; withstand direct pull force exceeding 1500 lb (680 kg) per insert.

.6 Clothes Hooks: Projecting no more than 1-1/8 inch (29 mm) from face of door.

.7 Door Pulls: Manufacturer's standard brushed nickel zamac pulls with antimicrobial coating at outswinging doors that comply with accessibility requirements.

.8 Indicator Door Latch: Manufacturer’s standard brushed nickel zamac indicator latch assembly with antimicrobial coating showing red in the window when in locked position and green when unlocked.

.9 Hinge Type:

.1 Full-Height Continuous Institutional Hinge.

.1 Hinges: stainless steel continuous piano hinges.

.10 Mounting Brackets:

.1 Full-Height.

.1 Mounting Brackets: 18 gauge (1.2 mm) stainless steel and extend full height of panel.

.2 U-Channels: Secure panels to pilasters.

.3 Angle Brackets: Secure pilasters-to-walls and panels to walls

.9 Standard of Acceptance:

.1 Refer to **09 60 00 FINISH SCHEDULE**.

.1 Edges: Consultant to select from manufacturer’s full range.

.2 Colour: Consultant to select from manufacturer’s full range.

.3 Door/Panel Height: 92” (2337 mm).

.4 Floor Clearance: 9 inches (228.6 mm) A.F.F.

2.4 FABRICATION

.1 General: Fabricate change room compartments to sizes indicated on Drawings. Coordinate requirements and provide for attachment of accessories.

.2 Doors: Pre-drill holes for latches and hinges. Factory install rubber bumpers secured with press fit and adhesive.

.3 Pilasters: Pre-drill holes for hinges.

.4 Anchors: Manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters and walls to suit floor and wall conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written installation instructions and datasheets.

3.2 EXAMINATION

.1 Examine work area to verify that measurements, substrates, supports, and environmental conditions are in accordance with manufacturer's requirements to allow installation.

.2 Proceed with installation once conditions meet manufacturer's requirements.

3.3 PREPARATION

.1 Ensure supplementary anchorage, if required, is in place.

.2 Do work in accordance with CSA / ASC B651.

3.4 INSTALLATION – 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 Comply with requirements of the Ontario Building Code 2020.

.3 Install partitions/screens in spaces with operating, temperature controlled HVAC systems. Shield partitions/screens from direct sunlight.

.4 Install partitions after other finishing operations, including painting, have been completed.

.5 Compartment installation:

.1 Verify blocking and supports in walls and ceilings has been installed properly at points of attachment.

.2 Verify location does not interfere with door swings or use of fixtures.

.3 Pedestal Mount Compartments: Secure pedestals to floor and level, plumb, and tighten. Secure continuous head rail to each pilaster. Adjust so tops of doors are parallel with overhead brace when doors are in closed position.

.4 Use fasteners and anchors suitable for substrate and project conditions

.5 Install units rigid, straight, plumb, and level.

.6 Conceal evidence of drilling, cutting, and fitting to room finish.

.7 Test for proper operation.

3.5 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 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.

3.6 ADJUSTING, CLEANING AND PROTECTION

.1 Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 15 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

.2 Touch-up, repair or replace damaged products.

.1 Proceed in accordance with Section 01 74 00 - Cleaning and Waste Management.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.3 Clean partition and screen surfaces with materials and cleansers in accordance with manufacturer's recommendations.

3.7 SCHEDULE

.1 Install as indicated.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 07 92 00 - Joint Sealants.

.2 Section 09 21 16 - Gypsum Board Assemblies.

.3 Division 23 - Mechanical.

.4 Division 26 - Electrical.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Division 01.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications, and data sheet for each product specified.

.3 Shop Drawings:

.1 Indicate, by large scale details, materials, finishes, dimensions, anchorage and assembly.

.4 Samples:

.1 Submit duplicate 300 mm long samples of profiles and colours.

.2 Prepare approx. 3 m. sample of feature wall protection and corner protection.

.5 Submit closeout data in accordance with Division 01:

.1 Provide manufacturer’s printed recommendations for general maintenance and cleaning of each sanitary wall panels for incorporation into operations and maintenance manuals.

1.3 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Regulatory Requirements:

.1 Surface burning characteristics of materials: listed and labelled by an organization accredited by Standards Council of Canada.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Division 01 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 and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect specified materials from nicks, scratches, and blemishes, and other types of damage that may impair proper hanging of materials, functioning, appearance or durability.

.3 Replace defective or damaged materials with new.

1.5 SITE CONDITIONS

.1 Temperature: maintain air temperature and structural base temperature at wall covering installation area above 20 degrees C and relative humidity below 40% for 72-hours before, during and 72-hours after installation.

1.6 WARRANTY

.1 Contractor agrees to correct any deficiencies found in the Work performed for a period of 2-years from date of Substantial Performance.

.2 Submit manufacturer’s warranty made out in name of Owner.

Part 2 Products

2.1 PVC PANELS

.1 Ceiling Covering: PVC panel, as follows:

.1 Thickness: 2.5 mm.

.2 Colour: as selected by Consultant from manufacturer’s full range.

.3 Standard of Acceptance:

.1 Altro Whiterock PVC Wall Cladding.

2.2 ACCESSORIES

.1 Adhesives and sealants: as recommended by manufacturer.

.2 End Caps and Corners: Prefabricated, injection moulded plastic; colour matching cover; field adjustable for close alignment with snap on cover.

.3 Fasteners: Aluminum, nonmagnetic stainless steel, or other non-corrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security type fasteners where exposed to view.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's printed installation instructions, data sheets, and standard details.

3.2 INSTALLATION

.1 Install sanitary wall panels level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

.2 Install panels at Shower Room ceilings.

.3 Provide splices, mounting hardware, anchors, and other accessories required for a complete installation, and as follows:

.1 Provide anchoring devices to withstand imposed loads.

.2 Splice aluminum retainers and plastic covers at different locations along the run where splices occur in horizontal runs of more than 6100 mm; no closer than 305mm apart.

.3 Adjust end and top caps as required to form tight seams.

.4 Provide top and edge mouldings, corners, and divider bars as required for a complete installation of impact resistant ceiling coverings.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Division 01. Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Division 01. Perform cleaning after installation to remove construction and accumulated environmental dirt.

.3 Manage and dispose of demolition and construction waste materials in accordance with local requirements.

3.4 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by Work of this Section.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 22 00 - Concrete Unit Masonry.

.2 Section 09 30 13 - Tiling.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM):

.1 ASTM A153/A153M-23, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

.2 ASTM A240/A240M-25a, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

.3 ASTM A653/A653M-25a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.4 ASTM A666-25a, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

.5 ASTM A924/A924M-22a, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

.6 ASTM A1008/A1008M-24, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

.7 ASTM B16/B16M-24, Standard Specifications for Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines.

.8 ASTM B19–20, Standard Specification for Cartridge Brass Sheet, Strip, Place, Bar, and Disks.

.9 ASTM B456-17(2022), Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.

.10 ASTM C1503-24, Standard Specification for Silvered Flat Glass Mirror.

.2 Canadian Standards Association (CSA):

.1 CSA-B651-18, Accessible Design for the Built Environment, Includes Errata 1 (2020).

.2 CSA-G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles, Includes Update No.1 (2020).

.3 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-1.81-M90, Air Drying and Baking Alkyd Primer for Vehicles and Equipment. (Withdrawn).

.2 CAN/CGSB-1.88-92, Gloss Alkyd Enamel, Air Drying and Baking.

.3 CGSB 31-GP-107MA, Non-Inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover. (Withdrawn)

.4 International Code Council (ICC):

.1 ICC A117.1-2017, Accessible and Usable Buildings and Facilities.

.5 Ontario Building Code, Barrier Free Design Section

1.3 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures:

.1 Submit manufacturer's printed product literature, specifications and datasheet.

.2 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures:

.1 Indicate size and description of components, base material, surface finish inside and out, hardware and locks, attachment devices, description of rough-in-frame, backing, building-in details of anchors for grab bars.

.3 Submit samples in accordance with Section 01 33 00 - Submittal Procedures:

.1 Samples to be returned for inclusion into work.

1.4 CLOSEOUT SUBMITTALS

.1 Submit closeout data in accordance with Section 01 78 10 - Closeout Submittals and Requirements:

.1 Provide maintenance data for toilet and bath accessories for incorporation into manual specified in Section 01 78 10 - Closeout Submittals and Requirements

.2 Include list of sources for disposable supplies, replacement parts and service recommendations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Materials

.1 Provide special tools required for accessing, assembly/disassembly or removal for toilet and bath accessories in accordance with requirements specified in Section 01 78 10 - Closeout Submittals and Requirements

.2 Deliver special tools to Consultant.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 78 10 - Closeout Submittals and Requirements

Part 2 Products

2.1 MANUFACTURERS

.1 Acceptable Manufacturers: subject to compliance with requirements specified in this Section and as established by the basis-of-design materials, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

.1 American Specialties Inc. (ASI)

.2 Bobrick Washroom Equipment Company.

.3 Bradley Corporation.

.4 Frost Products Ltd.

2.2 MATERIALS

.1 Sheet steel: to ASTM A653/A653M cold rolled, commercial quality, 0.912 mm minimum nominal thickness, with ZF001 designation zinc coating.

.2 Stainless steel sheet metal: to ASTM A666, Type 304, finish as indicated in component list in 1.519 mm minimum nominal thickness.

.3 Stainless steel tubing: Type 304, commercial grade, seamless welded, 1.2 mm wall thickness.

.4 Fasteners: concealed screws and bolts hot dip galvanized after fabrication, tamper and theft resistant exposed fasteners to match material of unit. Expansion shields fibre, lead or rubber as recommended by accessory manufacturer for component and its intended use.

.5 Provide universal keys for internal access to accessories for servicing and re-supplying. Provide minimum of six keys to Owner's representative.

2.3 COMPONENTS

.1 Shower seat: wall mounted fixed, stainless steel.

.1 Acceptable Materials:

.1 8203, ASI

.2 B-5191, Bobrick

.3 9562, Bradley.

.4 972, Frost Products.

.2 Grab bars: straight 1200 mm long x 38 mm dia x 1.2 mm thick of stainless steel with satin finish, concealed mounting flanges, screw attachment, flanges welded to tubular bar, provided with steel back plates and all accessories. Knurl bar at area of hand grips. Grab bar material and anchorage to withstand downward pull of 2.2 kN.

.1 Acceptable Materials:

.1 3801-48P, ASI.

.2 B-6806.99x48, Bobrick.

.3 812-001-48-2, Bradley.

.4 1001-NP48, Frost.

.3 Robe hook: stainless steel with satin finish, square profile, concealed mounting with approximately 40 mm projection.

.1 Acceptable Materials:

.1 7340-S, ASI.

.2 B76717, Bobrick.

.3 9114, Bradley.

.4 1138-S, Frost Products.

.4 Mirror (tilt mirror for barrier-free): with type 304, 19 mm stainless steel angle frame, full width piano-hinge welded to bottom for tilting. 6 mm thick electrolytically copper plated mirrored glass with 5 mm thick polyethylene padding and edges protected by plastic filler strips. Galvanized steel back secured to frame with concealed screws.

.1 Acceptable Materials:

.1 0535, ASI.

.2 B-293 series, Bobrick.

.3 Model 740, Bradley.

.4 941-FT Series, Frost Products.

.5 Shelf surface mounted, 200 mm deep, 400 mm wide, stainless steel.

.1 Basis-of-Design Materials:

.1 950-16, Frost Products.

2.4 FABRICATION

.1 Weld and grind joints of fabricated components flush and smooth. Use mechanical fasteners only where approved.

.2 Wherever possible form exposed surfaces from one sheet of stock, free of joints.

.3 Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.

.4 Back paint components where contact is made with building finishes to prevent electrolysis.

.5 Hot dip galvanize concealed ferrous metal anchors and fastening devices to CSA G164.

.6 Shop assemble components and package complete with anchors and fittings.

.7 Deliver inserts and rough-in frames to job site at appropriate time for building-in. Provide templates, details and instructions for building in anchors and inserts.

.8 Provide steel anchor plates and components for installation on studding and building framing.

2.5 FINISHES

.1 Chrome and nickel plating: to ASTM B456, satin finish.

.2 Labels: Exposed faces, provide maximum 38 mm diameter stamped manufacturer logo.

Part 3 Execution

3.1 PREPARATION

.1 Verify wall thickness and construction that will accept recessed accessories.

.2 Verify that solid blocking for support and anchoring of washroom accessories is installed where required. Confirm exact height and location with Consultant and Manufacturers Instructions.

.3 Verify that frames and anchors provided, whether by this Section or others, are correctly and securely installed ready to accept the accessory scheduled for the specific location.

.4 Verify that painting is complete and dry in area of installation before accessories are installed.

3.2 INSTALLATION

.1 Install accessories at heights to meet barrier free compliance and in coordination with drawings. Confirm heights with Consultant prior to installation.

.2 Install and secure accessories rigidly in place as follows:

.1 Hollow masonry units or existing plaster/drywall: use toggle bolts drilled into cell/wall cavity.

.2 Solid masonry, marble, stone or concrete: use bolt with lead expansion sleeve set into drilled hole.

.3 Toilet/shower compartments: use male/female through bolts.

.3 Install grab bars on built-in anchors provided by bar manufacturer.

.4 Use tamper proof screws/bolts for fasteners.

.5 Fill units with necessary supplies shortly before final acceptance of building.

3.3 SCHEDULE

.1 Locate accessories where indicated on drawings. Exact locations determined by Consultant.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society of Civil Engineers (ASCE):

.1 ASCE 7-16, Minimum Design Loads and Associated Criteria for Buildings and Other Structures.

.2 American Society of Testing and Materials (ASTM):

.1 ASTM A653/A653M-25a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM A1008/A1008M-25, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

.3 ASTM B221-21, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

.4 ASTM D4446/D4446M-13, Standard Test Method for Anti-Swelling Effectiveness of Water-Repellent Formulations and Differential Swelling of Untreated Wood When Exposed to Liquid Water Environments. (Withdrawn 2022)

.3 Canadian General Standard Board (CGSB):

.1 CAN/CGSB 1.300-2000, Applied Coating System of Semigloss Baked Finish for Metal Office Furniture. (Withdrawn)

.2 CAN/CGSB-44.40-2001, Steel Clothing Locker. (Withdrawn)

.4 CSA Group (CSA):

.1 CSA G40.20-13/G40-21-13 (R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel, Includes Update No.1 (2014).

.5 Ontario Building Code, Barrier Free Design Section

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Coordination

.1 Coordinate size and location of prefabricated metal bases for metal lockers.

.2 Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related work specified in other Sections so that metal lockers can be supported and installed as indicated.

1.3 ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures:

.1 Indicate the following:

.1 Type and class of locker.

.2 Thickness of metal.

.3 Fabricating and assembly methods.

.4 Assembled banks of lockers.

.5 Tops, hooks, shelves, bases, trim and numbers.

.6 Filler panels, end/back panels, doors, handles, locking method, ventilation method and finishes.

.2 Submit samples in accordance with Section 01 33 00 - Submittal Procedures:

.1 Submit duplicate 50 x 50 mm samples of colour and finish on actual base metal.

1.4 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data indicating adjustments, repair methods and replacement of locker doors and latching mechanisms for incorporation into manual specified in Section 01 78 10 - Closeout Submittals and Requirements.

1.5 QUALITY ASSURANCE

.1 Installer to be an authorized representative of metal locker manufacturer for installation and maintenance of locker systems for this Project.

.2 Obtain metal lockers and accessories through one source from a single manufacturer. Do not modify intended aesthetic appearance of metal lockers without the Consultant's written approval; submit comprehensive explanatory data to Consultant for review where modifications are necessary to meet project requirements before submission of Bids.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 74 00 - Cleaning and Waste Management.

1.7 SITE CONDITIONS

.1 Site Measurements: Verify location of concealed framing, blocking, and reinforcements that support metal lockers before they are enclosed, and configuration of recessed openings by Site measurements before fabrication and indicate measurements on Shop Drawings.

.2 Established Dimensions: Establish recessed opening dimensions and proceed with fabricating metal lockers without Site measurements where Site measurements cannot be made without delaying the Work. Coordinate wall and floor construction so that actual recessed opening dimensions correspond to established dimensions.

Part 2 Products

2.1 MANUFACTURERS

.1 Standard of Acceptance: refer to **09 60 00 FINISH SCHEDULE**.

.2 Acceptable Manufacturers: Subject to compliance with requirements specified in this Section [and as established by the Basis-of-Design Materials], manufacturers offering products that may be incorporated into the Work include the following:

.1 Canadian Locker Company Ltd.

.2 Dasco Storage Solutions.

.3 General Storage Systems.

.3 Sheet Steel: ASTM A653/A653M coating Designation Z275, commercial grade, stretcher leveled, wiped coat galvanized; to the following minimum base metal thicknesses:

.4 Steel Plates, Shapes, and Bars: In accordance with CSA G40.20/G40.21, Grade 300W.

.5 Fasteners: Zinc or nickel plated steel, slotless type exposed bolt heads, and self locking nuts or lock washers for nuts on moving parts.

.6 Anchors: Select material, type, size, and finish required for secure anchorage to each substrate to seismic requirements in accordance with ASCE 7 and as follows:

.1 Provide nonferrous metal or hot dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance.

.2 Provide toothed steel expansion sleeves for drilled-in-place anchors.

2.2 MANUFACTURED UNITS

.1 Lockers: to CAN/CGSB-44.40, Single full-height locker, Class Two - A bank of two or more lockers, freestanding.

.1 Size: 305 mm wide x 380 mm deep x 1830 mm high.

.2 Steel Thickness:

.1	Body: Side, Divider & Back:	0.61 mm thick
.2	Top, & Bottom:	0.76 mm thick
.3	Door Inner Face:	0.61 mm thick
.4	Door Outer Face:	0.91 mm thick
.5	Frame Vertical Components:	1.51 mm thick
.6	Frame Horizontal Components:	1.21 mm thick
.7	Hinges:	1.90 mm thick

.3 Assembly: welded.

.4 Top: sloped.

.5 Doors: one-piece double-wall envelope construction, steel thickness 0.95 mm (No.20 MSG), door swing left.

.6 Door handle: recessed handle steel with bright chromium.

.7 Door Strike: Continuous.

.8 Hinges: Continuous concealed leaf fast pin type hinges, minimum 50 mm long opening 180°; fabricated from 1.897 mm base metal thickness steel securely fastened to door and frame and having non-removable pins.

.9 Colours: Body to match doors to be chosen from manufacturers standard colour range.

2.3 BENCH

.1 Bench: Fixed pedestals formed from 9.5 mm thick x 100 mm aluminum welded into rectangular shape 254 mm wide x 387 mm high with predrilled holes for attachment to floor and seat.

.1 Bench Seats: hardwood laminate 241 mm wide x 32 mm deep, having rounded corners and edges.

.2 Length: as indicated on Drawings.

.3 Pedestal Finish: manufacturer’s standard powder coated, colour as directed by Consultant.

.4 Basis-of-Design Materials:

.1 Locker Room Benches, Hadrian Manufacturing Inc.

2.4 ACCESSORIES

.1 Locking system: padlocks.

.2 Accessories: Meeting CAN/CGSB-44.40 and as follows:

.1 Coat Hooks: Steel with chromium finish.

.2 Base: Standard steel base as supplied by manufacturer, colour to match.

.3 End Panels: Finished end panels to match body panel colour.

.4 Trim: Steel trim to manufacturer's standard including corner angles, jamb trim and fillers.

.5 Number Plates: Manufacturers standard plate.

.3 Finish: Baked enamel or powder coat to match colour listed above.

Part 3 Execution

3.1 EXAMINATION

.1 Examine walls, floors, and support bases for compliance with requirements for installation tolerances and other conditions affecting performance of work.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

.1 Assemble and install lockers in accordance with manufacturer's written instructions.

.2 Securely fasten lockers to grounds and nailing strips.

.3 Install filler panels (false fronts) where indicated and where obstructions occur.

Install finished end panels to exposed ends of locker banks.

.4 Install locker numbers.

.5 Install bench with fasteners as directed by Manufacturer and isolate different materials if required.

3.3 REPAIR

.1 Touch up marred finishes or replace metal lockers that cannot be restored to factory finished appearance.

3.4 ADJUSTING

.1 Clean, lubricate, and adjust hardware.

.2 Adjust doors and latches to operate easily without binding.

.3 Verify that integral locking devices operate properly.

3.5 PROTECTION

.1 Protect metal lockers from damage, abuse, dust, dirt, stain, or paint.

.2 Do not permit metal locker use during construction.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 This Section specifies requirements and instructions that are common to mechanical work Sections of the Specification and it is a supplement to each Section and is to be read accordingly.

1.3 DEFINITIONS

.1 Refer to Section 01 42 16, Definitions. The following are definitions of words found in mechanical work Sections of the Specification and on associated drawings:

.1 "concealed" – means work hidden from normal sight in furred spaces, shafts, tunnels, ceiling spaces, walls and partitions

.2 "exposed" – means work normally visible, including work in equipment rooms and similar spaces

.3 "provide" (and tenses of provide) – means supply and install complete

.4 "install" (and tenses of install) – means install and connect complete

.5 "supply" – means supply only

.6 "finished area" - means any area or part of an area which receives a finish such as paint, or is factory finished

.7 "governing authority" and/or "regulatory authority" and/or "Municipal authority" – means all government departments, agencies, standards, rules and regulations that apply to and govern the mechanical work and to which the work must adhere

.8 "Consultant" – means the Architect or Consulting Engineer who has prepared the Contract Documents on behalf of the Owner

.9 “Equal to” – if products supplied by an “Equal to” manufacturer are proposed for use the “Equal to” product must be equivalent in quality, size and weight, performance, and operating characteristics (including energy efficiency), to the specified product, and acceptance or rejection of an “Equal to” product will be made by the Consultant

.2 Wherever the words "indicated", "shown", "noted", "listed", or similar words or phrases are used in the specification they are understood, unless otherwise defined, to mean that the product referred to is "indicated", "shown", "listed", or "noted" on the drawings.

.3 Wherever the words "approved", "satisfactory", "as directed", "submit", "permitted", "inspected" or similar words or phrases are used in the specification or on the drawings they are understood, unless otherwise defined, to mean that work or product referred to is "approved by", "inspected by", etc., the Consultant.

.4 In the mechanical specification, singular may be read as plural, and vice-versa.

1.4 SUBMITTALS

.1 Refer to Section 01 78 39, Project Record Documents. As specified in this Section, submit the following to the Consultant:

.1 project close-out documentation: O & M Manuals, record as-built drawings, and all associated data

.2 progress payment breakdown: a detailed breakdown of the mechanical work cost

.3 Extended Warranties: copies of all extended warranties specified, dated, signed, and in the name of the Owner

.4 Contractor's P. Eng. Documentation: the name, qualifications, and evidence of current liability insurance for all professional engineers to perform work associated with the Contract

1.5 JOURNEYPERSON/APPRENTICE TRADESMEN

.1 All mechanical work is to be done by tradesmen who perform only the work that their certificates permit. Apprentice tradesmen must work under direct on-site supervision of an experienced journeyperson tradesperson.

.2 Unless otherwise specified, the journeyperson/apprentice ratio is to be in accordance with governing regulations.

1.6 CODES, REGULATIONS, AND STANDARDS

.1 All Codes, Regulations, and Standards referred to in this Section and in Sections to which this Section applies are the latest edition of the Codes, Regulations, and Standards in effect at the time the building permit is obtained, or at the time of bid closing for the Project, whichever comes first.

.2 All work is to be in accordance with requirements with Codes, Regulations, and Standards applied by governing authorities Included but not limited to the following:

1) Ontario Building (OBC)

2) Ontario Fire Code (OFC)

3) Ontario Electric Safety Code (OESC)

4) Canadian Standards Association (CSA)

5) Underwriters Laboratory Canada (ULC)

6) National Fire Prevention Association (NFPA)

.3 All mechanical piping system work, including equipment, must comply in all respects with requirements of local technical standards authorities and CSA B51, Boiler, Pressure Vessels and Pressure Piping Code. Pressure vessels and fittings defined in Clause 4.3 of CSA B51 must bear a Canadian Registration Number (CRN).

.4 Where any governing Code, Regulation, or Standard requires preparation and submission of applications, special details, or drawings for review, prepare and submit them. Pay all associated costs associated with these submittals.

.5 All electrical items associated with mechanical equipment are to be certified and bear the stamp or seal of a recognized testing agency such as CSA, UL, ULC, or ETL, or bear a stamp to indicate special electrical utility approval.

.6 Requirements of the Contract Documents are to take precedence when they are more stringent than codes, ordinances, standards, and statutes.

1.7 IMPERIAL AND METRIC MEASUREMENTS

.1 Conform to requirements of CAN/CSA-Z234.1, Canadian Metric Practice Guide.

1.8 DRAWINGS AND SPECIFICATION

.1 The mechanical drawings are performance drawings, diagrammatic, and show approximate locations of equipment and connecting services. Any information regarding accurate measurement of the building are to be taken at the site.

.2 The mechanical drawings are intended to convey the scope of work and do not show architectural and structural details. Provide, at your cost, all offsets, fittings, transformations, and similar products required as a result of obstructions and other architectural and structural details but not shown on the drawings.

.3 The locations of equipment and materials shown may be altered, when reviewed by the Consultant, to meet requirements of the equipment and/or materials, other equipment or systems being installed, and of the building, all at your cost.

.4 The mechanical drawings and specification are intended to be cooperative. Perform all work that is shown, specified, or reasonably implied on the drawings but not mentioned in the specification, or vice-versa, as though fully covered by both.

.5 When the scale and date of the drawings are the same, or when the discrepancy exists within the specification, the costliest arrangement will take precedence.

1.9 PLANNING AND LAYOUT OF THE WORK, AND ASSOCIATED DRAWINGS

.1 Properly plan, coordinate, and establish the locations and routing of services with all trades affected prior to installation such that the services will clear each other as well as any obstructions, including structural components of the building. Unless otherwise specified, the order of right-of-way for services is to be as follows:

.1 piping requiring uniform pitch

.2 piping 100 mm (4") diameter and larger

.3 large ducts (main runs)

.4 electrical cable tray and bus duct

.5 conduit 100 mm (4") diameter and larger

.6 piping less than 100 mm (4") diameter

.7 smaller branch ductwork

.8 conduit less than 100 mm (4") diameter

.2 Unless otherwise shown or specified, conceal all work in finished areas, and conceal work in partially finished or unfinished areas to the extent made possible by the area construction. Install piping, ductwork, and similar services as high as possible to conserve headroom and/or ceiling space. Notify the Consultant where headroom or ceiling space appears to be inadequate, prior to installation of the work.

.3 Locate all shut-off valves, balancing devices, air vents, equipment, and similar products, particularly such products located above suspended ceilings, for easy access for servicing and/or removal.

.4 Layout Drawings: Prepare layout drawings for mechanical work with locations of equipment and routing of services generally in accordance with the Contract Documents. Confirm inverts, coordinate with and make allowances for the work of other trades, accurately layout the work, and be entirely responsible for all work installed in accordance with layout drawings. Where any invert, grade, or size is at variance with the Contract Documents, notify the Consultant prior to proceeding with the work.

.5 Interference Drawings: Prepare dimensioned working interference drawings, supplementary to the Contract Documents, for all areas where multiple services and/or equipment occur, or where the work due to architectural and structural considerations requires special study and treatment. Review interference drawings with the Consultant before the work is installed. Where your work has been installed in such areas without preparation of interference drawings and conflicts occur, revise your work to suit at no additional cost.

1.10 GENERAL RE: INSTALLATION OF EQUIPMENT

.1 Unless otherwise specified or indicated, install all equipment in accordance with the equipment manufacturer’s recommendations and instructions. Governing Codes, Standards, and Regulations take precedence over manufacturer’s instructions.

1.11 WORKPLACE SAFETY

.1 Comply with requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding the use, handling, storage and disposal of hazardous materials. Submit WHMIS MSDS (Material Safety Data Sheets) for all products where required, and maintain 1 copy at the site in a visible and accessible location available to all personnel.

.2 Comply with all requirements of Occupational Health and Safety Regulations and all other regulations pertaining to health and safety, including worker’s compensation/insurance board and fall protection regulations.

.3 If at any time during the course of the work asbestos containing materials, black mould, lead paint, or any other such materials are encountered or suspected, and not previously identified, immediately report the discovery to the Consultant and cease all work in the area in question. Do not resume work in affected areas until the situation has been properly corrected and without written approval from the Owner.

1.12 SHOP DRAWINGS AND PRODUCT DATA SHEETS

.1 Submittals under all Division 20 shall be in accordance with General Conditions and Section 01 33 00 – Submittal Procedures.

.2 Submit for review, shop drawings and/or product data sheets indicating in detail the design, construction, and performance of products as requested in Sections of this Specification. The number of copies of shop drawings and/or product data sheets will be as later directed.

.3 Shop drawings are those prepared specifically for the Project. Product data sheets are copies of manufacturer’s standard catalogue, etc., literature.

.4 Endorse each copy of each shop drawing or product data sheet “Correct for Review By Consultant”, or "Certified to Be In Accordance With All Requirements" and include your company name, the submittal date, and the signature of an officer of your company to indicate your review and approval.

.5 "This review is for the sole purpose of ascertaining conformance with the general design concept. This review does not approve the detail design inherent in the shop drawings, responsibility for which remains with the Contractor, and such review does not relieve the Contractor of the responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract Documents. Be responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the work of all sub-trades."

1.13 CHANGES OR REVISIONS TO THE WORK

.1 Whenever the Consultant proposes in writing to make a change or revision to the design, arrangement, quantity, or type of any work from that required by the Contract, prepare and submit to the Consultant for approval, a quotation being your proposed cost for executing the change or revision.

.2 Your quotation is to be a detailed and itemized estimate of all products, material, labour, and equipment costs associated with the change or revision, plus overhead and profit percentages and all applicable taxes and duties.

.3 Unless otherwise stated in the Contract, the following requirements apply to all quotations submitted:

.1 when the change or revision involves deleted work as well as additional work, the cost of the deleted work (less overhead and profit percentages but including taxes and duties) is to be subtracted from the cost of the additional work before overhead and profit percentages are applied to the additional work

.2 material and labour costs are not to exceed those published in local estimating price guides, less applicable trade discounts, and labour costs for journeyperson and apprentice labour must not exceed prevailing rates at the time of execution of the Contract, and must reflect the actual personnel performing the work

.3 costs for rental tools and/or equipment are not to exceed local rental costs

.4 if overhead and profit percentages are not specified in the General Conditions of the Contract, Supplementary Conditions, or elsewhere in the Specification, but allowable under the Contract, then allowable percentages for overhead and profit are to be 10% for overhead and 5% for profit

.5 the overhead percentage will be deemed to cover all quotation costs other than actual site labour, product and materials and rentals

.6 all quotations, including those for deleted work, must include a figure for any required change to the Contract time.

.4 Failure to submit a proper quotation to enable the Consultant to expeditiously process the quotation and issue a Change Order will not be grounds for any additional change to Contract time.

1.14 SCAFFOLDING, RIGGING, AND HOISTING

.1 Unless otherwise specified or directed, supply, erect and operate all scaffolding, rigging, hoisting equipment and associated hardware required for your work. Immediately remove from the site all scaffolding, rigging, and hoisting equipment when no longer required.

.2 Do not place major erection loads on any portion of the structure without approval from the Consultant.

.3 Submit for review, rigging and hoisting plans, contemplated dates, permits, equipment, safety measures, and personnel prior to hoisting operations.

1.15 PROJECT CLOSEOUT SUBMITTALS

.1 Refer to Section 01 77 00, Closeout Procedures.

.2 Prior to application for Substantial Performance, submit all required items and documentation specified, including the following:

.1 Operating and Maintenance Manuals

.2 as-built record drawings and associated data

.3 extended warranties for equipment as specified

.4 all operating test certificates, i.e. Sprinkler Test Certificate

.5 final commissioning report and TAB report

.6 identified keys for mechanical equipment and/or panels for which keys are required, and all other items required to be submitted

.7 other data or products specified

.3 Operating and Maintenance Manuals: Submit 1 hard copy of operating and maintenance manuals consolidated in hardcover 3 "D" ring binders, each binder sized to include approximately 25% spare space for future data, and identified permanently with the Project name, "MECHANICAL OPERATING AND MAINTENANCE MANUAL" wording, and the date. Manuals are to include the following:

.1 an Introduction sheet listing the Consultant’s, Contractor’s, and Subcontractor names, street addresses, telephone and fax numbers, and e-mail addresses

.2 a Table of Contents sheet, and corresponding index tab sheets

.3 a copy of each shop drawing or product data sheet, with manufacturer’s/supplier’s name, telephone and fax numbers, email address, and the email address for local source of parts and service

.4 pressure test reports, and certificates issued by governing authorities

.5 Operating Data: Operating data is to include:

.1 a description of each system and its controls

.2 control schematics for equipment/systems including building environmental controls

.3 if applicable, the building automation system (BAS) architecture and all required operating data

.4 description of operation of each system at various loads together with reset schedules and seasonal variances

.5 operation instructions for each system and each component

.6 description of actions to be taken in event of emergencies and/or equipment failure

.7 valve tag schedule, and flow diagrams to indicate valve locations

.6 Maintenance Data: Maintenance data is to include:

.1 servicing maintenance, operation and trouble-shooting instructions for each item of equipment and each system

.2 schedules of tasks, frequency, tools required, and estimated task time

.3 complete parts lists with numbers

.7 Performance Data: Performance data is to include:

.1 equipment and system start-up data sheets

.2 equipment performance verification test results, and final commissioning report

.3 final testing adjusting and balancing reports

.8 Review Submittal: Assemble one copy of the O & M Manual and submit to the Consultant for review prior to Owner training and instructions, and assembling the remaining copies. Incorporate all comments into the final submission.

.9 Digital O & M Manuals: Submit 4 digital versions of the hard copy manual using the latest version of Adobe Acrobat Portable Document Format and enhanced with bookmarks, internet links, and internal document links. The digital copies are to be copied to CDR with custom labels which indicate the project name, date, the Consultant’s name, and "Operating & Maintenance Manual for Mechanical Systems".

.4 Record "As-Built" Drawings and Data: As work progresses at the site, clearly mark in red in a neat and legible manner on a set of white prints of the Contract Drawings, all significant changes and deviations from the routing of services and locations of equipment shown on the Contract Drawings and resulting from the issue of Addenda, Site Instructions, Change Orders, and job conditions. Use notes marked in red as required. Maintain the white print red line as-built set at the site for the exclusive use of recording as-built conditions, keep the set up-to-date at all times, and ensure that the set is always available for periodic review. The as-built set is also to include the following:

.1 the dimensioned location of all inaccessible concealed work

.2 the locations of control devices with identification for each

.3 the location of all piping system air vents and water hammer arrestors

.4 the location and tag identification for all tagged valves

.5 for underground piping, including service entrance/exit piping, record dimensions, invert elevations, all offsets, fittings, cathodic protection and accessories if applicable, and locate dimensions from benchmarks that will be preserved after construction is complete

.6 for fire protection systems, record actual locations of equipment, sprinkler heads, and valves, drains, and test locations, and deviations of pipe routing and sizing from that shown on the drawings

.7 the location of all concealed services terminated for future extension

.5 Digital Record "As-Built" Drawings: When work on site is complete, transfer all the as-built red line information from the site as-built drawings to a recordable and identified CAD disc with CAD work of equal quality to the Contract Drawings. Obtain a CAD disc as described below.

.6 Obtaining CAD Digital Files: The mechanical drawings have been prepared on a CAD system using the latest Release of AutoCad software. For the purpose of producing final as-built drawings, digital files of the Contract Drawings will be supplied by the Consultant for a nominal fee.

.7 Review and Submittal: Prior to inspection for Substantial Performance of the work, submit for review, the red line site as-built white prints, a CAD digital file of the as-built drawings, and a bound set of white prints (of equal quality to the Contract Drawings) made from the digital file. The Consultant will review the drawings and, if necessary, return the disc and the marked-up white prints for corrections or further revisions, in which case complete the corrective and/or revision work and resubmit the disc and white prints until they are determined to be acceptable, all prior to issue of a Certificate of Substantial Performance.

1.16 REQUIREMENTS FOR CONTRACTOR RETAINED ENGINEERS

.1 All professional engineers retained by you to perform consulting services with regard to your work, i.e. seismic engineer, fire protection engineer, structural engineer, are to be members in good standing with the local Association of Professional Engineers, and are to carry and pay for errors and omissions professional liability insurance in compliance with requirements of the governing authorities in the locale of the work.

.2 Your engineer's professional liability insurance is to protect your Consultants and Sub-Consultants, and their respective servants, agents, and employees against any loss or damage resulting from the professional services rendered by your Consultants, Sub-Consultants, and their respective servants, agents, and employees in regards to the work of this Contract.

.3 Liability insurance requirements are as follows:

.1 coverage is to be a minimum of $2,000,000.00 inclusive of any one occurrence

.2 the insurance policy is not to be cancelled or changed in any way without the insurer giving the Owner a minimum of thirty days written notice

.3 liability insurance is to be obtained from an insurer registered and licensed to underwrite such insurance in the location of the work

.4 evidence of the required liability insurance in such form as may be required is to be issued to the Owner, the Owner's Consultant, and Municipal Authorities as required prior to commencement of your Consultant's services

1.17 EXTENDED WARRANTIES

.1 All extended warranties specified in mechanical work Sections of the Specification are to be full parts and labour warranties, at the site, and in accordance with requirements of the Contract warranty, but direct and in writing from the equipment manufacturer/supplier to the Owner.

.2 Submit signed and dated copies of extended warranties which clearly state requirements specified above.

1.18 EQUIPMENT AND MATERIAL MANUFACTURER REQUIREMENTS

.1 Equipment and materials scheduled or specified on the drawings or in the Specification have been selected to establish a performance and quality standard.

.2 In most cases acceptable equipment and material manufacturers are listed for any product specified. Unless otherwise stated the bid price may be based on products supplied by any of the manufacturers named as acceptable for the particular product. If acceptable manufacturers are not listed for a particular product, base the bid price on the products supplied by the specified manufacturers.

.3 If products supplied by a manufacturer named as acceptable are used in lieu of the products specified by manufacturer's name and model number, ensure that the product is equivalent in performance and operating characteristics (including energy efficiency if applicable) to the specified product. Pay for any additional costs and changes to associated or adjacent work resulting from the use of products supplied by a manufacturer other than the specified manufacturer. In addition, in equipment spaces where products named as acceptable are used in lieu of the specified products and the dimensions of such products differ from the specified products prepare and submit for review, if requested, accurately dimensioned layouts of the rooms affected to prove that all the equipment in the room will fit properly.

1.19 EQUIPMENT AND SYSTEM MANUFACTURER'S CERTIFICATION

.1 When equipment/system installation is complete, but prior to start-up procedures, arrange and pay for the equipment/system manufacturer's authorized representative to visit the site to examine the installation, and when any required corrective measures have been made, to certify in writing to the Consultant that the equipment/system installation is complete and in accordance with the equipment/system manufacturer's instructions.

1.20 EQUIPMENT AND SYSTEM START-UP

.1 When installation of equipment/systems is complete, but prior to commissioning, perform start-up for equipment/systems as specified in mechanical work Sections in accordance with the following requirements:

.2 submit a copy of each equipment/system manufacturer's blank start-up report sheet to the Consultant for review, and incorporate any comments

.3 under direct on-site supervision and involvement of the equipment/system manufacturer's representative, start-up the equipment/systems, make any required adjustments, document the procedures, leave the equipment/systems in proper operating condition, and submit a complete set of start-up documentation sheets signed by the manufacturer/supplier and the Contractor

1.21 EQUIPMENT AND SYSTEM COMMISSIONING

.1 After successful start-up and prior to Substantial Performance, commission the mechanical work in accordance with requirements of CSA Z320, Building Commissioning. Use commissioning sheets included with the CSA Standard, and any supplemental commissioning sheets required. Submit final commissioning data sheets, TAB reports, project closeout documents, and other required submittals.

1.22 EQUIPMENT AND SYSTEM O & M DEMONSTRATION & TRAINING

.1 Refer to equipment and system operational and maintenance training requirements specified in Division 01.

.2 Train the Owner's designated personnel in all aspects of operation and maintenance of equipment and systems as specified in mechanical work Sections of the Specification. All demonstrations and training is to be performed by qualified technicians employed by the equipment/system manufacturer/supplier. The number of hours of training and the number of Owner's personnel to be involved will be specified in the mechanical work Sections to which this Section applies.

.3 For each item of equipment and for each system for which training is specified, prepare training modules as specified below. Operating and Maintenance Manuals are to be used during the training sessions, and training modules are to include:

.1 Operational Requirements and Criteria: Requirements and criteria are to include but not be limited to equipment function, stopping and starting, safeties, operating standards, operating characteristics, performance curves, and limitations.

.2 Troubleshooting: Troubleshooting is to include but not be limited to diagnostic instructions, test and inspection procedures.

.3 Documentation: Documentation is to include but not be limited to equipment/system warranties, and manufacturer's/supplier's parts and service facilities, telephone numbers, email addresses, and the like.

.4 Maintenance: Maintenance requirements are to include but not be limited to inspection instructions, types of cleaning agents to be used as well as cleaning methods, preventive maintenance procedures, and use of any special tools.

.5 Repairs: Repair requirements are to include but not be limited to diagnostic instructions, disassembly, component removal and repair instructions, instructions for identifying parts and components, and review of any spare parts inventory.

.4 Assemble the training modules into a training manual and submit a copy to the Consultant for review prior to scheduling training. Ensure that each participant in each training session has all required training material.

.5 Schedule demonstrations and training at mutually agreed to times with a minimum of 7 working days notice.

.6 Training Session DVD: For equipment/system demonstration and training sessions as specified in mechanical work Sections, submit an identified DVD of the session prepared by a professional photographer with construction project technical training session experience.

.7 Demonstration and Training Confirmation: Obtain a list of personnel to receive demonstration and training from the Consultant, and have each participant sign the list to confirm that he/she understood the demonstration and training session.

2 PRODUCTS

NOT APPLICABLE

3 EXECUTION

NOT APPLICABLE

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 This Section specifies products, common criteria and characteristics, and methods and execution that are common to one or more mechanical work Sections of the Specification, and it is intended as a supplement to each Section and is to be read accordingly.

1.3 SUBMITTALS

.1 Submittals under this Section shall be in accordance with General Conditions and Section 01 33 00 – Submittals and Division 20.

.2 Access door locations: submit white prints of architectural reflected ceiling plan drawings and elevation drawings to indicate proposed access door locations in walls and ceilings in finished areas

.3 List of equipment nameplates: submit a list of equipment identification nameplates indicating proposed wording and sizes

.4 Pipe & duct identification: submit a list of pipe and duct identification colour coding and wording

.5 Valve tag chart: submit a proposed valve tag chart and a list of proposed valve tag numbering and identification wording

.6 Waste management and reduction plan: submit a waste management and reduction plan prior to commencing work and as per requirements specified in this Section

.7 Drive belts: as specified in Part 2 of this Section, submit a spare belt set, tagged and identified, for each belt driven piece of equipment

.8 Additional submittals: submit any other submittals specified in this Section or other mechanical work Sections of the Specification

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:

.1 Acceptable Manufacturers:

.1 As listed in materials specified in this section.

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of piping specialty from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this Section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Pipe Sleeves

.1 Galvanized Sheet Steel: Minimum #16 gauge galvanized steel with an integral flange at one end to secure the sleeve to formwork construction.

.2 Polyethylene: Factory fabricated, flanged, high density polyethylene sleeves with reinforced nail bosses.

.3 Galvanized Steel or Cast Iron Pipe: Schedule 40 mild galvanized steel, or Class 4000 cast iron.

.2 Waterproofing Seal Materials

.1 Modular, mechanical seal assemblies selected to suit the pipe size and the sleeve size or wall opening size. Acceptable products are:

.1 Thunderline Corp. (Power Plant Supply Co.) "LINK SEAL" Model S-316.

.2 The Metraflex Co. "MetraSeal" type ES.

.3 Pipe Escutcheon Plates

.1 One-piece chrome plated brass or #4 finish type 302 stainless steel plates with matching screws for attachment to the building surface, each plate sized to completely cover the pipe sleeve or building surface opening, and to fit tightly around the pipe or pipe insulation.

.4 Piping Hangers And Supports

.1 General: Pipe hanger and support materials, including accessories, are to be, unless otherwise specified, in accordance with the Manufacturers Standardization Society (MSS) Standard Practice Manual SP-58, Pipe hangers and Supports-Materials, Design and Manufacture, and where possible, MSS designations are indicated with each product specified below. Conform to the following requirements:

.1 Unless otherwise specified, all ferrous hanger and support products are to be electro-galvanized.

.2 Hangers and supports for insulated piping are to be sized to fit around the insulation and the insulation jacket.

.2 Horizontal Suspended Piping: Hangers and supports are to be:

.1 Adjustable steel clevis hanger – MSS Type 1.

.2 Adjustable swivel ring band type hanger – MSS Type 10.

.3 Horizontal Pipe On Vertical Surfaces: Epoxy coated steel pipe stays are not permitted. Supports are to be:

.1 Carbon steel offset pipe clamp to support pipe away from the support surface.

.2 Heavy-duty steel pipe bracket – MSS type 26.

.3 Single steel pipe hook .

.4 Floor Supports For Vertical Risers: Supports are to be:

.1 Copper tubing riser clamp (plastic coated) – MSS Type 8.

.2 Heavy-duty steel riser clamp – MSS Type 8.

.5 Vertical Piping on Vertical Surfaces: Epoxy coated steel pipe stays are not permitted. Supports are to be:

.1 Carbon steel offset pipe clamp to support pipe away from the support surface.

.2 Heavy-duty steel pipe bracket or soil pipe bracket – MSS Type 26.

.3 Extension split pipe clamp – MSS Type 12.

.6 Special Hangers and Supports: Special hangers and supports for various applications are as follows:

.1 For bare horizontal copper piping – generally as above but factory vinyl coated to prevent direct copper/steel contact.

.2 For bare copper vertical piping – corrosion resistant ferrous clamps with flexible rubber gasket type material (not tape) to isolate the pipe from the clamp.

.3 For embedded (in concrete) PVC piping: special site fabricated galvanized steel pipe clamp support assembly with vertical rods, a Unistrut or equal base secured to base reinforcing steel, and guy wire, designed to be adjustable for proper piping slope and to secure the piping in position during the concrete pour.

.7 Hanger Rods: Electro-galvanized carbon steel (unless otherwise specified), round, threaded, complete with captive machine nuts with washers at hangers, sized to suit the loading in accordance with Table 3 in MSS SP-58, but, in any case, minimum 9.5 mm (3/8") diameter and in accordance with ASTM A307, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength, and ASME B18.31.3, Threaded Rods (Inch Series).

.5 Piping Drain Valves

.1 Minimum 2070 kPa (300 psi) water rated, 20 mm (¾") diameter, straight pattern full port bronze ball valves, each complete with a lever handle, threaded outlet suitable for coupling connection of 20 mm (¾") diameter garden hose, and a cap and chain. Electric Motors

.1 Unless otherwise specified, motors are to conform to EEMAC Standard MG1, applicable IEEE Standards, and applicable CSA C22.2 Standards, and are to meet NEMA standards for maximum sound level ratings under full load. Confirm motor voltages prior to ordering.

.2 Vertically mounted and submersible motors are to be purposely designed for mounting in this attitude.

.3 AC Motor Efficiency: The efficiency of single phase AC motors to 1 HP is to be in accordance with CAN/CSA C747. The efficiency of all three phase motors 1 HP and larger is to be in accordance with CAN/CSA C390 or IEEE 112B.

.4 Acceptable Manufacturers: Acceptable motor manufacturers are:

.1 Westinghouse Canada Inc.

.2 Canadian General Electric

.3 Baldor Electric Co.

.4 U.S. Electrical Motors

.5 Weg Electric Corp.

.6 Marathon Electric

.7 Magna-Tech Canada

.8 Toshiba Corp.

.9 Leeson Canada

.7 Motor Starters And Accessories

.1 Loose motor starters and accessories, disconnect switches, and motor control centres for mechanical equipment will be provided as part of the electrical work.

.8 Mechanical Work Identification Materials

.1 Equipment Nameplates: Minimum 1.6 mm (1/16") thick 2-ply laminated coloured plastic plates, minimum 12 mm x 50 mm (½" x 2") for smaller items such as damper motors and control valves, minimum 25 mm x 65 mm (1" x 2½") for equipment, and minimum 50 mm x 100 mm (2" x 4") for control panels and similar items. Additional requirements are as follows:

.1 Unless otherwise specified or required, each nameplate is to be white, complete with bevelled edges and black engraved capital letter wording to completely identify the equipment and its use with no abbreviations.

.2 Wording is generally to be as per the drawings, i.e. Fan EF-1, and is to include equipment service and building area/zone served, but must be reviewed prior to engraving.

.3 Supply stainless steel screws for securing nameplates in place.

.4 Nameplates for equipment suspended above floor level or generally not within easy viewing from floor level are to be increased in size so as to be easily readable from floor level

.2 Valve Tags: Coloured, 40 mm (1½") square, 2-ply laminated plastic with bevelled edges, red-white, green-white, yellow-black, etc., to match the piping identification colour, each complete with a 3.2 mm (1/8") diameter by 100 mm (4") long brass plated steel bead chain, and four lines of engraved maximum size identification wording, i.e.:

.1 VALVE V2

.2 100 mm (4")

.3 CHILL. WATER

.4 NORMALLY OPEN

.3 Standard Pipe Identification: Standard pipe identification is to be equal to Smillie McAdams Summerlin Ltd. or Brady vinyl plastic with indoor/outdoor type vinyl ink lettering and directional arrows, as follows:

.1 For pipe to and including 150 mm (6") diameter, coiled type snap-on markers of a length to wrap completely around the pipe or pipe insulation.

.2 For pipe larger than 150 mm (6") diameter, saddle type strap-on markers with 2 opposite identification locations and complete with nylon cable ties.

.4 Standard Pipe Identification Wording and Colours: Identification wording and colours for pipe identification materials are to be as follows:

PIPE SERVICE	IDENTIFICATION COLOUR	LEGEND
domestic cold water	green	DOM. COLD WATER
domestic hot water supply	green	DOM. HW SUPPLY
domestic hot water recirculation	green	DOM. HW RECIRC.
tempered domestic water	green	TEMP. DOM. WATER
sanitary drainage	green	SAN.
plumbing vent	green	SAN. VENT
fire protection sprinklers	red	F.P. SPRINKLER
heating water supply	yellow	HTG. WTR. SUPPLY
heating water return	yellow	HTG. WTR. RETURN

.5 Colours For Legends & Arrows: Colours for pipe identification legends and directional arrows are to be as follows:

IDENTIFICATION COLOUR	LEGEND & ARROW COLOUR
yellow	black
green	white
red	white

.6 Duct Identification: Custom made Mylar stencils with 50 mm (2") high lettering to accurately describe the duct service, i.e. "AHU-1 SUPPLY", complete with a directional arrow, and coloured ink with ink pads and roller applicators. Ink colour is generally to be black but must contrast with the lettering background.

3 EXECUTION

3.1 INSTALLATION

.1 General Piping And Ductwork Installation Requirements

.1 Unless otherwise specified, locate and arrange horizontal pipes and ducts above or at the ceiling on floors on which they are shown, arranged so that under consideration of all other work in the area, the maximum ceiling height and/or usable space is maintained. If required to maintain ceiling heights, reroute and/or resize ductwork, with Consultant's approval.

.2 Unless otherwise specified, install all work concealed in finished spaces, and concealed to the degree possible in partially finished and unfinished spaces. Refer to and examine the Architectural drawings and room finish schedules to determine finished, partially finished, and unfinished areas. Note that walls which are painted are considered finished.

.3 Install all pipes and ducts parallel to building lines and to each other.

.4 Neatly group and arrange all exposed work.

.5 Service and Maintenance Access: Locate all work to permit easy access for service or maintenance as required and/or applicable. Locate all valves, dampers and any other equipment which will or may need maintenance or repairs and which are installed in accessible construction so as to be easily accessible from access doors. Where valves, dampers and similar piping or ductwork accessories occur in vertical services in shafts, pipe spaces or partitions, locate the accessories at the floor level.

.6 Dissimilar Metal Pipe Connections: Make all connections between pipes of different materials using proper approved adapters. Provide cast brass dielectric type adapters/unions at connections between ferrous and copper pipe.

.7 Cleaning: Carefully clean all ducts, pipe and fittings prior to installation. Temporarily cap or plug ends of pipe, ducts and equipment which are open and exposed during construction.

.8 Surfaces To Receive Your Work: Inspect surfaces and structure prepared by other trades before performing your work. Verify that surfaces or the structure to receive your work have no defects or discrepancies which could result in poor application or cause latent defects in installation and workmanship. Report defects in writing. Installation of your work will constitute acceptance of such surfaces as being satisfactory.

.9 Piping Rust and Dirt: Any ferrous piping that exhibits in excess of 5% surface rust, either inside or outside or both is to be wire brush cleaned to bare metal and coated with suitable primer. Steel pipe, fittings and accessories are to be free of corrosion and dirt when work is complete or prior to being concealed from view. Where dirt is evident, clean the piping prior to being concealed.

.10 Repair of Finished Surfaces: For factory applied finishes, repaint or refinish all surfaces damaged during shipment and installation. The quality of the repair work is to match the original finish. This requirement also applies to galvanized finishes.

.11 Unions and Flanges: Whether shown or specified on the drawings or not, provide screwed unions or flanges in all piping connections to equipment, and in regular intervals in new piping runs in excess of 12 m (40') to permit removal of sections of piping.

.12 Elbows and Eccentric Reducers: Unless otherwise specified and except where space limitations do not permit, all piping elbows are to be long radius. Eccentric reducers are to be installed with the straight side at the top of the piping.

.2 Pipe Joint Requirements

.1 Do not make pipe joints in walls or slabs.

.2 Ream all piping ends prior to making joints.

.3 Screwed Steel Piping: Properly cut threads in screwed steel piping and coat male threads only with Teflon tape or paste, or an equivalent thread lubricant. After the pipe has been screwed into the fitting, valve, union, or piping accessory, not more than 2 pipe threads are to remain exposed.

.4 Welded Steel Piping: Site bevel steel pipe to be welded or supply mill bevelled pipe. Remove all scale and oxide from the bevels and leave smooth and clean. Use factory made welding tees or welding outlet fittings for piping branches off mains. Do not use shop or site fabricated fittings unless written approval has been obtained.

.5 Welding Requirements: Welding is to be TSSA registered. Welded joints are to be made by CWB certified, licensed journeyman welders qualified in accordance with CSA B51, Boiler Pressure Vessel and Pressure Piping Code, and who are in possession of a proper certificate of qualification for each procedure to be performed. Each weld is to be identified with the welder's identification symbol, and welds are not to be concealed until they have been inspected and approved. Electrodes are to be in accordance with CSA W48 Series, Electrodes, and requirements of CAN/CSA W117.2, Safety in Welding, Cutting and Allied Processes are to be followed.

.6 Flanged Joints: Unless otherwise specified, make all flanged joints with EDPM gasket materials to suit the application, and bolts and nuts. Bolts are not to be longer than the length necessary to screw the nut up flush to the end of the bolt. Bolts used for flanged connections in all piping with a working pressure of 690 kPa (100 psi) and greater are to be ASTM A-193, Grade B-7, with heavy hexagon nuts to ASTM A-194, CL-2H. Provide suitable washers between each bolt head and the flange and between each nut and the flange.

.7 Examination of Flanged Joints: A random check of bolted flanged connections will be made to verify that flanged connections are properly mated with no shear force acting on bolts. Supply all labour to disconnect and reconnect the selected flanged joints. If improperly mated joints are found, remove and reinstall the affected piping so that the flanges mate properly. If improperly mated joints are found, additional joints will be checked, and you will be responsible for the repair of any other improper joints discovered.

.8 Soldered Joints: Unless otherwise specified make all soldered joints in copper piping using flux suitable for and compatible with the type of solder being used. Clean the outside of the pipe end and the inside of the fitting, valve, or similar accessory prior to soldering. Comply with requirements of ASTM B828, Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings.

.9 Mechanical Joints: Install mechanical joint fittings and couplings in accordance with the manufacturer's instructions.

.10 Grooved Pipe & Coupling Joints: Make arrangements with the coupling and fitting manufacturer for shop and/or site instructions and demonstrations as required, and adhere to the manufacturer's instructions with respect to pipe grooving, support, type of gasket required, anchoring and guiding the grooved piping system.

.11 Pressure Crimped Piping Joints: If pressure crimped couplings and fittings are used, ensure that gaskets are fully compatible with the piping fluid, and that all valves and piping accessories are suitable. Use only fitting manufacturer supplied crimping equipment. Comply with the manufacturer's latest published specification, instructions, and recommendations with respect to pipe, coupling, and fitting preparation and installation, and support, anchoring and guiding of the piping system.

.12 PVC Piping Solvent Weld Joints: Solvent weld PVC piping in 2 parts, primer stage and cementing stage, in accordance with the manufacturer's recommendations, ASTM D2855, and CSA requirements.

.13 PVC Piping Gasketed Joints: Install PVC piping with gasketed joints in accordance with the manufacturer's current published specifications, instructions and recommendations, and CSA requirements.

.3 Installation Of Pipe Sleeves

.1 Except as specified below, where pipes pass through new concrete and/or masonry surfaces provide pipe sleeves as follows:

.1 In poured concrete slabs: unless otherwise specified - minimum #16 gauge flanged galvanized steel or, where permitted by governing authorities, factory fabricated plastic sleeves.

.2 In concrete or masonry walls: Schedule 40 galvanized steel pipe or Class 4000 cast iron pipe.

.2 Sleeves In Fire Rated Construction: Where sleeves are required in fire rated construction they are to be Schedule 40 galvanized steel pipe or Class 4000 cast iron pipe

.3 Size sleeves, unless otherwise specified, to leave 12 mm (½") clearance around the pipes, or where the pipe is insulated, a 12 mm (½") clearance around the pipe insulation.

.4 Pack and seal the void between the pipe sleeves and the pipe or pipe insulation in non-fire rated construction for the length of the sleeves as follows:

.1 Interior construction: pack sleeves in interior construction with mineral wool and seal both ends of the sleeves with non-hardening silicone base caulking compound.

.2 Exterior walls above grade: pack sleeves in exterior walls above grade with mineral wool and seal both ends of the sleeves water-tight with approved non-hardening silicone base caulking compound unless mechanical type seals have been specified.

.3 Exterior walls below grade: seal sleeves in exterior walls below grade (and any other wall where water leakage may be a problem) with link type mechanical seals as specified below.

.5 Where sleeves are required in masonry work, accurately locate and mark the sleeve location, and hand the sleeves to the mason for installation.

.6 Terminate piping for sleeves that will be exposed so that the sleeve is flush at both ends with the building surface concerned so that the sleeve may be completely covered by an escutcheon plate, except for sleeves in waterproof floors which are to terminate 100 mm (4") above the finished floor.

.7 "Gang" type sleeving will not be permitted.

.8 Where sleeves are provided in non-fire rated construction for future piping, or where piping has been removed from existing sleeves, cap and seal both ends of the sleeved opening.

.4 Installation Of Waterproof Mechanical Seals

.1 Provide watertight link type mechanical seals in exterior wall openings where shown or specified.

.2 Assemble and install each mechanical seal in accordance with the manufacturer's instructions.

.3 After installation, periodically check each mechanical seal installation for leakage and, if necessary, tighten link seal bolts until the seal is completely watertight.

.5 Sleeve And Formed Opening Location Drawings

.1 Prepare and submit for review, white print drawings indicating the size and location of all required sleeves, recesses and formed openings in new poured or precast concrete work.

.2 Such drawings are to be completely and accurately dimensioned and relate sleeve, recesses, and formed openings to suitable grid lines and elevation datum, and are to take into account structural items such as grade beams, column caps, and column drop slabs.

.3 Begin to prepare such drawings immediately upon notification of acceptance of bid and award of Contract.

.6 Installation Of Pipe Escutcheon Plates

.1 Provide escutcheon plates suitable secured over all new exposed piping passing through finished building surfaces. A finished building surface is any surface with a factory finish or that receives a site applied finish.

.2 Install the plates so that they are tight against the building surface concerned, and ensure that the plates completely cover pipe sleeves and/or openings, except where waterproof sleeves extend above floors, in which case the plate is to fit tightly around the sleeve.

.7 Installation Of Fastening And Securing Hardware

.1 Provide all fastening and securing hardware required for mechanical work to maintain installations attached to the structure or to finished floors, walls and ceilings in a secure and rigid manner capable of withstanding the dead loads, live loads, superimposed dead loads, and any vibration of the installed products.

.2 Use fasteners compatible with structural requirements, finishes and types of products to be connected. Do not use materials subject to electrolytic action or corrosion where conditions are liable to cause such action.

.3 Where the floor, wall or ceiling construction is not suitable to support the loads, provide additional framing or special fasteners to ensure proper securement to the structure that is to support the products. Provide reinforcing or connecting supports where required to distribute the loading to the structural components. Submit support details for review prior to installation.

.4 Obtain written consent before using explosive actuated fastening devices. If consent is obtained, comply with requirements of CSA Standards CAN3-Z166.1 and CAN3-Z166.2.

.8 Installation Of Pipe Hangers And Supports

.9 Provide all required pipe hangers and supports.

.1 Provide any additional structural steel channels, angles, inserts, beam champs and similar accessories required for hanging or supporting pipe. Unless otherwise shown or specified, hang or support pipes from the structure only.

.2 For Insulated Pipe: Size the hanger or support to suit the diameter of the insulated pipe and install the hanger or support on the outside of the insulation and insulation finish.

.3 Underground (in earth/backfill) Piping: Support requirements for underground piping in earth/backfill) are as follows:

.1 Support, unless otherwise specified, on a well compacted bed of dry, natural, undisturbed earth free from rocks or protrusions of any kind, or on compacted material as specified.

.2 Ensure that all bedding and supports for underground pipes are flat and true and that allowances are made for pipe hubs, couplings, or other protrusions so that no voids are left between the pipe and the bedding.

.4 Horizontal Above Ground Piping: Unless otherwise shown or specified, hang and/or support horizontal pipe above ground by means of hangers and/or supports specified in Part 2 of this Section. Unless otherwise shown or specified, hangers for suspended pipe to and including 25 mm (1") diameter are to be clevis type or adjustable ring type, and hangers for suspended pipe 40 mm (1½") diameter and larger are to be adjustable clevis type. Space hangers and supports in accordance with the following:

.1 Cast iron pipe: hang or support at every joint with maximum 2.4 m (8') spacing.

.2 Plastic pipe: conform to pipe manufacturer’s recommended support spacing.

.3 Copper and steel pipe: hang or support at spacing in accordance with the following schedule:

PIPE DIA.	MAX. SPACING STEEL (meters)	MAX. SPACING COPPER (meters)
to 25 mm (1")	2.4 m (8')	1.8 m (6')
40 mm (1½")	2.7 m (9')	2.4 m (8')
50 mm (2")	3.0 m (10')	2.7 m (9')
65 mm (2½")	3.6 m (12')	3.0 m (10')
75 mm (3")	3.6 m (12')	3.0 m (10')
90 mm (3½")	3.6 m (12’)	3.6 m (12')
100 mm (4")	4.2 m (14')	3.6 m (12')
250 mm (10")	6.0 m (20')	
300 mm (12")	6.7 m (22')	

.4 Flexible grooved pipe/coupling joint piping: as above but with not less than 1 hanger or support between joints.

.5 Changes in direction: where pipes change direction, either horizontally or vertically, provide a hanger or support on the horizontal pipe not more than 300 mm (12") from the elbow, and where pipes drop from tee branches, support the tees in both directions not more than 50 mm (2") on each side of the tee.

.6 Grouped piping: when pipes with the same slope are grouped and a common hanger or support is used, space the hanger or support to suit the spacing requirement of the smallest pipe in the group and secure pipes in place on the common hanger or support.

.7 Roller hangers & supports: provide roller hangers or supports for all heat transfer piping 150 mm (6") diameter and larger and conveying a material 75° C (170° F) or greater to facilitate pipe movement due to expansion and contraction, and at each hanger or support tack weld a steel protection saddle to the pipe to protect the piping insulation.

.8 Inline centrifugal pumps: support piping at both sides of inline centrifugal pumps.

.5 Vertical Piping: Unless otherwise shown or specified, support vertical piping by means of supports specified in Part 2 of this Section, spaced in accordance with the following:

.1 Support vertical pipes at maximum 3 m (10') intervals or at every floor, whichever is lesser.

.2 For sections of vertical piping with a length less than 3 m (10'), support the pipe at least once.

.3 For all vertical cast iron plain end pipe (mechanical joint type), secure the riser or pipe clamp around the pipe under a flange integral with the pipe for vertical support purposes, or provide a length of hub and spigot pipe to facilitate proper support.

.4 For all vertical steel pipe risers in excess of 3 m (10'), weld shear lugs to the pipe to carry the load.

.5 For vibration isolated piping risers, provide rubber-steel-rubber vibration isolation pads between the riser clamps and the floor.

.6 For piping subject to vertical movement exceeding 40 mm (1½") due to vertical pipe expansion, provide suitable engineered constant support hangers.

.6 Isolation for Bare Copper Tubing: Each hanger, support or securement for horizontal bare copper tubing is to be plastic coated to prevent direct contact between the pipe and the ferrous hanger. Each wall or floor clamp for vertical bare copper piping is to be isolated from the pipe by means of strips of flexible rubber inserts. The use of painted ferrous hangers and supports, including those painted with copper coloured paint, is not acceptable. Site application of tape or other types of isolation is not acceptable.

.7 Insulation Protection Shields: For insulated horizontal piping to and including 40 mm (1½") diameter, provide galvanized steel insulation protection shields between the insulation and the hanger or support. Install shields immediately after the pipe is insulated.

.8 Pipe Support from Steel Deck: Do not support piping from steel deck without written consent from the Consultant.

.10 Installation Of Equipment Drains And Piping Drain Valves

.1 Unless otherwise shown or specified, provide minimum 40 mm (1½") diameter type DWV copper drain piping from equipment overflows, condensate drain pans, pump bases, fresh air intake plenum drains, etc., to a floor drain location. Equip the drain piping with deep seal traps located in heated areas.

.2 Provide a drain valve at the bottom of piping risers, at all other piping low points, and wherever else shown and/or specified.

.3 Locate drain valves so that they are easily accessible.

.11 Supply Of Access Doors

.1 Supply access doors to give access to all mechanical work which may need maintenance or repair but which is concealed in inaccessible construction, except as otherwise specified herein or on the drawings.

.2 Locate access doors as inconspicuously as possible in walls and partitions and arrange mechanical work such that it is clearly within view and accessible for inspection and servicing, and to suit access door locations shown on the reviewed and approved white prints of reflected ceiling plan and elevation drawings submitted as per Part 1 of this Section.

.3 Group piping and ductwork to ensure the minimum number of access doors is required. Access doors will be installed by the trades responsible for the particular type of construction in which the doors are required.

.4 Submit a sample of each proposed access door for review prior to ordering.

.12 General Re: Installation Of Valves

.1 Generally, valve locations are indicated or specified on drawings or specified in Sections of the Specification where the valves are specified, however, regardless of locations shown or specified, the following requirements apply:

.1 Provide shut-off valves to isolate all systems, at the base of all vertical risers, in branch take-offs at mains and risers on all floors, to isolate all equipment, to permit work phasing as required, and wherever else required for proper system operation and maintenance.

.2 Install shut-off valves with handles upright or horizontal, not inverted, and located for easy access.

.3 Unless otherwise specified, provide a check valve in the discharge piping of each pump.

.4 Valve sizes are to be the same as the connecting pipe size.

.5 Valves are to be permanently identified with the size, manufacturer's name and figure number, and wherever possible, valves are to be the product of the same manufacturer.

.6 The manufacturer's name, valve model or figure number, and the pressure rating are to be clearly marked on each valve.

.7 For valves in insulated piping, the design of the valve stem, handle and operating mechanism is to be such that the insulation does not have to be cut or altered in any manner to permit valve operation.

.13 Installation Of Pressure Gauge & Thermometer Access Fittings

.1 Provide pressure gauge and thermometer access fittings in 6.4 mm (¼") threaded opening fittings for insertion/removal of piping mounted pressure gauges and thermometers. Where piping is insulated, provide extended length access fittings to accommodate the insulation.

.2 Unless pressure gauges and/or thermometers are provided with equipment, provide access fittings in the following locations:

.1 In valved tubing across the suction, suction strainer (if applicable), and discharge piping of each circulating pump.

.2 In the supply and return piping connections to main mechanical plant equipment such as boilers, chillers, heat exchangers, main coils, etc.

.3 In expansion tank(s) or piping immediately at the expansion tank.

.4 In all water connections to hot water heaters.

.5 In the downstream side of mixing valves.

.6 In separate domestic hot water storage tank(s).

.7 At the topmost outlet in each standpipe fire protection system riser.

.8 In piping at each side of a pressure reducing valve.

.9 In domestic water service piping downstream of the meter.

.10 Wherever else shown and/or specified on the drawings or in the Specification.

.2 All metal surfaces that are in contact with domestic water are to be NSF/ANSI 61 certified.

.14 Mechanical Work Identification

.1 Identify all new/relocated mechanical work in accordance with existing identification standards at the site.

.15 System Flow Diagrams

.1 Prepare AutoCAD, coloured, 1200 mm x 900 mm (48” x 36”) flow diagrams of mechanical systems to identify all equipment and valves.

.2 Install framed and glazed diagrams in equipment rooms housing the system equipment. Confirm location prior to installation.

.3 Include reduced size copies of the diagrams in each copy of the O & M Manuals.

.16 Finish Painting Of Mechanical Work

.1 Touch-up paint all damaged factory applied finishes on mechanical work products.

.2 Finish painting of exposed mechanical work is specified in Division 09 and is part of the work of Division 09.

.17 Pipe Leakage Testing

.1 Before new piping has been insulated or concealed, and before equipment, fixtures and fittings have been connected, test all piping for leakage.

.2 Tests are to be witnessed by the Consultant and/or Owner's representative, and, where required, representatives of governing authorities. Give ample notice of tests in writing and verify attendance. Have completed test report sheets dated and signed by those present to confirm proper test results.

.3 When circumstances prevent scheduled tests from taking place, give immediate and adequate notice of cancellation to all who were scheduled to attend.

.4 Gravity Drainage & Vent Piping: Securely close all openings and pipe ends and fill piping with water up to the highest level, and ensure that the water stands at the same level for a minimum of 2 hours. After the fixtures and fittings are set and the pipes connected to the building drain or drains, turn on water into all pipe, fixtures, fittings and traps in order to detect any imperfect material or workmanship. Make a smoke test if required by the Municipality. At your option, drain and vent piping may be pressure tested with cold water at 345 kPa (50 psi) for 2 hours with zero leakage.

.5 Domestic Water Piping: Test piping with cold water at a pressure of 1½ times normal working pressure and maintain the pressure for a minimum of 2 hours.

.6 Sprinkler System Piping: Test all system piping in accordance with requirements of NFPA No. 13, "INSTALLATION OF SPRINKLER SYSTEMS", and in accordance with any additional requirements of governing authorities.

.7 Heat Transfer (HVAC) System Piping: Test piping with cold water at a pressure of 1035 kPa (150 psi) for a minimum of 2 hours.

.8 General Re: All Testing: The following requirements apply to all testing:

.1 Ensure that all piping has been properly flushed, cleaned and is clear of foreign matter prior to pressure testing.

.2 Temporarily remove or valve off all piping system specialties or equipment which may be damaged by test pressures prior to pressure testing the systems, and flush piping to remove foreign matter.

.3 When testing is carried out below the highest level of the particular system, increase the test pressure by the hygrostatic head of 7 kPa (1 psi) for every 600 mm (24") below the high point.

.4 Include for temporary piping connections required to properly complete the tests.

.5 Piping under test pressure is to have zero pressure drop for the length of the test period.

.6 Make tight leaks found during tests while the piping is under pressure, and if this is impossible, remove and refit the piping and reapply the test until satisfactory results are obtained.

.7 Where leaks occur in threaded joints in steel piping, no caulking of these joints will be allowed under any conditions.

.8 Tests are to be done in reasonably sized sections so as to minimize the number of tests required.

.9 In addition to the leakage tests specified above, demonstrate proper flow throughout the systems including mains, connections and equipment, as well as proper venting and drainage, and Include for any necessary system adjustments to achieve the proper conditions.

.18 Electrical Wiring Work For Mechanical Work

.1 Unless otherwise specified or indicated, the following electrical wiring work for mechanical equipment will be done as part of the electrical work:

.1 "Line" side power wiring to motor starters or disconnect switches in motor control centres and starters or disconnects on motor starter panels, and "load" side wiring from the starters or disconnects to the equipment.

.2 "Line" side power wiring to individual wall mounted starters, and "load" side wiring from the starters to the equipment.

.3 "Line" side power wiring to pre-wired power and control panels and variable frequency drives, and "load" side power wiring from the panels and VFD's to the equipment.

.4 Provision of receptacles for plug-in equipment.

.5 Provision of disconnect switches for all motors that are in excess of 10 m (30') from the starter location, or that cannot be seen from the starter location, and all associated power wiring.

.6 Provision of dedicated 120 volt, 15A-1P circuits terminated in junction boxes in mechanical equipment rooms for automatic control and building automation system wiring connections to be made as part of the automatic controls work.

.7 120 volt power connections to electrical receptacles integral with small ceiling exhaust fans, including wiring through light switches or speed controllers.

.8 120 volt wiring connections to lighting fixture/switch combinations integral with air handling units.

.9 120 volt wiring connections to duplex receptacles integral with air handling unit control panels.

.2 Mechanical wiring work not listed above or specified herein or on the drawings to be done as part of the electrical work is to be installed in conduit and is to be done as part of the mechanical work in accordance with wiring requirements specified for the electrical work.

.19 Cutting And Patching For Mechanical Work

.1 All cutting and patching of existing building surfaces required for mechanical work, including core drilling walls and slabs for piping, will be done as part of another Division of the work and is excluded from the mechanical work.

.2 Accurately and carefully mark out the location and extent of cutting or drilling required and co-ordinate with the trade(s) performing the work. Note that the location and size of cut or drilled openings must be approved by the Consultant before the work commences, and all cut or drilled openings must not be larger than is absolutely necessary for installation of the pipe, duct, etc., and insulation where necessary.

.20 Packing And Sealing Core Drilled Pipe Openings

.1 Pack and seal the void between the pipe opening and the pipe or pipe insulation for the length of the opening as follows:

.1 Non-fire rated interior construction: pack openings in non-fire rated interior construction with mineral wool and seal both ends of the opening with non-hardening silicone base caulking compound to produce a water-tight seal.

.2 Exterior walls above grade: pack sleeves in exterior walls above grade with mineral wool and seal both ends of the sleeves water-tight with approved non-hardening silicone base caulking compound unless mechanical type seals have been specified.

.3 Exterior walls below grade: seal sleeves in exterior walls below grade (and any other wall where water leakage may be a problem) with link type mechanical seals as specified below.

.21 Cleaning Mechanical Work

.1 Refer to cleaning requirements specified in Division 01.

.2 Clean all mechanical work prior to application for Substantial Performance of the work.

.3 Include for vacuum cleaning the interior of air handling units and ductwork systems.

.22 Maintaining Equipment Prior To Acceptance

.1 Maintain all equipment in accordance with the manufacturer's printed instructions prior to start-up, testing and commissioning.

.2 Employ a qualified millwright to check and align shafts, drives, and couplings on all base mounted split coupled motor driven equipment.

.3 Where equipment lubrication fittings are not easily accessible, extend the fittings to accessible locations using copper or aluminium tubing.

.4 All filters are to be new upon Substantial Performance of the work. This is in addition to any spare filters specified.

.23 Connections To Other Equipment

.1 Carefully examine the Contract Documents during the bidding period and include for mechanical work piping and/or ductwork connections to equipment requiring such connections.

.24 Waste Management And Disposal

.1 Separate and recycle waste materials in accordance with requirements specified in Division 01.

.25 Installation Of Flexible Connectors

.1 Provide flexible connectors in all piping connections to vibration isolated equipment.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 This Section specifies thermal insulation requirements that are common to mechanical work Sections of the Specification. It is a supplement to each Section and is to be read accordingly.

1.3 REFERENCES

.1 Definitions:

.1 "concealed" means mechanical services and equipment above suspended ceilings, in non-accessible chases, in accessible pipe spaces, and furred-in spaces

.2 "exposed" means exposed to normal view during normal conditions and operations

.3 "domestic water" means all piping (cold, hot, tempered) extended from the building Municipal supply main

.4 “WHMIS sheets” means Workplace Hazardous Materials Information System sheets

.5 “mineral fibre” means a type of insulation manufactured from molten rock, slag, or glass in accordance with requirements of ASTM C547

.6 “PEX” means cross-linked polyethylene

.7 “insulation system” means insulation material, fasteners, jacket, and any other accessory.

.8 “TIAC” means Thermal Insulation Association of Canada.

.2 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 American Society for Testing and Materials (ASTM):

.1 ASTM A240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strap for Pressure Vessels and for General Applications

.2 ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

.3 ASTM C534 – Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form

.4 ASTM C547 - Standard Specification for Mineral Fibre Pipe Insulation

.5 ASTM C552 – Standard Specification for Cellular Glass Thermal Insulation

.6 ASTM C553 – Standard Specification for Mineral Fibre Blanket Thermal Insulation

.7 ASTM C612 – Standard Specification for Mineral Fiber Block and Board Thermal Insulation

.8 ASTM C1136 – Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation

.9 ASTM C1290 – Standard Specification for Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts

.10 ASTM D1784 – Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

.2 Thermal Insulation Association of Canada (TIAC):

.1 Best Practices Guide

.2 TIAC Quality Standard 1501

.3 Underwriters Laboratories of Canada (ULC):

.1 CAN/ULC-S101 – Fire Endurance Tests of Building Construction and Materials

.2 CAN/ULC-S114 – Test for Non-Combustibility

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with General Conditions and Section 01 33 00 – Submittals and Division 20.

.2 Product Data Sheets & WHMIS Sheets:

.1 Submit a product data sheet and a WHMIS sheet for each insulation system product. Product data sheets must confirm that the product conforms to requirements of referenced Codes, Standards, and material properties.

1.5 QUALITY ASSURANCE

.1 Mechanical insulation requirements specified in this Section are based on the Thermal Insulation Association of Canada Best Practices Guide.

.2 Qualifications:

.1 Installer’s:

.1 The company with the sub-contract for mechanical insulation work is to be a member in good standing of the Thermal Insulation Association of Canada.

.2 Mechanical insulation is to be applied by journeyman tradespersons in the Heat and Frost Insulation Trade. Registered apprentice tradespersons must be under direct, daily, on-site supervision of a journeyman.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:

.1 Acceptable Manufacturers:

.1 Acceptable insulation product manufacturers are listed in Section 4, Products, of the TIAC Best Practices Guide

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of valve from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this Section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Fire Hazard Ratings:

.1 Unless otherwise specified, all insulation system materials inside the building and above ground must have a fire hazard rating of not more than 25 for flame spread and 50 for smoke developed when tested in accordance with CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.

.2 Thermal Performance:

.1 Unless otherwise specified, thermal performance, i.e. conductivity, of insulation is to meet or exceed the values given in the National Energy Code of Canada for Buildings, and ASHRAE/IES Standard 90.1.

.3 Pipe Insulation Materials:

.1 Specialty Insulation for Piping: Factory fabricated foamed glass or closed cell foamed plastic insulation fittings specifically made for pipe mechanical joint fittings and couplings, and pipe risers at riser clamps. Acceptable manufacturers are:

.1 Shur-Fit Products Ltd.

.2 Armacell Canada Inc.

.3 Owens Corning “FOAMGLASS”

.2 TIAC Standard 1501, Code A2, Preformed Mineral Fibre: Rigid, sectional, sleeve type insulation to ASTM Standard C 547, Standard Specification for Mineral Fibre Pipe Insulation, supplied in 915 mm (3') lengths with a factory applied vapour barrier jacket and adhesive jacket closure.to ASTM C1136, Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation, with a minimum thermal conductivity of 0.033 W @ 24° C.

.4 Barrier-Free Lavatory/Sink Piping Insulation Kits:

.1 Removable, flexible, reusable, white, moulded PVC insulation kits with internal fasteners for barrier-free fixture drain piping and domestic water supplies exposed under the fixture.

.5 Ductwork System Insulation Materials:

.1 TIAC Standard 1502, Code A2, Rigid Mineral Fibre Board: Preformed board type insulation to ASTM C612, Standard Specification for Mineral Fiber Block and Board Thermal Insulation, with a factory applied reinforced aluminum foil and Kraft paper facing to ASTM C1136, Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation, a minimum thermal conductivity of 0.033 W @ 24° C., and a minimum density of 48 kg/m³.

.2 TIAC Standard 1502, Code B2, Flexible Mineral Fibre: Roll form insulation to ASTM C1290, Standard Specification for Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts, with a factory applied vapour barrier facing to ASTM C1136, Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation, a minimum thermal conductivity of 0.042 W @ 24° C., and a minimum density of 12 kg/m³.

.6 Insulating Coatings:

.1 Equal to Robson Thermal Manufacturing Ltd. insulating coatings as follows:

.1 Anti-condensation coating, "No Sweat-FX".

.2 Thermal insulating coating, "ThermaLite".

.7 Insulation Fastenings:

.1 Wire: Minimum #15 gauge galvanized annealed wire.

.2 Duct Insulation Fasteners: Weld-on 2 mm (3/32") diameter zinc coated steel spindles of suitable length, complete with minimum 40 mm (1½") square zinc plated steel self-locking washers.

.3 Tape Sealant: Equal to MACtac Canada Ltd. self-adhesive insulation tapes, types PAF, FSK, ASJ, or SWV as required to match the surface being sealed.

.4 Adhesive - Mineral Fibre Insulation: Clear, pressure sensitive, brush consistency adhesive, suitable for a temperature range of -20°C to 82°C (-4°F to 180°F), compatible with the type of material to be secured, and WHMIS classified as non-hazardous.

.5 Adhesive – Flexible Elastomeric Insulation: Armacell "Armaflex" #520 air-drying contact adhesive.

.6 Adhesive – Closed Cell Foamed Glass Insulation: Equal to Pittsburgh Corning PC88 multi-purpose two-component adhesive.

.7 Lagging Adhesive: White, brush consistency, ULC listed and labelled, 25/50 fire/smoke rated lagging adhesive for canvas jacket fabric, suitable for colour tinting, complete with fungicide and washable when dry.

.8 Sheet Metal Screws: No. 10 stainless steel sheet metal screws.

.8 Insulation Jackets and Finishes:

.1 TIAC Code C11, Canvas: ULC listed and labelled, 25/50 rated, roll form, minimum 170 g (6 oz.) canvas jacket material.

.2 TIAC Code C1, PVC: Roll form sheet and fitting covers in accordance with ASTM D1784, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds, minimum 15 mil thick, white, PVC, 25/50 rated, complete with installation and sealing accessories.

3 EXECUTION

3.1 INSTALLATION

.1 General Insulation Application Requirements:

.1 Unless otherwise specified, do not insulate the following:

.1 Factory insulated equipment and piping.

.2 Heating piping within radiation unit enclosures, including blank filler sections of enclosures.

.3 Branch domestic water piping located under counters to serve counter mounted plumbing fixtures and fittings, except barrier-free lavatories.

.4 Exposed chrome plated domestic water angle supplies from concealed piping to plumbing fixtures and fittings, except barrier-free lavatories.

.5 Heated liquid system pump casings, valves, strainers and similar accessories.

.6 Manufactured expansion joints and flexible connections.

.2 Do not apply insulation unless leakage tests have been satisfactorily completed.

.3 Ensure that all surfaces to be insulated are clean and dry.

.4 Ensure that the ambient temperature is minimum 13° C (55° F) for at least one day prior to the application of insulation, and for the duration of insulation work, and that relative humidity is and will be at a level such that mildew will not form on insulation materials.

.5 All insulation materials must be stored on site in a proper and dry storage area. Any wet insulation material is to be removed from the site and replaced.

.6 Install insulation directly over pipes and ducts and not over hangers and supports.

.7 Install piping insulation and jacket continuous through pipe openings and sleeves.

.8 Install duct insulation continuous through walls, partitions, and similar surfaces except at fire dampers.

.9 When insulating "cold" piping and equipment, extend insulation up valve bodies and other such projections as far as possible, and protect the insulation jacketing from the action of condensation at its junction with the metal.

.10 When insulating vertical piping risers 75 mm (3”) diameter and larger, use insulation support rings welded directly above the lowest pipe fitting, and thereafter at 4.5 m (15’) centres and at each valve and flange. Insulate as per Thermal Insulation Association of Canada National Insulation Standards, Figure No. 9.

.11 Where mineral fibre rigid sleeve type insulation is terminated at valves, equipment, unions, etc., neatly cover the exposed end of the insulation with a purpose made PVC cover on "cold" piping, and with canvas jacket material on "hot" piping.

.12 Where there is interference between weld bead, mechanical joints, etc., and insulation, use purpose made insulation fittings or otherwise neatly and properly insulate these items to maintain the insulation value of the work. Seal all exposed surfaces of insulation.

.13 Where thermometers, gauges, and similar instruments occur in insulated piping, and where access to heat transfer piping balancing valve ports and similar items are required, create a neat, properly sized hole in the insulation and provide a suitable grommet in the opening.

.14 Where existing insulation work is damaged as a result of a new mechanical work, repair the damaged insulation work to new work standards.

.2 Insulation For Pipe Mechanical Joint Fittings & Couplings, Etc.:

.1 Provide manufactured insulation fittings, the same thickness as the adjoining pipe insulation, for mechanical joint fittings and couplings, and for piping at riser clamps through the floor. Cover with purpose made PVC covers with joints sealed with tape.

.3 Insulation For Horizontal Pipe At Hangers And Supports:

.1 At each hanger and support location for piping 50 mm (2") diameter and larger and scheduled to be insulated, except where roller hangers and/or supports are required, and unless otherwise specified, supply a factory fabricated section of phenolic foam pipe insulation with integral vapour barrier jacket and captive galvanized steel shield. Supply the insulation sections to the piping installers for installation as the pipe is erected.

.4 Pipe Insulation Requirements – Inside Building & Above Ground:

.1 Insulate pipe inside the building and above ground, as scheduled below, in accordance with TIAC Quality Standard 1501, Piping, as follows:

.1 Material: Type A3 mineral fibre.

.2 Insulation application:

.1 1501-H for hot piping.

.2 1501-C for cold piping.

.3 Insulation finish: CPF/1 canvas jacket or CPF/4 PVC jacket for exposed piping.

PIPE SERVICE	DIAMETER	INSULATION THICKNESS
Domestic Cold Water	to 100 mm	25 mm

PIPE SERVICE	DIAMETER	INSULATION THICKNESS
	larger than 100 mm	40 mm
Domestic Hot Water, Supply & Recirculation	to 40 mm	25 mm
	larger than 40 mm	50 mm
Tempered Domestic Water	all	25 mm
Drain From Refrigerated Drinking Fountains (See Note #2	all	25 mm

Notes:

#1 Insulate storm drainage piping from roof drains from the roof drain to the point where the piping extends straight down, without offsets, and connects to a horizontal main.
#2 Insulate drainage piping from refrigerated drinking fountains from the fountain to nearest 75 mm drain.
#3 TIAC Standard 1501 Code A6 foamed elastomeric insulation may be used in lieu of Type A2, with 1501-CA application and specified finish.
#4 Dry fire protection zone piping drum drips in unheated areas will be traced with electric heating cable.
#5 Use TIAC non-combustible rock slag mineral fibre insulation for insulated pipe penetrating through fire rated construction, and for high temperature piping insulation such a high pressure steam and condensate

.5 Ductwork System Insulation Requirements – Inside Building:

.1 Insulate duct systems inside the building and above ground, as scheduled below, in accordance with TIAC Quality Standard 1502, Ductwork and Plenums, as follows:

.1 Material:

.1 Type A2 rigid mineral fibre for exposed rectangular ducts, and all plenums

.2 Type B2 flexible mineral fibre for concealed rectangular ducts, and concealed and exposed round or oval ducts

.2 Insulation application:

.1 CER/1 for heating and ventilating system rigid insulation

.2 CER/2 for heating and air conditioning system rigid insulation

.3 CEF/1 for heating and ventilation system flexible insulation

.4 CEF/2 for heating and air conditioning system flexible insulation

.3 Insulation finish:

.1 CRF/1 for exposed rectangular duct systems

.2 CRD//1 for exposed round/oval duct systems

DUCT SYSTEM SERVICE	INSULATION THICKNESS	
	Rigid Insulation	Flexible Insulation
Mixed Air Casings And Plenums	25 mm	n/a
Mixed Air Supply Ducts (Except Where Exposed In Area Served)	25 mm	40 mm

Notes:

#1 Provide commercial quality corner bead only on exposed rigid duct, plenum and casing insulation in all equipment rooms, corridors, and similar areas where the insulation is subject to damage.

.6 Common Duct System Insulation application Requirements:

.1 At duct connection flanges insulate the flanges with neatly cut strips of the rigid insulation material secured with adhesive to side surfaces of the flange with a top strip to cover the exposed edges of the side strips, then butt the flat surface duct insulation up tight to the flange insulation, or alternatively, increase the insulation thickness to the depth of the flange and cover the top of the flanges with tape sealant.

.2 The installation of fastener pins and washers is to be concurrent with the duct insulation application.

.3 Cut insulation fastener pins almost flush to the washer and cover with neatly cut pieces of tape sealant.

.4 Accurately and neatly cut and fit insulation at duct accessories such as damper operators (with standoff mounting) and pitot tube access covers.

.5 Prior to concealment of insulation by either construction finishes or jacket material, patch all vapour barrier damage by means of tape sealant.

.6 At trapeze hanger locations for rectangular duct install insulation between the duct and the hanger.

.7 At each duct hanger for round duct provide a 100 mm (4") wide full length piece of rigid mineral fibre board insulation between the duct and the hanger.

.7 Equipment Insulation Requirements – Removable/Reusable Type:

.1 Provide "wrap type" removable and reusable insulation covers for "cold" circuit balancing valves, backflow preventers, and similar items, and for steam traps and similar items requiring service in piping less than 150 mm (6") diameter.

.8 Application Of Insulating And Protective Coatings:

.1 Apply insulating and protective coatings in accordance with the manufacturer’s instructions. Remove any splatter from adjacent surfaces. Apply insulating/protective coating to the following surfaces:

.1 Paint all bare metal surfaces clear of "cold" piping and/or equipment insulation for a distance of from 300 mm (12") to 600 mm (24") clear of the pipe or equipment insulation, with "No Sweat-FX" anti-condensation coating.

.2 Paint all bare metal surfaces associated with mechanical systems with an operating temperature 60°C (140°F) with "ThermaLite" insulating coating.

.9 Chilled Liquid Pipe Insulation Vapour Damage Protection:

.1 Ensure that all pipe insulation longitudinal and circumferential joints are properly sealed.

.2 Ensure that there are no perforations to insulation vapour barriers,

.3 Provide properly sealed vapour dams in locations as follows:

.1 On butt ends at all locations where the insulation terminates.

.2 On butt ends and other exposed insulation surface on either side of fittings, tees, flanges, couplings, valves, strainers, and similar pipe accessories.

.3 On butt ends at every 3rd section of insulation (maximum 6 m (20') intervals) on horizontal piping.

.4 On butt ends at every 2nd section of insulation (maximum 2.4 m (8') intervals) in vertical piping.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 This Section specifies mechanical system testing, adjusting, and balancing requirements that are common to mechanical work Sections of the Specification and it is a supplement to each applicable Section and is to be read accordingly.

1.3 REFERENCES

.1 Definitions:

.1 The following are definitions of words used in this Section:

.1 “TAB” – means testing, adjusting and balancing to determine and confirm quantitative performance of equipment and systems and to regulate the specified fluid flow rate and air patterns at the terminal equipment, e.g., reduce fan speed, throttling, etc.

.2 “hydronic systems” – includes heating water, chilled water, glycol-water solution, condenser water, and any similar system

.3 “air systems” – includes all outside air, supply air, return air, exhaust air, and relief air systems

.4 “flow rate tolerance” – means the allowable percentage variation, minus to plus, of actual flow rate values in the Contract Documents

.5 “report forms” – means test data sheets arranged for collecting test data in logical order for submission and review, and these forms, when reviewed and accepted, should also form the permanent record to be used as the basis for required future testing, adjusting and balancing

.6 “terminal” – means the point where the controlled fluid enters or leaves the distribution system, and these are supply inlets on water terminals, supply outlets on air terminals, return outlets on water terminals, and exhaust or return inlets on air terminals such as registers, grilles, diffusers, louvers, and hoods

.7 “main” – means the duct or pipe containing the system’s major or entire fluid flow

.8 “sub-main” – means the duct or pipe containing part of the systems’ capacity and serving two or more branch mains

.9 “branch main” – means duct or pipe servicing two or more terminals

.10 “branch” – means duct or pipe serving a single terminal

.2 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction.

.1 Standards: Testing, adjusting and balancing of the complete mechanical systems is to be performed over the entire operating range of each system in accordance with 1 of the following publications:

.1 National Standards For A Total System Balance published by the Associated Air Balance Council

.2 Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems published by the National Environmental Balancing Bureau

.3 Chapter 37, Testing, Adjusting, and Balancing of ASHRAE Handbook HVAC Applications

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with General Conditions and Section 01 33 00 – Submittals and Division 20.

.2 Name and Qualifications of Testing and Balancing Agency: Within 30 days of work commencing at the site, submit the name and qualifications of the proposed testing and balancing agency in accordance with requirements of the article below entitled Quality Assurance.

.3 Sample Test Forms: Submit sample test forms, if other than those standard forms prepared by the Canadian Associated Air Balance Council (CAABC) or National Environmental Balancing Bureau (NEBB) are proposed for use.

.4 Drawing Evaluation Report: Submit a report by the Agency to indicate the Agency's evaluation of the mechanical drawings with respect to service routing and location or lack of balancing devices. Include the set of drawings used and marked-up by the Agency to prepare the report.

.5 Site Visit Reports: Submit a report by the Agency after each site visit made by the Agency during the construction phase of this Project.

.6 Draft and Final Reports: Submit a draft report and a final report as specified in Part 3 of this Section.

1.5 CLOSEOUT SUBMITTALS

.1 Submittals under this Section shall be in conformance with Section 01 77 00.

.2 Warranty: Submit a testing and balancing warranty as specified in Part 3 of this Section.

.3 Post Construction Site Visit Reports: Submit reports listing observations and results of post construction site visits as specified in Part 3 of this Section.

2 PRODUCTS

Not applicable.

3 EXECUTION

3.1 SCOPE OF WORK

.1 Perform total mechanical systems testing, adjusting, and balancing. Requirements include measurement and establishment of the fluid quantities of the mechanical systems as required to meet design specifications and comfort conditions, and recording and reporting the results.

.2 Mechanical systems to be tested, adjusted and balanced include:

.1 Domestic Water Systems: TAB of domestic water systems (all piping extended from the Municipal main) is to include:

.1 Domestic hot water recirculation piping.

.2 Tempered water piping system equipment and tempered water temperatures and flows.

.2 Heating Systems: TAB of heating systems is to include all piping and equipment fluid temperatures, flows and control, and if TAB is not done during the heating season, a follow-up site visit during the heating season will be required to confirm proper flows and temperatures, and any required system "fine tuning".

.3 Air Handling Systems: TAB of air handling systems is to include all equipment and ductwork air temperatures, capacities and flows.

.4 Existing Systems: The following existing systems, revised as part of the mechanical work, are to be tested, adjusted and balanced as for new systems:

.1 F-5, supplying ventilation air to the basement

3.2 TESTING, ADJUSTING AND BALANCING

.1 General Requirements: Conform to the following requirements:

.1 As soon as possible after award of Contract, the Agency is to carefully examine a white print set of mechanical drawings with respect to routing of services and location of balancing devices, and is to issue a report listing the results of the evaluation.

.2 The set of drawings examined by the Agency is to be returned with the evaluation report, with red line mark-ups to indicate locations for duct system test plugs, and required revision work such as relocation of balancing devices and locations for additional devices.

.3 After review of the mechanical work drawings and specification, the Agency is to visit the site at frequent, regular intervals during construction of the mechanical systems, to observe routing of services, locations of testing and balancing devices, workmanship, and anything else that will affect testing, adjusting and balancing.

.4 After each site visit, the Agency is to report results of the site visit indicating the date and time of the visit, and detailed recommendations for any corrective work required to ensure proper adjusting and balancing.

.5 Testing, adjusting and balancing is not to begin until:

.1 Building construction work is substantially complete and doors have been installed.

.2 Mechanical systems are complete in all respects, and have been checked, started, and adjusted.

.6 All mechanical systems to be tested, adjusted and balanced are to be maintained in full, normal operation during each day of testing, adjusting and balancing.

.7 Obtain copies of reviewed shop drawings of all applicable mechanical plant equipment and terminals, and temperature control diagrams and sequences.

.8 The Agency is to walk each system from the system "head end" equipment to terminal units to determine variations of installation from design, and the system installation trades will accompany the Agency.

.9 The Agency is to check all valves and dampers for correct and locked position, and temperature control systems for completeness of installation before starting equipment.

.10 Wherever possible, the Agency is to lock all balancing devices in place at the proper setting, and permanently mark settings on all devices.

.11 For belt-driven equipment, the Agency is to report to the Commissioning Agent who in turn is to inform the Contractor and Consultant of any situation where sheaves have to be replaced to suit testing and balancing, and replacements are to be done by the Contractor at no cost.

.12 Noise: the Agency is to balance all systems with due regard to objectionable noise which is to be a factor when adjusting fan speeds and performing terminal work such as adjusting air quantities, and should objectionable noise occur at the design conditions, the Agency is to immediately report the problem and submit data, including sound readings, to permit an accurate assessment of the noise problem to be made.

.13 Stratification: the Agency is to check all supply air handling system mixing plenums for stratification, and where the variation of mixed air temperature across coils is found to be in excess of ±5% of design requirements, the Agency is to report the problem and issue a detail sketch of plenum baffle(s) required to eliminate the stratification.

.14 Tolerances: the Agency is to perform testing, adjusting and balancing to within ± 5% of design values, and make and record measurements which are within ± 2% of actual values.

.15 Filters for all air handling systems equipped with air filters, test and balance the systems with simulated 50% loaded (dirty) filters by providing a false pressure drop.

.16 Seasonal requirements: test, adjust and balance air conditioning systems during the summer season and heating systems during winter season, including at least a period of operation at outside conditions within 2.8° C (5° F) wet bulb temperature of maximum summer design condition, and within 5.5° C (10° C) dry bulb temperature of minimum winter design condition, and take final temperature readings during seasonal operation.

.2 Preparation of Reports: Prepare reports as indicated below:

.1 Draft Reports: Upon completion of testing, adjusting, and balancing procedures, prepare draft reports on CAABC or NEBB forms. Draft reports may be hand written, but must be complete, factual, accurate, and legible. Organize and format draft reports in the same manner specified for the final reports. Submit 2 complete sets of draft reports. Only 1 complete set of draft reports will be returned.

.2 Final Report: Upon verification and approval of draft reports, prepare final reports, type written, and organized and formatted as specified below. Submit 2 complete sets of final reports. Use units of measurement (SI or Imperial) as used on the Project Documents.

.3 Report Format: Report forms are to be those standard forms prepared by the referenced standard for each respective item and system to be tested, adjusted, and balanced. Bind report forms complete with schematic systems diagrams and other data in reinforced, vinyl, 3-ring binders. Provide binding edge labels with the project identification and a title descriptive of the contents. Divide the contents of the binder into the divisions listed below, separated by divider tabs:

.1 General Information and Summary

.2 Plumbing Systems

.3 Air Systems

.4 Hydronic Systems

.5 Temperature Control Systems

.6 Special Systems

.4 Report Contents: The Agency is to provide the following minimum information, forms and data:

.1 Inside cover sheet to identify the Agency, the Contractor, and Project, including addresses, e-mail addresses and contact names and telephone numbers and a listing of the instrumentation used for the procedures along with the proof of calibration.

.2 The remainder of the report is to contain the appropriate forms containing as a minimum, the information indicated on the standard CAABC or NEBB report forms prepared for each respective item and system.

.3 The Agency is to include for each system to be tested, adjusted and balanced, a neatly drawn, identified (system designation, plant equipment location, and area served) schematic "as-built" diagram indicating and identifying all equipment, terminals, and accessories.

.4 The Agency is to include report sheets indicating building comfort test readings for all rooms.

.3 Verification of Reports: After the final testing and balancing report has been submitted, the Agency is to visit the site with the Contractor and Consultant to spot check results indicated on the balancing report. The Agency is to supply all labour, ladders, and instruments to complete spot checks. Note that if results of spot checks do not, on a consistent basis, agree with the final report, the spot check procedures will stop and the Agency is to then rebalance the systems involved, resubmit the final report, and again perform spot checks with the Contractor and Consultant.

.4 Certification and Warranty: When the final report has been accepted, the Contractor is to submit to the Owner, in the name of the Owner, a certificate equal to the CAABC National Guaranty Certification or a NEBB Quality Assurance Program Bond, and in addition, the Contractor is to submit a written extended warranty from the Agency covering 1 full heating season and 1 full cooling season, during which time any balancing problems which occur, with the exception of minor revision work done during scheduled site visits, will, at no cost, be investigated by the Agency and reported on to the Owner, and if it is determined that the problems are a result of improper testing, adjusting and balancing, they are to be immediately corrected without additional cost to the Owner.

.5 Post Balancing Site Visits: After acceptance of the final report, the Agency is to perform post testing and balancing site visits in accordance with the following requirements:

.1 Post-testing and balancing site visits are to be made:

.1 Once during the 1st month of building operation.

.2 Once during the 3rd month of building operation.

.3 Once between the 4th and 10th months in a season opposite to the 1st and 3rd month visit.

.2 During each return visit and accompanied by the Owner's representative, the Agency is to spot rebalance terminal units as required to suit building occupants and eliminate complaints.

.3 The Agency is to schedule each visit with the Contractor and the Owner, and inform the Consultant.

.4 After each follow-up site visit, the Agency is to issue to the Contractor and Consultant a report indicating any corrective work performed during the visit, all abnormal conditions and complaints encountered, and recommended corrective action.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 Section includes: Provide fire protection system, including but not limited to the following:

.1 Wet sprinkler systems

.2 Dry sprinkler systems

.3 Standpipe systems

.4 Pre-action systems

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 21 20 05 – Fire Extinguishers

.2 Section 21 31 00 – Fire Pump

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 American National Standards Institute (ANSI):

.1 ANSI/ASME B16.4, Grey Iron Threaded Fittings (Classes 125 and 250)

.2 American Society for Testing and Materials (ASTM):

.1 ASTM A53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded

.2 ASTM A106, Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service

.3 ASTM A234, Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service

.3 Canadian Standards Association (CSA):

.1 CSA B64.10, Selection and Installation of Backflow Preventers

.2 CSA B137.2, PVC Injection-Molded Gasketed Fittings for Cold-Water Pressure Services

.3 CSA B137.3, Rigid Polyvinyl Chloride (PVC) Pipe for Pressure Applications

.4 CAN/CSA B64.10, Backflow Preventers and Vacuum Breakers

.4 National Fire Protection Association (NFPA):

.1 NFPA 13, Standard for the Installation of Sprinkler Systems

.2 NFPA 14, Standard for the Installation of Standpipes and Hose Systems

.5 Underwriters Laboratories of Canada (ULC):

.1 CAN/ULC-S1001, Integrated Systems Testing of Fire Protection and Life Safety Systems

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with General Conditions and Section 01 33 00 – Submittals and Division 20.

.1 Shop Drawings/Product Data: Submit shop drawings/product data sheets to the regulatory authority for review and approval prior to submitting to the Consultant. Conform to the following requirements:

.2 Shop Drawings

.1 submit complete CAD white print layout drawings indicating source of water supply with pipe size and test flow and pressure, "head-end" equipment piping schematic, pipe routing and sizing, and risers, all signed and sealed by the design P. Eng.

.2 submit copies of all calculations stamped and signed by the design P. Eng., and a listing of all design data used in preparing the calculations, system layout and sizing

.3 Product Data:

.1 product data sheets are to include all products specified in this Section except pipe and fittings, each clearly marked to indicate the manufacturer, model number, construction and performance of the products being supplied, and each stamped and signed by the system design P. Eng.

.4 Test and Evaluation Reports:

.1 Weekly Inspection Reports: Submit copies of the system design P. Engineer’s bi-weekly inspection reports as specified below.

.2 Test Certificates: Submit completed NFPA system material and test certificate(s) as specified in Part 3 of this Section, and documentation to confirm successful testing and commissioning in accordance with CAN/ULC-S1001.

.3 Backflow preventer test reports in accordance with CSA B64.10.

.5 Final Completion Signoff Letter: Following completion of the system, the design P.Eng. responsible for the review is to provide a stamped signoff letter.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Site Personnel: All site personnel are to be Sprinkler Fitters or Sprinkler and Fire Protection Installers licensed in the jurisdiction of the work and under the continuous supervision of a site foreman who is a journeyman.

.2 System Installer: The system installer is to be an experienced fire protection system company and a member in good standing of the Canadian Automatic Sprinkler Association and is to be certified to CSA-W47.1 for welding.

.3 Dimensions and Coordination: Check and verify all dimensions and conditions at the site and ensure that the work can be performed as indicated. Co-ordinate work with all trades at the site and accept responsibility for and the cost of making adjustments to piping and/or spacing to avoid interference with other building components.

.4 Bi-Weekly Inspection Reports: The design P. Eng. is to conduct bi-weekly site inspections for quality control, and prepare and submit an inspection report after each site inspection.

.5 All system components must be UL and/or ULC listed and labelled, and FM approved.

.6 Existing System: Verify the working condition of all existing fire protection system equipment which has direct interface with the new work and is to remain. Replace with new equipment where necessary.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:

.1 Acceptable Manufacturers:

.1 Fire Suppression System Design and Installation

.1 C&H Fire Suppression

.2 Forest City Fire Protection

.3 Vipond

.4 Troy Life and Fire Safety

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

2.2 PERFORMANCE/DESIGN CRITERIA

.1 System Designer: Fire protection work to be installed is to be designed by a fully qualified mechanical P. Eng. registered and licensed in the jurisdiction of the Project. Refer to the mechanical work Section entitled Mechanical Work General Instructions for requirements governing the employment of the Engineer.

.2 Water Flow and Pressure Test Data: If water supply flow and pressure test data is not available, conduct Municipal main water flow and pressure tests at the nearest fire hydrant to obtain criteria to be used in system design. Include the hydrant location and flow and pressure test data with system design calculations.

.3 Sprinkler System Design Criteria: Fire protection sprinkler work is to be designed in accordance with NFPA 13 and Provincial Standards, and, where required, local building and fire department requirements and, if required, the standards of the Owner's Insurer.

.4 Sprinkler /System Occupancy – Hazard Design requirements: As per NFPA 13 occupancy-hazard density requirements, unless otherwise specified.

2.3 MATERIALS

.1 Pipe, Fittings and Joints:

.1 Pipe, fittings and joints are to be as follows, with exceptions as specified in Part 3 of this Section:

.1 Schedule 40 Black Steel – Grooved Coupling Joints: North American produced Schedule 40 mild black carbon steel, ASTM A53, Grade B, complete with fittings and couplings equal to Victaulic "FireLock" fittings and Victaulic Style 005 rigid coupling joints. Strap-on fittings such as Victaulic "Snap-Let" strap type fittings are not acceptable.

.2 Schedule 40 Black Steel – Screwed and Welded Joints: North American produced Schedule 40 mild black carbon steel, ASTM A53, Grade B. Screwed piping is to be complete with Class 125 cast iron screwed fittings to ANSI/ASME B16.4. Welded piping is to be complete with factory made seamless carbon steel butt welding fittings to ASTM A234, Grade WPB, long sweep pattern wherever possible.

.2 Sprinkler Heads:

.1 Sprinkler heads are to be as specified/scheduled on the drawings.

.2 Recessed sprinkler heads in finished areas are to be chrome plated unless otherwise specified. Concealed sprinkler head ceiling plates are to match the ceiling colour.

.3 Where exposed pendent heads occur in areas with suspended ceilings, they are to be complete with chrome plated escutcheon plates. Similarly, sidewall heads with concealed piping are to be complete with chrome plated escutcheon plates.

.4 Sprinkler heads which are exposed in areas where they may be subject to damage are to be complete with wire guards, chrome plated where in finished areas.

.3 Spare Sprinkler Head Cabinet:

.1 Surface wall mounting, red enamelled steel, identified cabinet with hinged door, shelves with holes for mounting sprinkler heads, a wrench or wrenches suitable for each type of sprinkler head, and a full complement of spare sprinkler heads.

.2 The cabinet is to be sized to accommodate a minimum of 4 spare heads for each type of head used on the Project, however, each cabinet is to be full of spare heads.

3 EXECUTION

3.1 PREPARATION

.1 Demolition / Removal:

.1 Do all required fire protection system demolition work. Refer to demolition requirements specified in the mechanical work Section entitled Demolition and Revision Work..

3.2 INSTALLATION

.1 Piping Installation Requirements

.1 Provide all required fire protection system piping. Do all piping work in accordance with “Reviewed” shop drawings and NFPA requirements. Unless otherwise specified, piping is to be as follows:

.1 for “wet” system piping inside building and above ground, Schedule 40 grooved end black steel with Victaulic or equal fittings and coupling joints, or, for piping to and including 50 mm (2") diameter, screwed fittings and joints, or piping 65 mm (2½") diameter and larger, welding fittings and welded joints

.2 for “wet” sprinkler piping downstream of "head end" alarm valve(s) and equipment: Schedule 10 of "Lightwall" black steel pipe with Victaulic or equal fittings and coupling joints or screwed fittings and joints

.3 for branch sprinkler piping to heads in suspended ceilings, etc.: flexible piping installed in accordance with the manufacturer’s instructions

.2 All pipe sizes, pipe routing, equipment quantities and locations, and layout of work shown on the drawings are to assist you during the tendering period. Ensure adequate fire protection system coverage. Do not reduce the size of the fire protection system main or re-route the main unless approved.

.3 All pipe, fittings, couplings, flanges and similar components are to be cleaned after erection is complete. Any ferrous pipe, fitting, coupling, flange, hanger, support and similar component which exhibits rust is to be wire brush cleaned and carefully coated with suitably coloured primer.

.4 Slope all horizontal piping so that it may be completely drained. Provide capped drain points.

.5 Provide a pressure gauge at the highest outlet in each standpipe riser. Locate gauges so that they can be read easily. Where possible, locate gauges in fire hose cabinets. See the mechanical work Section entitled Basic Mechanical Materials and Methods for pressure gauge requirements.

.6 When fire protection work is complete, test the system components and the overall system(s) and submit completed NFPA material and test certificate(s), and any other documentation required.

.2 Shut-Off Valves And Check Valves:

.1 Provide shut-off valves and check valves in piping where shown and wherever else required.

.2 Locate all valves for easy operation and maintenance.

.3 Confirm exact locations prior to roughing-in.

.3 Shut-Off Valve Supervisory Switches:

.1 Unless otherwise specified, equip each shut-off valve with a supervisory switch.

.2 Identify each supervised valve with a 150 mm (6") square, engraved, laminated red-white plastic tag to correspond with supervised valve numbering specified and/or shown as part of the electrical work fire alarm system.

.4 Sprinkler Heads:

.1 Provide all required sprinkler heads.

.2 Sprinkler head locations must be carefully coordinated with all drawings, including architectural reflected ceiling plan drawings, and, where applicable, electrical drawings. Coordinate sprinkler head locations in areas with suspended ceilings with the location of lighting, grilles, diffusers, and similar items recessed in or surface mounted on the ceiling as per the reflected ceiling plans. In areas with lay-in tile, centre the sprinkler head both ways in the lay-in tile wherever possible. Confirm locations prior to roughing-in.

.3 Maintain maximum headroom in areas with no ceilings.

.4 Provide guards for heads where they are subject to damage.

.5 Provide high temperature heads in equipment rooms and similar areas over heat producing or generating equipment.

.5 Spare Sprinkler Head Cabinet:

.1 Supply a full complement (to fill cabinet) of spare sprinkler heads of the types used (minimum four of each type) and place in a wall mounting storage cabinet located adjacent to the sprinkler system "head end" equipment where later directed.

3.3 TESTING AND COMMISSIONING

.1 Test and commission the fire protection system in accordance with requirements of CAN/ULC-S1001.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 Section includes: Provide domestic water piping and valves.

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 22 11 13 – Domestic Cold Water Booster Pump Set

.2 Section 22 11 19 – Domestic Water Piping Specialties

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 National Sanitation Foundation (NSF):

.1 NSF/ANSI/CAN 61 – Drinking Water System Components-Health Effects

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with General Conditions and Section 01 33 00 – Submittals and Division 20.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this Section except for pipe and fittings, and chlorine.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers listed throughout Part 2 are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification.

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of valve from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this Section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 All products specified in this Section that are in contact with domestic water are to be NSF/ANSI/CAN 61 certified.

.2 Pipe, Fittings and Joints

.1 Hard Copper - Solder Joint: Type "L" hard drawn seamless copper to ASTM B88, complete with wrought copper solder type fittings to ASME/ANSI B16.22 and soldered joints using NSF/ANSI 61 certified silver alloy lead-free solder for cold water pipe, and 95% tin/5% Antimony or silver alloy lead free solder for other services, with flux to ASTM B813.

.2 Copper Pressure Coupled Joint: Type "L" hard drawn seamless copper to ASTM B88 with Viega "ProPress" copper fittings with "Smart Connect" feature, EDPM seals, and pressure type crimped joints made by use of a Rigid Tool Co. Model 330-B or Model 330-C electro-hydraulic crimping tool.

.3 Stainless Steel: Schedule 10 Type 304/304L to ASTM A312/A312M, threaded with screwed stainless steel fittings to ASTM A403/A403M for piping to 65 mm (2½") diameter, roll grooved with Victaulic Co. factory grooved end Type 304/304M stainless steel fittings and cast stainless steel coupling joints with gaskets meeting NSF/ANSI 61 requirements and Type 316 stainless steel bolts, Victaulic Style 807N rigid type or Style 877N flexible type as required by the location and application.

.4 Semi-Rigid Polyethylene Tubing: Equal to Versa Fittings and Mfg. Inc. 12 mm (½") diameter, high density, semi-rigid polyethylene tubing, 1380 kPa (200 psi) rated.

.3 Dielectric Unions

.1 Lead-free dielectric unions, each complete with a thermoplastic liner and rated minimum 1725 kPa (250 psi) at 120º C (250º F).

.4 Shut-Off Valves

.1 Brass & Bronze Ball Valves: Lead free, Class 600, 4140 kPa (600 psi) non-shock WOG rated, 2-piece, full port ball type valves, each complete with a forged brass or bronze body, blowout-proof stem, solid forged brass or bronze chrome plated ball, "Teflon" or "PTFE" seat, a removable coated steel lever handle marked with valve identification, and ends to suit the piping being connected. Valves in insulated piping are to be complete with stem extensions. Acceptable manufacturers are:

.1 Toyo Valve Co.

.2 Milwaukee Valve Co.

.3 Kitz Corporation

.4 Combraco Industries Inc. Apollo

.5 Watts Water Technologies Inc.

.5 Check Valves

.1 Horizontal: Class 125, bronze, lead-free with identifying tag, 1380 kPa (200 psi) WOG rated horizontal swing type check valves with ends to suit the connecting piping. Acceptable products are:

.1 Toyo Valve Co.

.2 Milwaukee Valve Co.

.3 Kitz Corporation

.4 Combraco Industries Inc. Apollo

.5 Watt Water Technologies Inc.

.2 Vertical: Equal to Kitz Corp. Code 26, bronze, lead-free, 1725 kPa (250 psi) WOG rated vertical lift check valve with ends to suit the connecting piping.

.6 Drain Valves:

.1 Refer to Part 2 of the mechanical work Section entitled Basic Mechanical Materials and Methods

3 EXECUTION

3.1 PREPARATION

.1 Demolition / Removal :

.1 Do all required domestic water system demolition work. Refer to demolition requirements specified in the mechanical work Section entitled Demolition and Revision Work.

3.2 INSTALLATION

.1 Piping Installation Requirements

.1 Provide all required domestic water piping.

.2 Piping, unless otherwise specified, is to be as follows:

.1 for 12 mm (½") diameter trap seal primer tubing located underground or in concrete or masonry construction - semi-rigid polyethylene

.2 for pipe inside building and above ground - Type "L" hard copper with solder joints or, **at your option**, Type "L" hard copper with pressure coupled mechanical joints, or Type 304/304L stainless steel with screwed joints or grooved end coupling joints

.3 Lay pipes true to line and grade with bells upgrade. Fit sections together so that, when complete, the pipe has a smooth and uniform invert. Keep pipe thoroughly clean so that jointed compound will adhere. Inspect the pipe for defects before being lowered into the trench.

.4 Slope all piping so that it can be completely drained.

.5 Provide proper dielectric unions in all connections between copper pipe and ferrous pipe or equipment.

.6 Secure trap seal primer tubing embedded in concrete to reinforcing steel in a secure manner and be present during the concrete pour to ensure that the tubing is not damaged or dislodged.

.2 Installation Of Shut-Off And Check Valves

.1 Refer to Part 3 of the mechanical work Section entitled Basic Mechanical Materials and Methods.

.2 Valves to and including 100 mm (4") diameter are to be ball type. Valves larger than 100 mm (4") diameter are to be butterfly type.

.3 Valves in CPVC rigid piping are to be Ipex "Aquarise" CPVC ball valves.

.3 Installation Of Balancing Valves

.1 Provide balancing valves in domestic hot water recirculation piping where shown or required.

.2 Locate each valve such that it is easily accessible.

.4 Installation of Drain Valves

.1 Refer to Part 3 of the mechanical work Section entitled Basic Mechanical Materials and Methods.

.5 Installation Of Partition Stops

.1 Provide partition stops in domestic water piping to each group of suite washroom plumbing fixtures. Locate partition stops in piping near the floor level in inconspicuous but accessible locations. Confirm exact locations prior to roughing-in.

.6 Installation Of Pressure Reducing Valves

.1 Provide domestic water pressure reducing valves in piping where shown and/or specified. Install so that each valve is readily accessible. Whenever possible, provide pressure reducing valves factory pre-set to required pressures.

.2 Check and test operation and adjust as required.

.7 Systems Integration:

.1 Underground Municipal Service Connection

.1 Make all required arrangements with the Municipality for installation of domestic water service piping from the Municipal main to the property line.

.2 Pay all charges levied by the Municipality for the service connection work.

.3 Municipal charges for underground street service connection work will be paid out of a prime cost allowance. Submit original copies of invoices issued by the Municipality for street service connection work.

3.3 SYSTEM STARTUP

.1 Flushing and Disinfecting Piping:

.1 Flush and disinfect all new and/or reworked domestic water piping after leakage testing is complete.

.2 Isolate new piping from existing piping prior to flushing and disinfecting procedures.

.3 Flush piping until all foreign materials have been removed and the flushed water is clear. Provide connections and pumps as required. Open and close valves, faucets, hose outlets, and service connections to ensure thorough flushing.

.4 When flushing is complete, disinfect the piping with a solution of chlorine in accordance with requirements of the Ministry of Environment document entitled Procedure for Disinfection of Drinking Water in Ontario, all under supervision of a P. Eng. authorized by the Professional Engineers of Ontario to perform such work.

.5 When disinfecting is complete, submit water samples to a certified laboratory for purity testing and, when testing indicates pure water in accordance with governing standards, submit a copy of the test results and fill the systems.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 Section includes: Provide drainage waste and vent piping and valves.

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 22 13 18 – Drainage and Vent Piping Specialties

.2 Section 22 13 19 – Drainage Pumps and Accessories

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 American Society for Testing and Materials (ASTM):

.1 ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

.2 ASTM B306 - Standard Specification for Copper Drainage Tube (DWV)

.2 Canadian Standards Association (CSA):

.1 CAN/CSA-B70 -

.2 CAN/CSA B182.2 - PVC Sewer Pipe and Fittings (PSM Type)

.3 CAN/CSA-B602 -

.3 Underwriters Laboratories of Canada (ULC):

.1 CAN/ULC-S102.2 – Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies.

.2 CAN/ULC-S115 - Standard Method Of Fire Tests Of Firestop Systems

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with General Conditions and Section 01 33 00 – Submittals and Division 20.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this Section except for pipe and fittings.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers listed throughout Part 2 are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification.

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of valve from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this Section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Pipe, Fittings and Joints:

.1 Buried/Embedded PVC – DWV: PVC drain, waste and vent pipe and fittings to CAN/CSA-B181.2, complete with solvent weld joints.

.2 Above Ground PVC - DWV: Rigid IPS PVC drain, waste and vent pipe and fittings to CAN/CSA B181.2, complete with a flame spread rating less than 25 and a smoke developed rating less than 50 when tested to CAN/ULC-S102-2, solvent weld joints, and, for fire barrier penetration, approved firestop conforming to CAN4-S115.

.3 Copper- Solder Joint: Type DWV hard temper to ASTM B306, with forged copper solder type drainage fittings and 50% lead - 50% tin solder joints.

.4 Cast Iron: Class 4000 cast iron pipe and fittings to CAN/CSA-B70, cast iron soil pipe, fittings, and means of joining, and mechanical coupling joints to CAN/CSA-B602, Mechanical couplings for drain, waste, and vent pipe and sewer pipe, equal to Anaco “Husky” Series 400, 4-strap type for pipe to 100 mm (4”) and 6-strap type for piping larger than 100 mm (4”).

.5 Galvanized Steel - Victaulic Coupling Joint: Schedule 40 mild steel, galvanized, ASTM A53, factory or site rolled grooved, complete with Victaulic galvanized ductile iron grooved end fittings and, unless otherwise specified, Victaulic Style 77 hot dip galvanized mechanical joint couplings with Grade M gaskets.

3 EXECUTION

3.1 PREPARATION

.1 Demolition / Removal:

.1 Do all required drainage and vent piping demolition work. Refer to demolition requirements specified in the mechanical work Section entitled Demolition and Revision Work.

3.2 INSTALLATION

.1 Drain and Vent Piping Installation Requirements:

.1 Provide all required drainage and vent piping. Pipe, unless otherwise specified, is to be as follows:

.1 for (buried in earth/backfill) gravity piping inside and outside the building, unless otherwise specified - rigid DR35 PVC sewer pipe or rigid solvent weld IPS PVC drain, waste and vent pipe

.2 for piping embedded in concrete, rigid solvent weld IPS PVC drain, waste and vent pipe

.3 for buried (in earth/backfill) drainage pump discharge piping – rigid IPS PVC drain, waste and vent pipe

.4 for pipe inside the building and above ground in sizes to and including 65 mm (2½") diameter - type DWV copper

.5 for pipe inside the building and above ground in sizes 75 mm (3") diameter and larger - Class 4000 cast iron with 4-strap couplings for pipe to and including 100 mm (4”) diameter, and 6-strap couplings for piping larger than 100 mm (4”) diameter, all with torque wrench tightened bolts, and, where pipe riser/building expansion will or may be a problem, cast iron pipe expansion joints equal to Bibby-Ste-Croix 654 Series

.6 for pipe inside the building and above ground in lieu of type DWV copper and cast iron, at your option and where permitted by governing Codes and Regulations – 25/50 rated rigid IPS PVC drain, waste and vent pipe

.2 Unless otherwise specified, slope horizontal drainage piping above ground in sizes to and including 75 mm (3") diameter 25 mm (1") in 1.2 m (4'), and pipe 100 mm (4") diameter and larger 25 mm (1") in 2.4 m (8').

.3 Install and slope underground drainage piping to inverts or slopes indicated on the drawings to facilitate straight and true gradients between the points shown. Verify available slopes before installing the pipes.

.4 Unless otherwise specified, slope horizontal branches of vent piping down to the fixture or pipe to which they connect with a minimum pitch of 25 mm (1") in 1.2 m (4').

.5 Extend vent stacks up through the roof generally where shown but with exact locations to suit site conditions and in any case a minimum of 3 m (10') from fresh air intakes. Terminate vent stacks a minimum of 330 mm (13") above the roof (including roof parapets) in vent stack covers.

.6 Provide mechanical joint couplings at connections between copper pipe and ferrous pipe or equipment. Fitting shall include interior shoulder which provides a smooth surface for drainage and prevents contact between dissimilar metals.

.7 Embedded Rigid PVC: Where horizontal rigid PVC solvent weld piping is embedded in concrete, provide a support, minimum two per 3.65 m (12’) length of pipe, consisting of a length of Unistrut channel secured to the bottom rebar, a pipe clamp supported by two hanger rods and secured to the Unistrut, and guy wires from the ends of the pipe clamp to the rebar to rigidly secure the supports in place. Secure piping in place, adjust slopes, and be present during the concrete pour to ensure that the piping is not damaged or dislodged.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 Section includes: Provide drainage and vent piping specialties.

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 22 13 16 – Drainage Waste and Vent Piping and Valves

.2 Section 22 13 19 – Drainage Pumps and Accessories

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 American Society for Testing and Materials (ASTM):

.1 ASTM C32 – Standard Specification for Sewer and Manhole Brick

.2 Canadian Standards Association (CSA):

.1 CSA B55.1 – Test method for measuring efficiency and pressure loss of drain water heat recovery units

.2 CSA B55.2 – Drain Water Heat Recovery Units.

.3 CAN/CSA-B79 – Commercial and residential drains and cleanouts

.4 CAN/CSA-S157 – Strength Design in Aluminum

.5 CAN/CSA-A257.4 – Precast Circular Concrete Manhole Sections, Catch Basins, and Fittings, and Municipal standards

.6 CAN/CSA-B481 – Grease Interceptors

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with General Conditions and Section 01 33 00 – Submittals and Division 20.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this Section.

.3 Certification Letters: Submit letters from product manufacturers/suppliers to certify correct installation of products as specified in Part 3 of this Section.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:

.1 Acceptable Manufacturers:

.1 For floor cleanout terminations:

.1 Zurn Industries Ltd.

.2 Watts Canada,

.3 Mifab Inc.,

.4 J. R. Smith Mfg. Co.,

.5 Wade Canada

.2 For floor drains:

.1 Zurn Industries Ltd.,

.2 Watts Canada,

.3 Mifab Inc.,

.4 J. R. Smith Mfg. Co.,

.5 Wade Canada

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of drainage component from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this Section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 All drainage products (floor drains, roof drains, cleanouts, etc.) specified in this Section are to be in accordance with requirements of CSA B79, Commercial and Residential Drains and Cleanouts.

.2 Cleanouts:

.1 Horizontal Piping: TY pipe fitting with an extra heavy brass plug screwed into the fitting.

.2 Vertical Piping: Bronze or copper cleanout tees in copper piping, each complete with a bronze ferrule, and, for cast iron piping, "BARRETT" type cast iron cleanout tees, each gas and water-tight and complete with a bolted cover.

.3 Floor Cleanout Terminations:

.1 Factory finished cast iron terminations, each adjustable and complete with:

.1 a cast iron body with neoprene sleeve

.2 solid, gasketed, round (except as noted) polished nickel-bronze scoriated top access cover to suit the floor finish

.3 a seal plug

.4 captive, vandal-proof, stainless steel securing hardware

.2 All cleanout terminations in areas with a tile or sheet vinyl floor finish are to be as above but with a square top in lieu of a round top.

.4 Floor Drains:

.1 Unless otherwise specified or scheduled, floor drains are to be vandal-proof adjustable drains in accordance with CSA B79 and the drawing schedule, each complete with:

.1 a cast iron body with outlet to suit connecting piping, reversible membrane clamp with weepholes, and latex based paint or epoxy protective coating

.2 a 12 mm (½") diameter trap seal primer connection

.3 a round (except as noted) strainer with securing hardware

.2 All strainers in areas with a tile or sheet vinyl floor finish are to be as above but with a square top in lieu of a round top.

3 EXECUTION

3.1 INSTALLATION

.1 Cleanouts:

.1 Provide cleanouts in drainage piping in locations as follows:

.1 in the building drain or drains as close as possible to the inner face of the outside wall, and, if a building trap is installed, locate the cleanout on the downstream side of the building trap;

.2 at or as close as practicable to the foot of each drainage stack

.3 at maximum 15 m (50') intervals in horizontal pipe 100 mm (4") diameter and smaller

.4 at maximum 30 m (100') intervals in horizontal pipe larger than 100 mm (4") diameter

.5 wherever else shown on the drawings

.2 Cleanouts are to be the same diameter as the pipe in piping to 100 mm (4") diameter, and not less than 100 mm (4") diameter in piping larger than 100 mm (4") diameter.

.3 Where cleanouts in vertical piping are concealed behind walls or partitions, install the cleanouts near the floor and so that the cover is within 25 mm (1") of the finished face of the wall or partition.

.2 Floor Cleanout Terminations:

.1 Where cleanouts occur in horizontal inaccessible underground piping, extend the cleanout TY fitting up to the floor, and provide a cleanout termination set flush with the finished floor.

.2 In waterproof floors, ensure that each cleanout termination is equipped with a flashing clamp device. Cleanout terminations are to suit the floor finish.

.3 Where cleanout terminations occur in finished areas, confirm locations prior to rough-in and arrange piping to suit.

.4 Ensure that cleanout termination covers in tiled floor are square in lieu of round.

.3 Floor Drains:

.1 Provide floor drains where shown on the drawings.

.2 Equip each drain with a trap and trap seal primer piping.

.3 In equipment rooms and similar areas, exactly locate floor drains to suit the location of mechanical equipment and equipment indirect drainage piping. In washrooms, exactly locate floor drains to avoid interference with toilet partitions.

.4 Confirm the exact location of drains prior to roughing in. Where floor drains occur in washrooms coordinate locations with toilet partition installations.

.5 Temporarily plug and cover floor drains during construction procedures. Remove plugs and covers during final cleanup work and when requested, demonstrate free and clear operation of each drain. Replace any damaged grates and refinish any areas of the drain where the cast iron finish has been damaged or removed, including rusted areas.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

.2 Section includes: Provide hydronic piping and valves.

.3 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 23 21 16 – Hydronic Piping Specialties

.2 Section 23 25 00 – HVAC Water Treatment

1.2 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 American Society of Testing and Materials (ASTM):

.1 ASTM A53, Standard Specification for Pipe, Steel, Black, and Hot-Dipped, Zinc-Coated, Welded and Seamless

.2 ASTM B88, Standard Specification for Seamless Copper Water Tube

.3 ASTM A105, Standard Specification for Carbon Steel Forgings for Piping Applications

.4 ASTM A234, Standard Specification for Piping Fittings of Wrought Carbon Steel for Moderate and High Temperature Service

.5 ASTM A536, Standard Specification for Ductile Iron Castings

.2 American National Standards Institute (ANSI):

.1 ANSI/ASME B16.4, Cast Iron Threaded Fittings

.2 ANSI/ASME B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings

1.3 SUBMITTALS

.1 Submittals under this Section shall be in accordance with General Conditions and Section 01 33 00 – Submittals and Division 20.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this Section except for pipe and fittings, and chlorine.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:

.1 Acceptable Manufacturers:

.1 Valves (Bronze, Cast Iron)

.1 Kitz

.2 Nibco

.3 Toyo

.2 Valves (Steel)

.1 Bonney Forge

.2 Kitz

.3 Beric

.3 Circuit Balancing Valves

.1 Tour & Andersson

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of piping specialty from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this Section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Pipe, Fittings And Joints:

.1 Black Steel - Screwed Joint: Mild black carbon steel, Grade B, ERW, ASTM A53, complete with Class 125 cast iron threaded fittings to ANSI/ASME B16.4, and screwed joints.

.2 Black Steel - Grooved End Mechanical Joint: Mild black carbon steel, Grade B, ERW, ASTM A53, factory or site roll grooved, complete with Victaulic Co. (or equal) cast ductile iron grooved end fittings, including full flow elbows, conforming to ASTM A536, and Victaulic Style 07 "Zero-Flex" (or equal) rigid couplings for piping in the Mechanical Rooms and for piping risers, Style 77 (or equal) standard flexible couplings for all other piping.

.3 Black Steel - Pressure Coupled Joint: Schedule 10 mild black steel, ASTM A53, square cut, deburred and clean, complete with Viega “MegaPress” 2070 kPa (300 psi) rated, formed, cold drawn steel fittings and couplings with Grade "E" EDPM O-rings and “Smart Connect” feature, and pressure type crimped joints made by use of an electro-hydraulic crimping tool supplied by the fitting manufacturer.

.4 Soft Copper Pipe: Type "L" seamless soft copper to ASTM B77.

.5 Hard Copper - Solder Joint: Type "L" hard drawn seamless copper to ASTM B88, complete with wrought copper fittings to ANSI B16.22, and 95% tin/5% Antimony solder joints.

.2 Piping Unions:

.1 Screwed Piping: Malleable iron, ground joint, bronze or brass to iron or bronze to bronze seat screwed unions and union elbows with a minimum pressure rating of 1725 kPa (250 psi) steam at 260° C (500° F).

.2 Flanged Piping: Forged carbon steel slip-on type raised faced welding flange unions to ASTM A105, 150 lb. Class for steel pipe, and slip-on type 150 lb. Class bronze flanges for copper pipe.

.3 Shut-off valves:

.1 Ball Type: Class 600, 4140 kPa (600 psi) WOG rated full port 2-piece ball valves, each complete with:

.1 A forged brass or bronze body and cap.

.2 Blowout-proof stem.

.3 Solid forged brass chrome plated ball.

.4 "Teflon" or "PTFE" seat.

.5 Ends to suit the piping being connected.

.6 Removable and identified lever handle.

.2 Butterfly Type: Cast ductile iron, lug body style, 1200 kPa (175 psi) rated butterfly valves, each suitable for bubble-tight dead end service with the valve closed and either side of the connecting piping removed, and each complete with:

.1 A neck to permit 50 mm (2") of insulation above the flange.

.2 A field replaceable EPDM seat.

.3 Ductile iron disc.

.4 Stainless steel shaft with EPDM seal.

.5 A lever handle for valves to and including 150 mm (6") diameter, and a handwheel and gear type operator for valves larger than 150 mm (6") diameter.

.4 Drain Valves:

.1 Refer to Part 2 of the mechanical work Section entitled Basic Mechanical Materials and Methods.

.5 Circuit Balancing Valves:

.1 Globe style, “Y” pattern circuit balancing valves designed to facilitate precise flow measurement, precision flow balancing, and positive shut-off, each rated for 2070 kPa at 120° C (300 psi at 250° F) and complete with:

.1 A brass body, stem and plug for valves to 50 mm (2”) diameter, and a cast or ductile iron body with bronze plug disc and stem for valves larger than 50 mm (2”) diameter.

.2 A multi-turn, 360° adjustment handwheel with micrometer type indicators and a lockable hidden memory feature.

.3 Two 6.4 mm (¼”) threaded brass metering ports with check valves and gasketed caps on the inlet side of the valve for connection to a differential pressure meter.

.6 Radiator Shut-Off And Balancing Valves:

.1 Heavy pattern, straight, 1750 kPa (250 psi) rated at 120° C (250° F) bronze or brass radiator valves, each complete with:

.1 A replaceable composition disc with brass disc holder.

.2 A self-adjusting, spring loaded packing system.

.3 A brass union tailpiece.

.4 A handle for inlet valves.

.5 A brass throttle and brass operating cap key for flow balancing for outlet valves.

3 EXECUTION

3.1 INSTALLATION

.1 Demolition:

.1 Do all required hydronic piping system demolition/revision work. Refer to demolition requirements specified in the mechanical work Section entitled Demolition and Revision Work.

.2 Piping Installation Requirements:

.1 Provide all required hydronic piping. Pipe, unless otherwise specified, is to be:

.1 For pipe to and including 65 mm (2½") diameter, Schedule 40 black steel, screwed, or type "L" hard copper with solder joints or pressure coupled joints, or, for runout piping from mains and risers to terminal equipment, Schedule 10 black steel with Viega "MegaPress" fittings and couplings.

.2 For short branch connections to heating equipment where structural obstructions occur and site bending of pipe is advantageous, a single length of type "L" soft copper.

.2 Slope horizontal piping mains to provide a minimum continuous up-grade of 25 mm (1") in 6 m (20') to high points. Slope branch supply and return piping connections to equipment a minimum of 25 mm (1") in 1.2 m (4'). Leave sufficient room at high points for installation and maintenance of air vents.

.3 Install automatic control valves, piping wells and similar piping and/or equipment mounted control components required for automatic temperature control systems supplied as part of the control. Refer to drawing control diagrams and details.

.4 Connect equipment provided as part of the work of other Sections of the Specification with piping as indicated and/or required. Refer to pipe connection details on drawings.

.5 Unions: Provide screwed unions, removable mechanical joint couplings, or weld-on or solder-on flanges in piping at all connections to valves, strainers and similar piping system components which may need maintenance or repair, at all equipment connections, in runs of piping exceeding 9 m (30') at 4.5 m (15') regular intervals to permit removal of sections of piping, and wherever else indicated on the drawings.

.6 Shut-off Valves: Provide shut-off valves in piping connections to equipment, to isolate piping risers, to isolate other sections of systems as shown, and wherever else indicated on the drawings. Valves in piping to and including 50 mm (2") diameter are to be ball type. All other shut-off valves are to be ball or butterfly type unless otherwise specified. Locate all valves so that they are easily accessible. Wherever possible, install valves at uniform height. Provide chain operators for valves which are inaccessible for operation from floor level.

.7 Drain Valves: Refer to Part 3 of the mechanical work Section entitled Basic Mechanical Materials and Methods.

.8 Circuit Balancing Valves: Provide circuit balancing valves in piping generally where shown on the drawings but with exact locations in accordance with instructions of personnel doing system flow balancing work. Confirm locations prior to installation.

.3 Flushing And Cleaning Piping:

.1 Flush and clean new piping in accordance with requirements specified in the mechanical work Section entitled HVAC Water Treatment.

.4 Testing, Adjusting And Balancing:

.1 When work is complete and equipment is operating as intended, test, adjust and balance water flows in accordance with requirements specified in the mechanical work Section entitled Testing, Adjusting, and Balancing.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 Section includes: Provide standard ductwork

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 23 31 06 – Special Systems Ductwork

.2 Section 23 31 07 – Ductwork Cleaning

.3 Section 23 32 00 – Casings and Plenums

.4 Section 23 33 00 – Duct System Dampers and Accessories

.5 Section 23 33 05 – Silencers

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 American National Standards Institute (ANSI):

.1 ANSI/SMACNA HVAC Duct Construction Standards- Metal and Flexible

.2 American Society of Testing and Materials (ASTM):

.1 ASTM A653, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Coated (Galvannealed) by the Hot-Dip Process

.3 Underwriters Laboratories Canada (ULC):

.1 CAN/ULC-S110, Standard Methods of Test for Air Ducts

.2 CAN/ULC-S102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

.4 National Fire Protection Association (NFPA):

.1 NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilation Systems

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with General Conditions and Section 01 33 00 – Submittals and Division 20.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this Section except for duct and fittings.

.3 Test and Evaluation Reports:

.1 Duct Pressure Tests

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:

.1 Acceptable Manufacturers:

.1 Flexible Ductwork

.1 Flexmaster

.2 Continental

.3 Wiremold

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of piping specialty from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this Section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Galvanized Steel Ductwork:

.1 General: Galvanized steel sheet is to be hot dipped in accordance with requirements of ASTM A653. Galvanizing for bare uncovered duct to be finish painted is to be G60. All other galvanizing is to be G90.

.2 Rectangular: Lock forming grade hot dip galvanized steel, ASTM A653, shop fabricated, minimum #26 gauge.

.3 Round: Factory machine fabricated, spiral, mechanically locked flat seam, single wall duct, fittings and couplings.

.2 Flexible Metallic Ductwork

.1 Bare: Spirally wound, semi-rigid, self-supporting corrugated aluminum duct with continuous triple lock seams, ANSI/SMACNA Form "M-UN", ULC-S110 listed and labelled as a Class 1 Air Duct, constructed of dead soft aluminum strip, and supplied in 3 m (10') lengths.

.2 Insulated: Spirally wound, semi-rigid, self-supporting corrugated aluminum duct with continuous triple lock seams, ANSI/SMACNA Form "M-I", ULC-S110 listed and labelled as a Class 1 Air Duct, constructed of dead soft aluminum strip, supplied in 3 m (10') lengths and factory covered with 40 mm (1½") thick, 12 kg/m^3 (0.75 lb/ft^3) density, minimum 6 R-value fibreglass insulation with a vinyl jacket meeting flame spread and smoke developed requirements of CAN/ULC-S102.

.3 Metal Duct System Joint Sealant

.1 ULC listed and labelled, premium grade, grey colour, water base, non-flammable duct sealer, brush, or gun applied, with a CAN/ULC S102 maximum flame spread rating of 5 and smoke developed rating of 0.

3 EXECUTION

3.1 INSTALLATION

.1 Demolition:

.1 Do all required standard ductwork system demolition/revision work. Refer to demolition requirements specified in the mechanical work Section entitled Demolition and Revision Work.

.2 Fabrication And Installation Of Galvanized Steel Ductwork:

.1 Provide all required standard galvanized steel ductwork, rectangular and/or round and/or flat oval as shown. Note that where rectangular ductwork is shown, round or flat oval ductwork of equivalent cross-sectional area is acceptable.

.2 Variable air volume ductwork from supply fans to boxes is to be as above but rectangular duct take-offs are to be double side straight taper type with a take-off length equal to 0.5 times the branch duct width but minimum 150 mm (6") length, and the double taper side is to have an included angle of minimum 60°.

.3 Duct Routing and Dimensions: Confirm the routing of all ductwork at the site and site measure ductwork prior to fabrication. Note that duct dimensions may be revised to suit site routing and building element requirements, if dimension revisions are reviewed with and approved by the Consultant. Duct routing and/or dimension revisions to suit conditions at the site are not grounds for a claim for an extra cost.

.4 Ducts Run Within or Through OWSJ: Refer to structural drawings. Where ductwork is to be run within or through open web steel joists, note that ductwork shown on the mechanical drawings is schematic only and is to be altered as required to suit the steel joist configuration, spacing, panel points, and cross-bridging at no additional cost.

.5 Ductwork Located at Sprayed Fireproofing: Wherever ductwork is required at locations where sprayed fireproofing is applied to building construction, install the ductwork only after the fireproofing work is complete and do not compromise the fire rating of the sprayed fireproofing.

.6 Automatic Control Components: Install (but do not connect) all duct system mounted automatic control components supplied as part of the automatic control work.

.7 Heat Transfer Equipment Connections: Where indicated, provide duct connections to fan powered heat transfer equipment with integral coils.

.8 Separate Hot Water Reheat Coils: Flange connect ductwork to hot water reheat coils in accordance with requirements of ANSI/SMACNA HVAC Duct Construction Standards Metal and Flexible. The coils will be suspended independent of connecting ductwork as part of the heat transfer work.

.9 Rectangular Duct Support Inside Building: Support horizontal rectangular ducts inside the building in accordance with ANSI/SMACNA HVAC Duct Construction Standards Metal and Flexible, but use trapeze hangers with, unless otherwise specified, galvanized steel channels, and galvanized steel hanger rods for all ducts that are exposed, and all concealed ducts wider than 500 mm (20").

.10 Round and Flat Oval Duct Support Inside Building: Support round and flat oval ducts inside the building in accordance with ANSI/SMACNA HVAC Duct Construction Standards Metal and Flexible, but, unless otherwise specified, for both uninsulated and insulated ducts exposed in finished areas, use bands and secure at the top of the duct to a hanger rod, all similar to Ductmate Canada Ltd. type "BA". If the duct is insulated, size the strap to suit the diameter of the insulated duct.

.11 Flanged Duct Joints: Where flanged duct joints are used, do not locate the joints in wall or slab openings, or immediately at wall or slab openings. Do not use flanged joints for exposed uninsulated ducts in finished areas.

.12 Application of Sealants: Apply sealants by brush or gun to cleaned metal surfaces. Where bare ductwork is exposed apply neat uniform lines of sealant. Randomly brushed, sloppy looking sealant applications will be rejected and must be repaired or replaced with a neat application of the sealant.

.13 Protective Coating for Exposed Exterior Ducts: Clean exterior exposed (uninsulated) ducts with a heavy full coverage of black metal paint equal to Bakor #410-02.

.14 Connection of Dissimilar Metal Ducts: Where dissimilar metal ducts are to be connected, isolate the ducts by means of flexible duct connection material as specified in the Section entitled Duct System Dampers and Accessories.

.15 Exposed Round Gymnasium Ductwork: All round exposed ductwork in the Gymnasium is to be two metal gauges heavier than the standard metal gauge for the same size duct, and duct hangers are to be pairs of 9.5 mm (⅜") diameter hanger rods secured to 40 mm (1½") wide #12 gauge galvanized steel split clamps around the full circumference of the duct at maximum 1.8 m (72") centres. Double nuts and lock washers are to be provided on each hanger rod above and below each clamp.

.3 Installation Of Flexible Ductwork:

.1 Provide maximum 3 m (10') long lengths of flexible ductwork for connections between galvanized steel duct mains and branches, and necks of ceiling grilles and diffusers. Do not install flexible ductwork through walls, even if shown on the drawings.

.2 Stretch out lengths of duct prior to cutting and installation.

.3 At rectangular galvanized steel duct, accurately cut holes and provide flanged or "Spin-in" round flexible duct connection collars. Seal joints with duct sealer.

.4 Install flexible ducts as straight as possible and support in accordance with requirements of ANSI/SMACNA HVAC Duct Construction Standards Metal and Flexible, and secure at each end with nylon or stainless steel gear type clamps, and seal joints. Provide long radius duct bends where they are required.

.5 Do not penetrate fire barriers with flexible duct.

.4 Duct System Protection, Cleaning And Start-Up:

.1 Temporarily cover all open ends of new ducts during construction.

.2 Vacuum all dirt and foreign matter from the entire duct systems and clean duct system terminals and the interior of air handling units prior to operating fans.

.3 Prior to starting any supply air handling system provide 50 mm (2") thick glass fibre construction filters at fan equipment in place of permanent filters.

.4 Provide cheesecloth over all duct system inlets and outlets and run the system for twenty-four hours, after which remove the cheesecloth, the construction filters, and install new permanent filters.

.5 Include all labour for a complete site walk-through with testing and balancing personnel following the route of all duct systems to be tested, adjusted and balanced for the purpose of confirming the proper position and attitude of dampers, the location of pitot tube openings, and any other work affecting the testing and balancing procedures. Perform all corrective work required as a result of this walk-through.

.5 Testing, Adjusting And Balancing:

.1 When work is complete and equipment is operating as intended, test, adjust and balance air flows and temperatures in accordance with requirements specified in the mechanical work Section entitled Testing, Adjusting, and Balancing.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 Section includes: Provide duct system dampers and accessories

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 23 31 05 – Standard Ductwork

.2 Section 23 31 06 – Special Systems Ductwork

.3 Section 23 31 07 – Ductwork Cleaning

.4 Section 23 32 00 – Casings and Plenums

.5 Section 23 33 05 – Silencers

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 American National Standards Institute (ANSI):

.1 ANSI/SMACNA HVAC Duct Construction Standards- Metal and Flexible

.2 American Society of Testing and Materials (ASTM):

.1 ASTM A653, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Coated (Galvannealed) by the Hot-Dip Process

.3 Underwriters Laboratories Canada (ULC):

.1 CAN/ULC-S110, Standard Methods of Test for Air Ducts

.2 CAN/ULC-S102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

.4 National Fire Protection Association (NFPA):

.1 NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilation Systems

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with General Conditions and Section 01 33 00 – Submittals and Division 20.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this Section except for pipe and fittings, and chlorine.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers listed throughout Part 2 are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of piping specialty from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this Section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Round To Rectangular Duct Connections:

.1 Galvanized steel, flared, flanged or notched as required, "SPIN-IN" type round duct take-off collars with locking dampers in accordance with ANSI/SMACNA HVAC Duct Construction Standards Metal and Flexible.

.2 Air Turning Vanes:

.1 For square elbows - multiple-radius turning vanes, interconnected with bars, adequately reinforced to suit the pressure and velocity of the system, constructed of the same material as the duct they are associated with, and in accordance with ANSI/SMACNA HVAC Duct Construction Standards Metal and Flexible.

.3 Manual Balancing (Volume) Dampers:

.1 Flanged and drilled, low leakage, single or parallel blade (depending on damper size) manual balancing dampers with AMCA certified maximum leakage through a 1.2 m x 1.2 m (4' x 4') damper of 52 L/s/m^2 (110 ft^3/min) against 1 kPa (0.145 psi) differential static pressure, each constructed of the same material as the connecting ductwork unless otherwise specified, each designed to maintain the internal free area of the connecting duct, and each complete with:

.1 Rectangular dampers: such as a Nailor Industries Inc. Model 1010 and 1020 damper, maximum size 1.2 m x 1.2 m (4' x 4') for a single damper and complete with:

.1 #16 gauge hat channel frame with reinforced corners and #16 gauge blades, galvanized steel for galvanized steel ductwork, Type 304 stainless steel for other ductwork unless otherwise specified.

.2 Dual durometer bulb type extruded PVC blade seals, and compression type cambered metal jamb seals.

.3 A hexagonal or square shaft extension through the frame.

.4 Non-stick, non-corrosive synthetic bearings for rectangular dampers, flange stainless steel bearings for round dampers, with an outboard support bearing and outboard support bearing bracket.

.5 Blade stops for single blade dampers, designed to prevent the blade from moving more than 90°.

.6 Plated steel linkage for multiple blade dampers, totally enclosed within the frame and out of the airstream.

.7 A locking hand quadrant damper operator with, for insulated ducts 50 mm standoff mounting.

.2 Round dampers: such as a Nailor Industries Inc. Model 1090 butterfly style damper, maximum 600 mm (24") diameter, equipped with:

.1 A #20 gauge frame with stiffening beads.

.2 2 #20 gauge blades laminated together, equivalent to #14 gauge, 90º rotation, with open/close end stops and a cross-linked polyethylene blade steel.

.3 12 mm (½") diameter drive shaft bolted to the blade and extended approximately 100 mm (6") beyond the frame.

.4 "Celcon" or equal bearings.

.5 A locking hand quadrant damper operator with, for insulated ducts 50 mm standoff mounting.

.2 Multiple Damper Section Assembly: An assembly supplied with the dampers or site constructed of the same material as the damper and designed for tight and secure mounting of the individual dampers.

.3 Acceptable manufacturers are:

.1 Nailor Industries Inc.

.2 T.A. Morrison & Co. Inc. "TAMCO"

.3 NCA Manufacturing Ltd.

.4 Greenheck Fan Corp.

.5 Ruskin Co.

.4 Backdraft Dampers:

.1 Counterbalanced backdraft dampers such as a T. A. Morrison & Co. Inc. "TAMCO" Series 7000, sized as shown and complete with:

.1 Extruded aluminium frame and blades, with captive extruded silicone blade and frame seals.

.2 Hard aluminum alloy crank arms, pivot rods, and linkage rod located out of the airstream.

.3 Maintenance free bearing system with an aluminum pivot point rotating in a "Celcon" or equal bearing.

.2 Acceptable manufacturers are:

.1 T.A. Morrison & Co. Inc. "TAMCO"

.2 Nailor Industries Inc.

.3 NCA Manufacturing Ltd.

.4 Greenheck Fan Corp.

.5 Ruskin Co.

.5 Fusible Link Dampers:

.1 Curtain blade type, dynamic, galvanized steel (unless otherwise specified) fusible link dampers, ULC classified to Standard CAN/ULC-S112 and in accordance with NFPA 90A requirements, factory tested for closure under airflow, 1 1/2 hour or 3 hour rated as required, and complete with:

.1 A constant force type 301 stainless steel closure spring.

.2 A blade lock assembly.

.3 A steel sleeve.

.4 Retaining angles.

.5 Unless otherwise specified, a 74°C (165°F) rated standard fusible link.

.2 Fusible link dampers are to be Type "B" or Type "C" (as required) with the folded curtain blade out of the air stream except where damper size or location requires the use of type "A" dampers with the curtain blade in the air stream.

.3 Acceptable fusible link damper manufacturers are:

.1 Nailor Industries Inc.

.2 Greenheck Fan Corp.

.3 Pottorff

.4 Ruskin Co.

.6 Flexible Connection Material:

.1 Waterproof, indoor-outdoor type flexible connection material meeting requirements of NFPA 90A, consisting of woven glass fibre fabric coated on both sides with synthetic rubber. Acceptable products are:

.1 Duro Dyne Canada Inc. "DUROLON"

.2 Dyn Air Inc. "HYPALON"

.7 Duct Access Doors:

.1 In accordance with ANSI/SMACNA HVAC Duct Construction Standards Metal and Flexible, with sizes suitable in all respects for the purpose for which they are provided, and, unless otherwise specified, constructed of the same material as the duct they are associated with.

.8 Ductwork Drain Points:

.1 Equal to Ductmate Canada Ltd. "DUCTMATE MOISTURE DRAIN", 20 mm (¾") diameter moisture drains with galvanized sheet metal funnel, and chrome plated brass threaded drain, nut and cap.

.9 Thermostats:

.1 Surface wall mounting programmable thermostats, line voltage or low voltage and single or double stage as required, each suitable for the product/system concerned, complete with:

.1 A factory set 0.55 to 1° C (1 to 1.8° F) dead band.

.2 Locking cover.

.3 Tamper-proof concealed adjustment set-point dial.

.4 “AAA” battery temperature indication backup.

.5 Digital display of temperature in ºF or ºC, a thermometer, and a 12 or 24 hour clock.

.6 As applicable, a HEAT-OFF-COOL switch and a FAN ON-OFF switch.

3 EXECUTION

3.1 INSTALLATION

.1 Installation Of Round To Rectangular Duct Connections:

.1 Cut round holes in rectangular ducts using a purpose made hole cutter and provide round to rectangular “Spin-In fittings with dampers for connection of flexible round ductwork. Seal the cut duct around the fitting.

.2 Installation Of Splitter Dampers:

.1 Provide splitter dampers in supply ductwork at branch duct connections off supply air mains, and wherever else shown and/or specified on the drawings. Install splitter dampers so they cannot vibrate and rattle and so that the damper operation mechanisms are in an easily accessible and operable location. Ensure that operators for dampers in insulated ducts are equipped with stand-off mounting brackets.

.3 Installation Of Turning Vanes:

.1 Provide turning vanes in ductwork elbows where shown on the drawings and wherever else required where, due to site installation routing and duct elbow radius, turning vanes are recommended in accordance with ANSI/SMACNA HVAC Duct Construction Standards Metal and Flexible.

.4 Installation Of Manual Balancing (Volume) Dampers:

.1 Provide manual balancing dampers in all open end ductwork, in all duct mains, and wherever else shown and/or specified.

.2 Install the dampers so that the operating mechanism is accessible and positioned for easy operation, and so that the dampers cannot move or rattle. Ensure that operating mechanisms for dampers in insulated ducts are complete with stand-off mounting brackets.

.3 Dampers in fresh air ducts, exterior wall/roof openings, etc., are to be insulated type.

.4 Confirm exact damper locations with personnel doing air quantity balancing testing work and install dampers to suit. Include for providing five additional dampers at no additional cost.

.5 Installation Of Backdraft Dampers:

.1 Provide backdraft dampers where shown.

.2 Install and secure the dampers so that they cannot move or rattle.

.6 Installation Of Fusible Link Dampers:

.1 Provide fusible link dampers where shown and/or specified on the drawings. Ensure that the damper rating (1½ or 3 hr.) is suitable for the fire barrier it is associated with.

.2 Install dampers with retaining angles on all 4 sides of the sleeve on both sides of the damper and connect with ductwork in accordance with the damper manufacturer’s instructions and details to meet Code requirements.

.3 Provide expansion clearance between the damper or damper sleeve and the opening in which the damper is required. Ensure that the openings are properly sized and located, and that all voids between the damper sleeve and the opening are properly sealed to maintain the rating of the fire barrier.

.7 Installation Of Flexible Connection Material:

.1 Provide a minimum of 100 mm (4") of flexible connection material where ducts, plenums, and/or casings connect to fans, and wherever else shown or specified.

.2 Rigidly secure a minimum of 75 mm (3") of duct material (minimum #24 gauge) to each edge of the flexible fabric and to the fan, duct, plenum, etc., in accordance with ANSI/SMACNA HVAC Duct Construction Standards Metal and Flexible. Ensure that connections to the flexible fabric material are arranged and supported so as to not impose any external forces on the fabric.

.8 Installation Of Duct Access Doors:

.1 Provide access doors in ductwork for access to all components which will or may need maintenance and/or repair, including reheat coils. Install in accordance with requirements of ANSI/SMACNA HVAC Duct Construction Standards Metal and Flexible.

.2 Identify access doors provided for fusible link damper maintenance with "FLD" stencil painted or marker type red lettering and ensure that the doors are properly located for damper maintenance.

.3 When requested, submit a sample of proposed duct access doors for review.

.4 Where sectionalized fusible link dampers and/or balancing dampers are provided in large ducts, provide a plenum type access door to suit, and adequately reinforce the ductwork to suit the access door installed.

.9 Installation Of Thermostats:

.1 Supply thermostats for control systems and mount on an outlet box approximately 1.6 m (5') above the floor where shown.

.2 Connect thermostats with control wiring in accordance with the drawings and the wiring requirements specified below in this Section.

.3 Check thermostat operation and adjust to design requirements.

.10 Control Wiring:

.1 Provide all required power wiring for controls from 15A-1P circuits terminated in junction boxes adjacent to the control work and do all control wiring to connect control components.

.2 Install wiring in conduit in accordance with electrical work wiring material and installation requirements.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

.2 Section includes: Provide air terminal units

.3 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 23 31 05 – Standard Ductwork

.2 Section 23 31 06 – Special Systems Ductwork

.3 Section 23 33 00 – Duct System Dampers and Accessories

1.2 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 American National Standards Institute (ANSI):

.1 ANSI/ASHRAE Standard 130, Laboratory Methods of Testing Air Terminal Units

.2 Air Conditioning, Heating, and Refrigeration Institute (AHRI):

.1 AHRI Standard 880, Standard for Performance Rating for Air Terminals

.3 Underwriters Laboratories (UL):

.1 UL 1995/CA C22.2 No. 236, Heating and Cooling Equipment

1.3 SUBMITTALS

.1 Submittals under this Section shall be in accordance with General Conditions and Section 01 33 00 – Submittals and Division 20.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this Section except for pipe and fittings, and chlorine.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:

.1 Acceptable Manufacturers:

.1 Price Industries Inc.

.2 Titus

.3 Nailor Industries Inc.

.4 Krueger Division of Air System Components Inc.

.5 Johnson Controls “York”

.6 Trane Technologies

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of piping specialty from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this Section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Series Fan Powered Constant Air Volume Terminal Boxes:

.1 Horizontal fan-powered terminal units with blower, motor, mixing plenum, and primary air damper contained in a single unit housing as per the drawing schedule, generally as specified for standard air volume boxes both complete with a return air fan section.

.2 Fan Section: Constructed of minimum #22 galvanized steel, internally lined as specified for terminal boxes, and complete with:

.1 Removable bottom access panel.

.2 Duct connection collar, and a backdraft damper.

.3 A direct connected fan-motor assembly, resiliently mounted, and consisting of an overload protected permanent split capacitor motor and a centrifugal, steel, dynamically balanced blower wheel with forward curved blades.

.4 A solid-state controller for adjusting air flow, with an input terminal for remote speed adjustment from a building automation system.

.1 Electrically Commutated Motor (ECM):

.1 Brushless DC controlled by an integrated controller/inverter that operates the wound stator and senses rotor position to electrically commutate the stator. The motor shall be supplied with a speed controller. The speed controller shall have dual outputs to control up to two motors, and allow for manual dial motor speed adjustment, or a [2-10 VDC] or [4-20 mA] signal for variable speed control.

.2 Permanent magnet type motor with near-zero rotor losses designed for synchronous rotation.

.3 Designed to maintain a minimum 70 percent efficiency over the entire operating range.

.4 The ECM shall be furnished with factory programming:

.1 Pressure Independent Program

.1 A pressure independent program shall be provided to allow the ECM to compensate for fluctuations in external static pressure, providing constant airflow.

.2 The air volume flow rate shall be maintained to within five percent of desired flow in a system with up to 0.50 inches water gauge of external static pressure.

.5 A forward curved, centrifugal type fan.

.3 Primary Air Damper Assembly:

.1 The damper assembly shall be heavy-gauge, galvanized steel with a solid shaft rotating in bushings.

.2 The damper shaft shall incorporate a visual position indicator etched into the end of the damper shaft to clearly indicate damper position over the full range of 90 degrees.

.1 The damper shaft shall be mounted on the right of the damper when looking in the direction of airflow.

.3 The low leakage 18 gauge damper assembly shall incorporate a peripheral gasket on the damper blades for tight airflow shutoff.

.1 Air leakage past the closed damper shall not exceed two percent of the unit maximum airflow at 3 inch water gauge inlet static pressure, tested in accordance with ASHRAE 130.

.2 The damper, seal and bushing system shall be tested to 1.25 million cycles, or the equivalent of 100 full open/closures per day for 35 years, with no visible signs of wear, tear, or failure of the damper assembly after such testing.

.4 Airflow Sensor:

.1 The airflow sensor shall be a differential pressure airflow device measuring total and static pressure, and shall be mounted to the inlet valve.

.2 Plastic parts shall be fire-resistant, complying with UL 94.

.3 The airflow sensor shall be RoHS (Restriction of Hazardous Substances) compliant. Materials containing polybrominated compounds shall not be acceptable.

.4 Control tubing shall be protected by grommets at the wall of the airflow sensor's housing.

.5 The airflow sensor shall be furnished with a minimum of twelve total pressure sensing ports and four static sensing ports, and shall include a center averaging chamber that amplifies the sensed airflow signal.

.6 The airflow sensor signal accuracy shall be plus or minus five percent throughout terminal operating range.

.5 Inlet Valve:

.1 The inlet valve shall be a consistent diameter to retain flex duct and provide a stop for hard duct.

.2 The gasket seal shall be a low leakage continuous piece with a peripheral gasket for tight airflow shutoff.

.3 The inlet valve shall include two heavy duty stop pins to accurately position the damper in the open and closed position.

.4 Electrical Requirements:

.1 Fan powered terminal units shall be provided with single-point power connection.

.2 The terminal unit equipment wiring shall comply with the requirements of NFPA 70.

.5 Hot Water Heat Coils: For boxes as scheduled, factory tested coils as per the drawing schedule, each complete with copper tubes mechanically expanded into plate type aluminum fins, factory mounted in an enclosure insulated with foil faced insulation meeting NFPA 90A and CAN/ULC-S102 25/50 flame spread and smoke developed criteria, and complete with a quick-opening insulated access panel sized and located for coil inspection and maintenance.

.1 The hot water coil casing shall be factory-installed on the terminal discharge with slip-and drive attachment for downstream ductwork.

.2 A gasketed and insulated access door shall be provided, located on bottom of unit.

.3 Coil handing shall be identical to unit handing.

.4 All water coils shall be hydrostatically tested to a minimum 390 pounds per square inch, with a minimum burst pressure of 1800 pounds per square inch at ambient temperature. All water coils are rated for a maximum of 300 pounds per square inch working pressure at 200 degrees Fahrenheit.

.5 The water coil shall be certified in accordance with AHRI 410 and units shall bear an AHRI 410 label.

.6 Thermostat and Accessories: For boxes as indicated, wall mounting thermostat with thermometer and guard, supplied with the boxes by the box manufacturer, suitable in all respects for the box it controls and the control sequence, and complete with all required installation and connection accessories.

3 EXECUTION

3.1 INSTALLATION

.1 Installation Of Terminal Boxes:

.1 Provide ceiling mounted terminal boxes where shown.

.1 Install the terminal units in accordance with the manufacturer's instructions.

.2 Install the inlets of the air terminal units with the air flow sensors a minimum of three duct diameters from elbows, transitions, and duct takeoffs.

.3 See drawings for the size(s) and duct location(s) of the air terminal units.

.4 Support the terminal units individually from the structure in accordance with manufacturer's recommendations.

.5 Do not support the terminal units from the ductwork.

.6 Verify that electric power is available and of the correct characteristics.

.2 Secure each box in place from the structure by means of galvanized steel angles and hanger rods, independent of connecting ductwork.

.3 Connect each box with ductwork as indicated. Provide straight inlet duct the same size as the box inlet and of a length equal to a minimum of four duct diameters. Refer to the drawing detail. Co-ordinate final box adjustments and settings with personnel doing system testing and balancing work.

.4 Testing, Adjusting and Balancing: When work is complete and equipment is operating as intended, test, adjust and balance air flows and temperatures in accordance with requirements specified in the mechanical work Section entitled Testing, Adjusting, and Balancing.

.5 Start-Up: Refer to the article entitled Equipment and System Start-up in the Mechanical Work General Instructions Section.

.6 Commissioning: Refer to commissioning requirements specified in the Mechanical Work General Instructions Section.

.7 Demonstration and Training: Refer to the article entitled Equipment and System O&M Demonstration & Training in the Mechanical Work General Instructions Section. Include for 3 hours of on-site operation demonstration and training for 2 groups of 6 people.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 Section includes: Provide grilles and diffusers

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 23 31 05 – Standard Ductwork

.2 Section 23 31 06 – Special Systems Ductwork

.3 Section 23 33 00 – Duct System Dampers and Accessories

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 American National Standards Institute (ANSI):

.1 ANSI/ASHRAE Standard 70, Method of Testing the Performance of Air Outlets and Air Inlets

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with General Conditions and Section 01 33 00 – Submittals and Division 20.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this Section except for pipe and fittings, and chlorine.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:

.1 Acceptable Manufacturers:

.1 Price Industries Inc.

.2 Krueger Division of Air System Components Inc.

.3 Titus HVAC

.4 Nailor Industries Inc.

.5 Metalaire

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of piping specialty from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this Section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Grilles And Diffusers:

.1 Grilles and diffusers of the type, size, capacity, finish, and arrangement as shown on the drawings and as per the drawing schedule, each equipped with all required mounting and connection accessories to suit the mounting location and application.

3 EXECUTION

3.1 INSTALLATION

.1 Installation Of Fire Stop Flaps And Thermal Blankets:

.1 Provide fire stop flaps in the duct connection necks of grilles and diffusers installed in ULC fire rated suspended ceiling systems where shown on the drawings.

.2 Provide thermal blanket material to completely cover grille and/or diffuser pans above suspended ULC fire rated ceilings. Cut, install, and secure in place in accordance with the manufacturer's instructions and ULC requirements.

.2 Installation Of Grilles And Diffusers:

.1 Provide grilles and diffusers where shown on the drawings. Wherever possible, grilles and diffusers are to be the product of one manufacturer.

.2 Unless otherwise specified connect grilles and diffusers in accordance with requirements of ANSI/SMACNA HVAC Duct Construction Standards Metal and Flexible.

.3 Exactly locate grilles and diffusers to conform to the final architectural reflected ceiling plans and detailed wall elevations, and to conform to the final lighting arrangement, ceiling layout, ornamental and other wall treatment.

.4 Equip supply diffusers having a basic four-way or all round air pattern for operation in one, two, or three way pattern where indicated on the drawings.

.5 Provide sheet metal plenums, constructed of the same material as the connecting duct, for linear grilles and/or diffusers where shown. Construct and install the plenums in accordance with requirements of ANSI/SMACNA HVAC Duct Construction Standards Metal and Flexible. Where individual sections of linear grilles or diffusers are not equipped with a volume control device, equip the duct connection collar(s) with volume control device(s).

.6 Confirm grille and diffuser finishes prior to ordering.

.7 Bolt grilles, registers, and diffusers in place and provide safety chains in gymnasiums and similar rooms or areas where the grille, register and diffuser may be subject to damage.

.3 Supply Of Door Grilles:

.1 Supply door grilles as shown and scheduled.

.2 Hand the grilles to the appropriate trade at the site for installation.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, the General Requirements of Division 01 and Division 20.

1.2 SUMMARY

.1 Section includes: Provide radiation units

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 23 21 13 – Hydronic Piping and Valves

.2 Section 23 21 16 – Hydronic Piping Specialties

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

.1 CSA-B214, Installation Code for Hydronic Heating Systems

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with General Conditions and Section 01 33 00 – Submittals and Division 20.

.2 Product Data:

.1 Product Data: Submit product data sheets for all products specified in Part 2 of this Section except for pipe and fittings, and chlorine.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:

.1 Acceptable linear ceiling panel radiation unit manufacturers are:

.1 Sigma Corp.

.2 Adair Industries "Airtex"

.3 Rosemex Inc.

.4 Frenger Systems Ltd.

.2 Requests for substitutions shall be made in conformance with Section 01 25 00 – Substitution Procedures.

.3 Substitution Limitations:

.1 No further substitutions will be permitted.

.4 Single source responsibility: Obtain each type of piping specialty from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this Section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

.1 Linear Radiant Ceiling Panels:

.1 Continuous linear radiant ceiling panels sized and arranged as shown and scheduled on the drawings, complete with:

.1 Extruded aluminum panels with aluminum saddles to secure 12 mm (½") diameter type "L" copper piping, non-hardening heat conductive paste between the piping and the panels, and a white finish factory applied to the face of each panel.

.2 Cross channel braces in quantities as recommended by the panel manufacturer to suit the panel length, and end and centre clips.

.3 All required type "L" copper piping return bends and connection fittings.

3 EXECUTION

3.1 INSTALLATION

.1 Installation Of Radiant Ceiling Panels:

.1 Provide linear radiant ceiling panels where shown. Install cross channel braces, end and centre clips as per the panel manufacturer’s published details.

.2 Secure panels in place on T-bars and/or wall channel moulding provided as part of the suspended ceiling system work and provide ceiling hanger wire at 1.2 m (4’) centres between the structure and the cross-channel braces.

.3 Interconnect radiant panels by means of 12 mm (½”) diameter soft copper tubing or connection accessories supplied with the panels, as required. Ensure that the heating piping system has been flushed and cleaned prior to connecting the radiant panels.

.4 Personnel handling the unprotected panels are to wear clean white gloves to avoid soiling the panel face finish.

.5 When installation of the panels is complete, cover the top of all active panels with 25 mm (1”) thick glass fibre batt insulation.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, and Division 01 – General Requirements.

1.2 SUMMARY

.1 This Section specifies requirements and instructions that are common to Electrical Division of the Specification and it is a supplement to each section and is to be read accordingly.

.1 Any item or subject which is shown, mentioned, or reasonably implied on either drawings or in the specifications, is considered to be properly and sufficiently specified and shown; and must be provided. Provide all material, labour, equipment, tools, consumables, etc. required to complete all the work of the Electrical Division

.2 These common works relate to all scope of work related within the Electrical Divisions which incorporates:

.1 Electrical Drawings

.2 Division 26 Electrical specification

.3 These common works also have the following Sections which are applicable to all Sections within this Division and supplement this Section:

.1 26 05 02 – Firestopping and Smoke Seal Systems

.2 26 05 03 – Electrical Work Testing

.3 26 05 05 – Demolition and Revision Work

.4 26 05 53 – Identification for Electrical Systems

.2 Products furnished/supplied but not installed under this Section:

.1 Supply to Division 09 installer the access doors. Provide location where these doors and orientation these doors should be installed.

.3 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Division 02 Existing Conditions

.2 Section 03 30 00 Cast-in-Place Concrete

.3 Division 09 Finishes

.4 Division 26 Electrical

1.3 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 If a change to the work is requested, the Contractor to submit pricing for the change including an itemized list of the associated material and labour changes and costs. Apply mark-up as indicated in the Contract.

.2 A change must be approved by the Contractor before the work is to proceed. If work is performed without such approval, it is performed at the Contractor's or Sub-Contractors' risk.

.3 In the event of a disagreement by the Contractor over valuation of the change in work, resolution will follow the procedure outlined below:

.1 Labour hours are derived using the RSMeans Electrical Costing Book.

.2 Labour rates are as stated in the Instructions to Bidders.

.3 Material prices are "Trade" prices provided by a local supplier or distributor.

.4 Material requirements are obtained from field measurements.

.5 Major equipment prices are reasonably negotiated.

.2 Progress Payment Breakdown:

.1 Submit, prior to submittal of the first progress payment draw, a breakdown of the cost of the electrical work to assist the Consultant in reviewing and approving monthly progress payment claims.

.2 The payment breakdown is subject to the Consultant's approval and progress payments will not be processed until an approved breakdown is in place. The breakdown is to include one-time claim items such as mobilization and demobilization, insurance, bonds (if applicable), shop drawings and product data sheets, commissioning, and project closeout submittals.

.3 Breakdown to include the following line items as a minimum:

.1 Job costs (permits, bonds, mobilization, supervision, and job foreman)

.2 Demolition and relocation

.3 Distribution and service (panels, feeders, and main service)

.4 Mechanical equipment wiring (to include starters, motor control centres, disconnect switches, and wiring)

.5 Electric heating

.6 Branch wiring (to include devices, cover plates, installation, and wiring)

.7 Lighting (to include fixtures, poles, mounting, installation, and wiring)

.8 Emergency lighting system (to include battery units, exit lights, remote fixtures, and wiring)

.9 Lighting control system

.10 Extra-low voltage pathways (to include cable tray, wireways, conduits, sleeves, ductbank, and firestopping)

.11 Audio-visual system

.12 Intercom and paging

.13 Fire alarm system

.14 Miscellaneous equipment, systems, and associated wiring

1.4 REFERENCES

.1 Definitions:

.1 The following are definitions of words found in electrical work Sections of the Specification and on associated drawings:

.1 "concealed" – means work hidden from normal sight in furred spaces, shafts, tunnels, ceiling spaces, walls and partitions

.2 "exposed" – means work normally visible, including work in electrical and equipment rooms and similar spaces

.3 "provide" (and tenses of provide) – means supply and install complete

.4 "install" (and tenses of install) – means install and connect complete

.5 "supply" – means supply only

.6 "finished area" - means any area or part of an area which receives a finish such as paint, or is factory finished

.7 "governing authority" and/or "regulatory authority" and/or "Municipal authority" – means all government departments, agencies, standards, rules and regulations that apply to and govern the electrical work and to which the work must adhere

.8 "Consultant" – means the Architect or Consulting Engineer who has prepared the Contract Documents on behalf of the Owner

.2 Wherever the words "indicated", "shown", "noted", "listed", or similar words or phrases are used in the specification they are understood, unless otherwise defined, to mean that the product referred to is "indicated", "shown", "listed", or "noted" on the drawings.

.3 Wherever the words "approved", "satisfactory", "as directed", "submit", "permitted", "inspected" or similar words or phrases are used in the specification or on the drawings they are understood, unless otherwise defined, to mean that work or product referred to is "approved by", "inspected by", etc., the Consultant.

.4 In the electrical specification, singular may be read as plural, and vice-versa.

.2 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Division. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 American National Standards Institute (ANSI):

.1 ANSI/ASHRAE/IES 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings

.2 Canadian Standards Association (CSA):

.1 CAN/CSA-Z32 – Electrical Safety and Essential Electrical Systems in Healthcare Facilities

.2 CAN/CSA-Z317.10 – Handling of Waste Materials in Healthcare Facilities

.3 CAN/CSA-Z317.13 – Infection Control During Construction, Renovation, and Maintenance of Health Care Facilities

.4 CAN/CSA-Z8001 – Commissioning of Healthcare Facilities

.3 Underwriters Laboratories of Canada (ULC):

.1 CAN/ULC-S1001 – Standard for Integrated Systems Testing

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Plan work well in advance to eliminate delivery, installation and co-ordination difficulties. Be held equally responsible with other Sections or Divisions to resolve interferences and to co-operate with other Sections to satisfactorily complete the project. Being there first will not be accepted as a legitimate reason.

.2 Examination of site and documents:

.1 When estimating the cost of the work and prior to submitting a bid for the work carefully examine all the bid documents and visit the site to determine and review all existing site conditions that will or may affect the work and include for all such conditions in the bid price.

.2 Report to the Consultant, prior to bid submittal, any existing site condition that will or may affect performance of the work as per the drawings and specifications. Failure to do so will not be grounds for additional costs.

.3 Drawings and Specification:

.1 Read the electrical work drawings in conjunction with all work drawings including but not limited to civil, landscaping, structural, architectural, sprinkler, and mechanical.

.2 The electrical drawings are performance drawings, diagrammatic, and show approximate locations of equipment and connecting services. Any information regarding accurate measurement of the building is to be taken at the site. Do not scale the drawings, and do not use the drawings for prefabrication work.

.3 The drawings are intended to convey the scope of work and do not show architectural and structural details. Include cost for all offsets, fittings, transformations, and similar products required as a result of obstructions and other civil, architectural and structural details but not shown on the drawings.

.4 The locations of equipment and materials shown may be altered, when reviewed by the Consultant. Include cost to meet requirements of the equipment and/or materials, other equipment or systems being installed, and of the building.

.5 Sections of the Electrical Division are not intended to delegate functions nor to delegate work and supply of materials to any specific trade, but rather to generally designate a basic unit of work, and the Sections are to be read as a whole.

.6 The electrical specification does not generally indicate the specific number of items or extent of material required. The specification is intended to provide product data and installation requirements. It is necessary to refer to drawing schedules, layouts, schematic diagrams, riser diagrams, and details to determine correct quantities.

.7 The electrical drawings and specification are intended to be cooperative. Perform all work that is shown, specified, or reasonably implied on the drawings but not mentioned in the specification, or vice-versa, as though fully covered by both.

.8 When the scale and date of the drawings are the same, or when the discrepancy exists within the specification, the costliest arrangement will take precedence.

.9 In the case of discrepancies between the drawings and specifications, the documents will govern in the order specified in the General Conditions, however, when the scale and date of the drawings are the same, or where the discrepancy exists within the specification, the costliest arrangement will take precedence.

.4 Coordination:

.1 Relation to other sections:

.1 Provide all cutting and patching required for the Section work by the appropriate trade at the expense of the Electrical Division, unless otherwise specified or shown. Refer to the Architectural Specifications and drawings for details of cutting and patching provisions and requirements.

.2 Provide all sleeves, inserts, hangers and core drilling of slabs, etc., required for completion of the Section work. Coordinate the location of inserts, sleeves, hangers, holes, back boxes, tubs, junction boxes, etc., with the respective Section into whose materials they are being installed. Extend all floor and roof sleeves 100 mm (4 in) above the finished levels, unless noted otherwise. Complete all roof sleeves with roof flashing and rain shields to ensure a weatherproof seal.

.3 Cut holes and install sleeves for electrical installations piercing fire, smoke, thermal, exterior, and acoustic separations to minimum sizes.

.1 Install firestopping and smoke seals in accordance with Section 26 05 02 – Firestopping and Smoke Seals.

.2 Seal all gaps on both sides of the separation by a qualified tradesman using materials and methods described in the applicable specification section, to maintain the appropriate rating, acoustic, thermal bridge, or water resistance. All costs for such will be paid for by the Electrical Division.

.3 If an existing penetration is not properly sealed to these standards, either provide new penetration for work and seal appropriately, or seal entire opening including existing penetrations. Where multiple Divisions are penetrating the same separation, group services and share sealing costs where appropriate.

.4 Where access doors are required for electrical installations, supply types with self opening screwdriver lock and positive latching mechanism to the appropriate Division 09 subtrade for installation by them in the walls or ceiling. Pay all cost for installation by Division 09. Access doors are required where electrical equipment is located behind non-accessible surfaces and where access to, or servicing of the equipment is necessary. The access door size and fire rating must be approved by the Contractor. Refer to the Architectural Specifications for details of access door installation requirements. Provide installations to avoid the need for access doors where indicated.

.5 Deliver all electrical equipment and fixtures to the site with the specified finish. Provide touch up painting of electrical equipment scratched on site. Finish painting of primed electrical equipment and all concealed or exposed conduit, boxes, etc., as required will be provided by Division 09. Where finish painting and priming is within existing exposed ceiling, cost to be carried by this Division.

.6 Immediately wrap and seal in plastic “bubble” wrap all fixtures, equipment, and system components delivered to the site and not contained in sealed cardboard cartons. Following installation, the items will be protected from dirt, dust, and damage with similar plastic wrap or protective enclosures until energized and put into full operation.

.7 Coordinate installation of switches, thermostats, and other devices together at one common location with installing Sections and obtain approval on site from the Contractor of exact arrangement.

.2 Work in existing building:

.1 Complete all demolition and revision work in accordance with Section 26 05 05 – Demolition and Renovation Work.

.2 Visit the site to examine the existing conditions and make necessary allowances in bid price for demolition, removal, relocation, re-routing and reconnection of existing electrical equipment and wiring as required for the execution and completion of this project. In general, relocate existing services as required to accommodate new work and architectural changes. In areas being totally renovated, provide all remaining electrical demolition work and replace existing installations with new as shown. Remove all existing redundant installations prior to final acceptance. Include in the bid price extra charges for premium time and temporary provisions, if required, to complete the work as described and according to the schedule provided.

.3 Install all conduit and feeders through the existing building along routes shown on the drawings or approved on site by the Owner and Contractor. New installations will not necessarily be allowed along shortest routes but should follow routes indicated or corridors or routes of other services where possible if not shown.

.4 Unless noted otherwise, all existing electrical equipment and cabling which has not been removed or identified to be turned over to the Owner will become the property of the Division (for disposal or removal from the site as applicable) and have an appropriate salvage value included in the bid amount.

.5 Clean and paint, as appropriate, existing electrical equipment removed and indicated for re-use on this project. Refurbish or replace as required before re-installation.

.6 Re-routed as required wiring location in areas being altered or demolished, by re-feeding outlets or equipment required to remain in service to maintain the continuity of these services.

.7 Coordinate sequence of removal and relocation of existing equipment and wiring with the other Sections and conform to the requirements and conditions outlined.

.8 Provide adequate protection to existing cabling and equipment throughout the project and particularly where cabling and electrical equipment have become exposed to mechanical injury or moisture in the course of alterations or new construction.

.9 In some instances, new outlets and equipment are shown in the same location as the existing outlets, these may be fed through the existing conduits provided that the conduits and cabling are in good condition and are acceptable to the Electrical Authority as reusable. All unused conduit entrance openings will be sealed.

.3 Power Interruptions:

.1 Keep service and distribution system power interruptions to a minimum. Coordinate power interruptions with the Owner and all other Subcontractors. Provide to the Owner written application for electrical interruptions from the Electrical Division indicating the date, time, and estimated duration of the interruption. Submit application for approval of the power interruptions to the Owners and Contractor at least two weeks prior to the requested shut-down date.

.2 Prior to each shutdown or interruption, again inform the Owner in writing seventy-two hours in advance of the proposed shutdown or interruption and obtain written approval to proceed. Do not shutdown or interrupt any system or service without such written approval.

.3 Perform work associated with shutdowns and interruptions as continuous operations to minimize the shutdown time and to reinstate the systems as soon as possible and prior to any shutdown, ensure that all materials and labour required to complete the work for which the shutdown is required are available at the site.

.5 Planning and layout of the work, and associated drawings:

.1 Properly plan, coordinate, and establish the locations and routing of services with all subcontractors affected prior to installation such that the services will clear each other as well as any obstructions, including structural components of the building. Unless otherwise specified, the order of right-of-way for services is to be as follows:

.1 piping requiring uniform pitch

.2 piping 100 mm (4 in) diameter and larger

.3 large ducts (main runs)

.4 electrical cable tray and bus duct

.5 conduit 100 mm (4 in) diameter and larger

.6 piping less than 100 mm (4 in) diameter

.7 smaller branch ductwork

.8 conduit less than 100 mm (4 in) diameter

.2 Unless otherwise shown or specified, conceal all work in finished areas, and conceal work in partially finished or unfinished areas to the extent made possible by the area construction. Install conduit, raceway, and similar services as high as possible to conserve headroom and/or ceiling space. Install cable tray used for extra-low voltage cables as low as possible where removable finished ceilings are installed. Notify the Consultant where headroom or ceiling space appears to be inadequate prior to installation of the work.

.3 Revise or alter the arrangement of work that has been installed without proper coordination, study and review, even if it was completed in accordance with the Contract Documents, in order to conceal the work behind finishes, or to allow the installation of other work, at no additional cost. In addition, pay for the cost of alterations in other work required by the alterations to your work.

.4 All junction boxes, equipment and similar products, particularly such products located above suspended ceilings must be located for easy access for servicing and/or removal. Products which do not meet this location requirement are to be relocated to an accessible location at no additional cost.

.6 Permits, Fees, And Certificates:

.1 Apply for, obtain and pay for all permits required to complete the electrical work.

.2 Submit to the Consultant, all approval/inspection certificates issued by governing authorities to confirm that the work as installed is in accordance with the rules and regulations of the governing authorities. Pay any costs associated with issue of the certificates.

.7 Workplace Safety:

.1 Comply with requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding the use, handling, storage, and disposal of hazardous materials. Submit WHMIS MSDS (Material Safety Data Sheets) for all products where required and maintain one copy at the site in a visible and accessible location available to all personnel.

.2 Comply with all requirements of Occupational Health and Safety Regulations and all other regulations pertaining to health and safety, including worker's compensation/ insurance board and fall protection regulations.

.3 Asbestos, Mould, Lead Paint, PCBs, or other hazardous material: If at any time during the course of the work asbestos containing materials, black mould, lead paint, or any other such materials are encountered or suspected, immediately report the discovery to the Contractor and cease all work in the area in question. Do not resume work in affected areas until the material is properly identified as non-hazardous or the situation has been properly corrected with written approval from the Owner.

1.6 SUBMITTALS

.1 Submittals under this Division to be in accordance with Section 01 33 00 – Submittal Procedures.

.2 Regulatory Communications:

.1 Forward to the Contractor copies of all correspondence and instructions from the Electrical Authority or any other Authority having Jurisdiction for clarification and action.

.3 Shop Drawings/Product Data:

.1 Shop drawings are those prepared specifically for the Project. Product data sheets are copies of manufacturer's standard catalogue or literature.

.2 Shop drawings and product data sheets must confirm that the product proposed meets all requirements of the Contract Documents.

.3 Submit for review Shop Drawings and Product Data sheets, in electronic PDF format, covering all items or equipment to be installed under the Contract (faxed and generic documents are not acceptable). Shop drawings and product data sheets to show all physical properties, relevant performance, and installation information. The drawings and data required to generally be as outlined under each Section of the Specification but will not be restricted to the items listed. Distribute reviewed Shop Drawings and data sheets to other relevant Sections as required for completion of their related work.

.4 All submitted Shop Drawings and data sheets must have been reviewed in detail by the Contractor and must bear their stamp. Should the drawings not have been reviewed and stamped, they will be rejected immediately.

.5 Each shop drawing or product data sheet is to be properly identified with the project name and the product drawing or specification reference, for example "Lighting Fixture F1", and all shop drawing or product data sheet dimensions are to be either metric or imperial to match dimensions on the drawings.

.6 Equipment will not be accepted on site until review of shop drawings and data sheets is complete. shop drawings or data sheets marked "Reviewed as Modified" are conditionally approved such that the Contractor to ensure equipment satisfies all Contract requirements. Delivery of equipment may proceed but final, corrected shop drawings and data sheets must be submitted prior to close of Contract.

.7 This review is for the sole purpose of ascertaining conformance with the general design concept. This review will not mean that the reviewer approves the detail design inherent in the shop drawing, responsibility for which will remain with the Section submitting same, and such review does not relieve the Electrical Division of their responsibility for efforts or omissions in the Shop Drawings and data sheets or of their responsibility for meeting all requirements of the Contract Documents. The Electrical Division is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to the fabrication processes or to techniques of construction and installation, for all quantities indicated and for co-ordination of the work of all Sections.

1.7 CLOSEOUT SUBMITTALS

.1 Submittals under this Section shall be in conformance with Section 01 77 00 – Closeout Procedures.

.2 Operation and Maintenance Manuals:

.1 Forward to the Contractor “Maintenance and Instruction Manuals” within four (4) weeks of substantial completion of the project.

.2 Provide all closeout submittals in a digital format. Organize all individual electronic documents in directories similar to the tabs in a binder and filenames in plain English describing of the contents within each file. Provide all documents in unsecured PDF format with searchable text. Provide all audio and video content encoded in a format that can be viewed using standard codecs freely available on the most current version of Microsoft Windows operating system.

.3 Each manual will contain, but not be restricted to, the following information:

.1 each shop drawing (revised as per the reviewed drawings)

.2 each product data sheet (revised as per the reviewed drawings)

.3 equipment parts list

.4 recommended list of spare parts

.5 operating and maintenance instructions

.6 equipment installation details, construction and performance data

.7 summary of all training provided including full training documents and audio-visual content

.8 list of all manufacturing and equipment service depots including address, email and telephone numbers

.9 Electrical Authority final inspection certificate

.10 emergency lighting test results

.11 fire alarm verification certificate and test report

.12 fire alarm audibility report

.13 integrated systems testing report

.14 lighting recycling certificate

.15 any other certificates, approval letters, etc.

.4 Provide qualified technicians to instruct the Owner's Representatives in the operation and maintenance of the systems and equipment included in the Electrical Division.

.3 Warranty Documents:

.1 Provide warranty documents in conformance with Section 01 77 00.

.2 Provide to the Consultant, all specified warranties, extended warranties, and free manufacturer extended warranties as applies to each individual section.

.3 The warranty period(s) commences on the date of Substantial Performance of the Work and shall be valid for the full duration specified.

.4 Submit warranties to the Consultant prior to Final Payment Certification.

.4 Record Documents:

.1 As-Built Drawings:

.1 During the progress of the work the Electrical Division will always keep on the site, a complete and separate set of prints and will note thereon clearly, neatly, accurately and promptly all Architectural, Structural, Mechanical and Electrical changes, revisions and additions to the work and deviations from the Contract Documents.

.2 Include accurate locations, depth, size, content, and type of all below grade pathways in these as-built drawings.

.3 Indicate also on the as-built drawings the location of access panels or removable ceiling tiles which cover equipment or junction boxes which may require future access or where conduit or wiring for future use is located.

.4 Prepare the final as-built drawings will all changes, revisions, and additions to the work and deviations from the Contract Documents by a qualified draftsperson in AutoCAD at the contractor's expense as an electronic copy and one hard copy to be submitted to the Contractor at the completion of the project with an application for a Certificate of Total Performance. Eradicate obsolete information from final as-built drawings.

.5 Submit as-built drawings in electronic format. All documents will be in both AutoCAD and unsecured PDF format.

1.8 QUALITY ASSURANCE

.1 Regulatory Requirements:

.1 All work carried out under this Contract will comply with, but not be limited to the requirements of the latest edition of the following codes and regulations:

.1 Ontario Electrical Safety Code complete with Bulletins and Amendments.

.2 Ontario Building Code complete with Supplemental Bulletins and its referenced standards.

.3 Applicable Standards from CSA, ULC, and from other standards organizations indicated herein.

.4 All applicable Federal, Provincial, Municipal and Industry standards and regulations.

.2 All electrical items are to be certified and bear the stamp or seal of a recognized testing agency such as CSA, UL, ULC, ETL, or bear a stamp to indicate special electrical authority approval.

.3 Requirements of the Contract Documents are to take precedence when they are more stringent than codes, ordinances, standards, and statutes.

.2 Qualifications:

.1 Installer's:

.1 Installer/Applicator/Erector to have a minimum of 5 years' continuous Canadian experience successfully completing projects similar in size and complexity as the Work of this Division. Submit proof of experience upon Consultant's request.

.2 Provide all work for Division 26 Electrical by qualified journeyman electricians or apprentices, holding valid provincial Certificates of Qualification, and be supervised by a competent foreman.

.3 Provide all work for Division 27 Communications and Division 28 Electronic Safety and Security by qualified technicians with documented certifications by manufacturers of equipment being installed and be supervised by a competent foreman.

.4 The work of the Electrical Division will be reflected in the quality of installations - any unsatisfactory installations will be removed and replaced accordingly.

.5 Provide all changes or alterations to the installations of this project required by an authorized Inspector of an Authority Having Jurisdiction in accordance with the terms and conditions of Contract.

.3 Certifications:

.1 Obtain all permits and certificates bearing upon this Trade and pay all fees and charges for same.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials of this Division in accordance with Section 01 61 00 – Common Product Requirements.

1.10 PROJECT CONDITIONS

.1 Existing Conditions:

.1 Visit the site of the building and examine the existing conditions in relation to the work to be done. The Electrical Division to be responsible to allow for any requirements which could have been revealed during such examinations.

.2 Prepare a complete set of Interference drawings in co-ordination with other Sections for all typical or critical locations to indicate site installation conditions where space is limited. Use field measurements to indicate accurate dimensions and configurations of all Electrical services in relation to Structural and Architectural conditions as well as Mechanical services. Coordination with other Sections in the preparation of Drawings and layout of the related work is imperative. Submit these interference drawings to the Contractor for review prior to proceeding with any related work, according to normal Shop Drawing procedure.

1.11 WARRANTY

.1 All materials and installations of the Electrical Division will be guaranteed for a period of two years from the date of final acceptance of the work unless otherwise specified, regardless of the extent of equipment manufacturer's warranties.

2 PRODUCTS

2.1 MANUFACTURERS

.1 Alternate Manufacturers:

.1 In some sections of this specification, materials and equipment are specifically described and named by manufacturer for the purpose of establishing a minimum standard of materials, product quality and other specified requirements.

.2 The project systems design as per the Drawings and Specifications is based on the specified manufacturer's equipment but is intended to be appropriate for equivalent equipment of all other manufacturers contained listed in the Approved Manufacturers list within each Section.

.3 Products of manufacturers listed as "Alternates" are subject to product data and shop drawing review to ensure that they are equivalent to the products of the specified manufacturer. Alternate manufacturer's equipment will conform to the space limitations imposed by the project and the intent as outlined in this Specification and Drawings.

.4 The Electrical Division is encouraged to submit alternative proposals of manufacturers not listed in the Approved Manufacturers List of proposals or modified design with appropriate costs, delivery, and system design adjustments which they feel may be advantageous considerations for the project.

3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions:

.1 Examine all work of other Sections upon which the Work of each Section depends.

.2 Do not proceed with installation until all wet work such as concrete and painting has been completed and thoroughly dried.

.3 Report in writing to the Consultant/Project Manager any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work of each Section.

.4 Do not proceed with Work of each Section until all unsatisfactory conditions have been rectified and site conditions are ready to receive work.

.5 Commencement of work implies acceptance of existing conditions and work by other Sections.

3.2 PREPARATION

.1 Protection of in-place conditions:

.1 Provide temporary protection of adjacent areas and surfaces by means of masking (enclosures) where necessary to prevent contamination by Work of each Section.

3.3 INSTALLATION

.1 Installation of equipment:

.1 Unless otherwise specified all equipment is to be installed in accordance with the equipment manufacturer's recommendations and instructions, and requirements of governing Codes, Standards, and Regulations. Governing Codes, Standards, and Regulations take precedence over manufacturer's instructions.

.2 Ensure that proper access and service clearances are maintained around equipment, and, where applicable, access space for future equipment removal or replacement is not impeded. Remove and replace any equipment which does not meet this requirement.

.2 Scaffolding, Rigging, And Hoisting:

.1 Unless otherwise specified or directed, supply, erect and operate all scaffolding, rigging, hoisting equipment and associated hardware required for your work. Immediately remove from the site all scaffolding, rigging, and hoisting equipment when no longer required.

3.4 SITE QUALITY CONTROL

.1 Site Tests and Inspections:

.1 Conduct field inspection and testing as specified in Section 01 40 00

.2 Non-Conforming Work:

.1 Defective materials or quality of work, whenever found, at any time prior to acceptance of the work, shall be rejected regardless of previous inspection. Inspection will not relieve responsibility but is a precaution against oversight or errors.

.2 Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to the satisfaction of the Consultant at no additional cost to the Owner.

.3 Manufacturer Services:

.1 When equipment/system installation is complete, but prior to start-up procedures, arrange and pay for the equipment/system manufacturer's authorized representative to visit the site to examine the installation, and when any required corrective measures have been made, to certify in writing to the Consultant that the equipment/system installation is complete and in accordance with the equipment/system manufacturer's instructions.

3.5 SYSTEM STARTUP

.1 Preform all testing in accordance with Section 26 05 03 – Electrical Work Testing.

.2 Conduct acceptance tests to demonstrate that the equipment and systems meet the specified requirements. Conduct tests as soon as conditions permit. Make all changes, adjustments or replacements required as the preliminary tests may indicate.

.3 Operate all the equipment under normal conditions for a minimum period of five days as a start-up test. Defects disclosed must be repaired and tests repeated until pronounced satisfactory.

.4 Conduct final acceptance tests in the presence of the Contractor. Invite Consultant and Owner to attend with a minimum of one week's notification.

.5 Provide the services of one journeyman electrician and all ladders, tools, consumables, and associated equipment to assist the Contractor in carrying out the test.

3.6 ADJUSTING

.1 Adjust moving or operating parts to operate/function smoothly and properly.

3.7 CLEANING

.1 Clean work area daily in accordance with Section 01 74 00 – Cleaning and Waste Management.

.2 Remove all excess materials from site as Work proceeds and at completion.

.3 On completion of the Work remove all tools, containers, surplus materials, equipment, waste, etc.; and leave site neat, clean, and tidy to the satisfaction of the Owner.

.4 Clean and make good surfaces soiled or otherwise damaged because of Work of each Section at no additional cost to the Owner.

.5 Leave surfaces clean and ready for subsequent Work.

3.8 CLOSEOUT ACTIVITIES

.1 Equipment and System Commissioning:

.1 After successful start-up and prior to Substantial Performance, commission the electrical work in accordance with requirements of CSA Z320, Building Commissioning. Use commissioning sheets included with the CSA Standard, and any supplemental commissioning sheets required. Submit final commissioning data sheets, project closeout documents, and other required submittals.

.2 Equipment and system Operation and Maintenance (O&M) demonstration and training:

3.9 PROTECTION

.1 Protect installed materials to prevent damage by other trades for the duration of the construction period. Use materials that may be easily removed without leaving residue or permanent stains.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 01 and Section 26 05 00 Common Work Results for Electrical.

1.2 SUMMARY

.1 This Section specifies fire stopping and smoke seal requirements that are common to electrical work Sections of the Specification and it is a supplement to each Section and is to be read accordingly.

1.3 REFERENCES

.1 Acronyms/Abbreviations:

.1 MSDS: Material Safety Data Sheet

.2 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Underwriters Laboratories of Canada (ULC):

.1 CAN/ULC-S101 Standard Method of Fire Endurance Tests of Building Construction and Materials

.2 CAN/ULC-S115 Standard Method of Fire Tests of Firestop Systems

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with Section 26 05 00 Common Work Results for Electrical.

.2 Product Data:

.1 Submit manufacturer's Product data sheets and MSDS for Products proposed for use in the Work of this Section. Include printed technical data, installation instructions and general recommendations for all materials and components. Include certification indicating compliance of materials with project requirements

1.5 CLOSEOUT SUBMITTALS

.1 Submittals under this Section shall be in conformance with Section 26 05 00 Common Work Results for Electrical.

.2 Test and Evaluation Reports:

.1 Submit a letter of proper firestopping and smoke seal certification as specified in Part 3 of this Section.

1.6 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer:

.1 Installer shall have a minimum of 5 years' continuous Canadian experience successfully completing projects similar in size and complexity as the Work of this Section. Submit proof of experience upon Consultant's request.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:

.1 Acceptable Manufacturers:

.1 A/D Fire Protection Systems "FIREBARRIER"

.2 Tremco Fire Protection Systems "TREMstop"

.3 3M "Fire Barrier"

.4 Hilti Firestop Systems

.5 Specified Technologies

.2 Requests for substitutions shall be made in conformance with Section 26 05 00 Common Work Results for Electrical.

2.2 MATERIALS

.1 Firestopping and Smoke Seal System Materials

.1 Asbestos-free elastomeric materials tested, listed and labelled by ULC in accordance with CAN4-S115, Standard Method of Fire Tests of Firestop Systems and CAN/ULC-S101, Standard Method of Fire Endurance Tests of Building Construction and Materials for installation in ULC designated firestopping and smoke seal systems to provide a positive fire, water and smoke seal, and a fire-resistance rating (flame, hose stream and temperature) not less than the fire resistance rating of surrounding fire rated construction.

.2 Materials are to be compatible with abutting dissimilar materials and finishes and complete with primers, damming and back-up materials, supports, and anchoring devices in accordance with the firestopping manufacturer's recommendations and the ULC tested assembly.

3 EXECUTION

3.1 PREPARATION

.1 Abide by the following requirements:

.1 examine substrates, openings, voids, adjoining construction and conditions under which the firestop and smoke seal system is to be installed, and confirm compatibility of surfaces

.2 verify penetrating items are securely fixed and properly located with the proper space allowance between penetrations and surfaces of openings

.3 report any unsuitable or unsatisfactory conditions to the Contractor and Consultant in writing, prior to commencement of work, and note that commencement of work will mean acceptance of conditions and surfaces

.4 mask where necessary to avoid spillage and over coating onto adjoining surfaces, and remove stains on adjacent surfaces

3.2 INSTALLATION

.1 Where electrical work penetrates fire rated construction, provide ULC listed and labelled firestopping and smoke seal materials installed in accordance with requirements of CAN4-S115 (ratings F, FT, FH, and FTH as required), CAN/ULC-S101, and all other governing authorities to seal the penetrations.

.2 Application: Conform to the following application requirements:

.1 use an experienced applicator approved by the manufacturer of the firestopping material manufacturer

.2 prime substrates in accordance with the product manufacturer's written instructions

.3 provide temporary forming as required and remove only after materials have gained sufficient strength and after initial curing

.4 tool or trowel exposed surfaces to a neat, smooth, consistent finish

.5 remove excess compound promptly as work progresses and upon completion

.6 at all cable transit locations, seal the perimeter of the angle iron framing on both sides of the wall or slab with ULC listed and labelled sealant materials to provide a positive smoke seal

3.3 SITE QUALITY CONTROL

.1 Site Tests and Inspections:

.1 Notify the Consultant when the work is complete and ready for inspection, and prior to concealing or enclosing firestopping and smoke seal materials and service penetration assemblies. Arrange for final inspection of the work by the Municipal Building Inspector prior to concealing or enclosing work. Make any corrections required.

.2 Non-Conforming Work:

.1 Defective materials or quality of work, whenever found, at any time prior to acceptance of the work, shall be rejected regardless of previous inspection. Inspection will not relieve responsibility but is a precaution against oversight or errors.

3.4 CLOSEOUT ACTIVITIES

.1 Certification:

.1 On completion of the firestopping and smoke sealing installation submit a letter of assurance to the Consultant certifying that the firestopping and smoke sealing installation has been carried out throughout the building to all electrical service penetrations and that the installation has been done in strict accordance with the requirements of the Provincial Building Code, any applicable local Municipal Codes, ULC requirements, and the manufacturer's instructions.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 01 and Section 26 05 00 Common Work Results for Electrical.

1.2 SUMMARY

.1 This Section specifies requirements, criteria, methods and execution for electrical demolition work that are common to one or more electrical work Sections, and it is intended as a supplement to each Section and is to be read accordingly.

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

.1 CSA S350 Code of Practice for Safety in Demolition of Structures

2 EXECUTION

2.1 EXAMINATION

.1 Verification of Conditions:

.1 Examine all work of other Sections upon which the Work of this Section depends.

.2 If hazardous materials and/or waste not listed in the Specification is found, stop the associated work and notify the Owner and Consultant immediately and await directions.

.3 Report in writing to the Consultant/Project Manager any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work of this Section.

.4 Do not proceed with Work of this Section until all unsatisfactory conditions have been rectified and site conditions are ready to receive work.

.5 Commencement of work implies acceptance of existing conditions and work by others.

2.2 PREPARATION

.1 Protection of In-Place Conditions:

.1 Provide temporary protection of adjacent areas and surfaces by means of masking (enclosures) where necessary to prevent contamination by Work of this Section.

.2 Disconnection and Removal of Existing Electrical Work

.1 Where indicated on the drawings, disconnect and remove existing electrical work, including hangers, supports, etc. Disconnect at the point of supply, remove obsolete connecting services and make the system safe. Cut back obsolete conduit behind finishes and cap unless otherwise specified.

.2 The scope and extent of the demolition or revision work is only generally indicated on the drawings. Estimate the scope, extent and cost of the work at the site during the bidding period scheduled site visit(s).

.3 Where deemed necessary by the Owner and Consultant, existing shafts, walls, and inaccessible ceilings will be opened by the Owner to permit site visit inspection of services to be removed/revised as part of the work but usually concealed behind such construction.

.4 Claims for extra costs for demolition work not shown or specified but clearly visible or ascertainable at the site during bidding period site visits will not be allowed.

.5 If any re-design is required due to discrepancies between the electrical drawings and site conditions, notify the Consultant who will issue a Site Instruction. If, in the opinion of the Consultant, discrepancies between the electrical drawings and actual site conditions are of a minor nature, the required modifications are to be done at no additional cost.

.6 Where existing electrical services extend through, or are in an area to serve items which are to remain, maintain the services in operation. Include for rerouting existing services concealed behind existing finishes and which become exposed during the renovation work, so as to be concealed behind new or existing finishes.

.7 Unless otherwise specified, remove from the site and dispose of all existing materials which have been removed and are not to be relocated or reused, except for the following which are to be handed over to the Owner at the site:

.1 XXX

.2 XXX

.3 Interruption to and Shut-Down ff Electrical Services and Systems

.1 Co-ordinate all shut-down and interruption to existing electrical systems with the Owner. Generally, shut-downs may be performed only between the hours of 12:00 midnight Friday until 6:00 a.m. Monday morning.

.2 Upon award of contract, submit a list of anticipated shut-down times and their maximum duration.

.3 Prior to each shut-down or interruption, inform the Owner in writing seventy-two hours in advance of the proposed shut-down or interruption and obtain written approval to proceed. Do not shut-down or interrupt any system or service without such written approval.

.4 Perform work associated with shut-downs and interruptions as continuous operations to minimize the shut-down time and to reinstate the systems as soon as possible, and, prior to any shut-down, ensure that all materials and labour required to complete the work for which the shut-down is required are available at the site.

2.3 CLEANING

.1 Complete cleaning of this Section in accordance with Section 26 05 00 Common Work Results for Electrical.

2.4 PROTECTION

.1 Protect installed materials to prevent damage by other trades for the duration of the construction period. Use materials that may be easily removed without leaving residue or permanent stains.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, Division 01 – General Requirements, and Section 26 05 00 – Common Work Results for Electrical.

1.2 SUMMARY

.1 Section includes: Provide wire and cable, including but not limited to the following:

.1 This Section, "Wire and Cable", shall apply to all systems of this Contract. Variations or alterations of the requirements for a system, will be specified in that system section.

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 26 05 53 – Identification for Electrical Systems

.2 Section 26 05 33 – Raceway and Boxes for Electrical Systems

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Provide local motor and equipment disconnecting switches or devices for all items regardless of Electrical Code exceptions for mechanical equipment, architectural equipment, Owner purchased equipment and system control panels. The wiring for equipment schedules and drawings do not indicate these disconnecting switches or devices. Some equipment items have integral disconnect switches provided and pre-wired with the equipment. In case of equipment manufacturer supplied disconnecting switches, issue a full credit to the contract to delete the switches specified under this section.

.2 Wiring for Mechanical Equipment:

.1 Refer to the "Wiring for Mechanical Equipment Schedule", for the schedule of devices and wiring to be provided.

.2 Wiring for mechanical equipment as described in the specification and as indicated on the drawings are based on the specified mechanical equipment. Wiring for this equipment shall not commence until approved wiring diagrams have been obtained

.3 Provide all required 120 V control equipment and wiring. Only line voltage components built-in to the equipment by the manufacturer or included under the controls or Equipment Sections of mechanical work will be provided by the Mechanical Division. In general, the Mechanical Division will provide all low voltage (24 V or less) control equipment and wiring and all pneumatic control devices and tubing unless otherwise indicated.

.4 Should alternate equipment other than the specified equipment be substituted all alterations to the wiring incurred by the said substitution will be provided at the Mechanical Division's expense. All changes and costs incurred by the substituted equipment, will be subject to the Contractor's approval.

.5 Remote push buttons, pilot lights, and control devices in finished areas shall be heavy duty oil tight devices and contact blocks in flush wall mounted boxes 1100 mm (43 in) above floor level, and finished with stainless steel covers.

.3 Wiring for Architectural/Owner Purchased Equipment:

.1 Provide labour and materials to supply power to Architectural or Owner purchased equipment and make the necessary electrical connections. Provide an approved receptacle circuit termination device, disconnect switch, etc. to suit the item requirements. Also install and wire remote control devices for this equipment as noted on the drawings. Refer to notes on the Electrical Drawings and the Equipment Wiring Schedules for further details. Wiring requirements as indicated are based on the specified equipment. Wiring for this equipment shall not commence until approved equipment shop drawings identifying connection point, outlet requirement, rating and wiring diagram have been received.

.2 Provide a power supply to each electrically operated door, dock leveller, etc., terminating in a disconnect switch at the equipment connection point. The equipment supplier will provide the control devices, starters, limit switches, etc., for installation. Complete the wiring between components according to the equipment supplier's wiring diagram.

1.4 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer's:

.1 For installation of Mineral Insulated Wire, persons trained and experienced with this product will be employed in its installation.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Storage and Handling procedures:

.1 Mineral Insulated Wiring must be stored in a dry location. The ends of the wire must be packed and wrapped to keep all moisture from penetrating the magnesium oxide insulation.

2 PRODUCTS

2.1 MATERIALS

.1 Distribution And Branch Circuit Conductors

.1 Conductors to and including 10 AWG are to be solid or stranded type. Conductors larger than 8 AWG are to be stranded. All conductors are to be constructed from 98% conductive copper and are to be approved for 600 volts. Conductors are to be colour coded, factory identified on the insulation with the manufacturer's name, conductor size and metal, voltage rating, and CSA type and designation. Conductors are to be as follows:

.1 "T-90 Nylon" single conductor in accordance with CSA C22.2 No. 75, Thermoplastic-Insulated Wires and Cables, 90° C (195° F) rated, PVC insulated and nylon covered.

.2 "RW-90" single conductor in accordance with CAN/CSA C22.2 No. 38, Thermoset-Insulated Wires and Cable, 90° C (195° F) rated, X-link polyethylene insulated.

.3 "AC-90" flexible cable to CSA C22.2 No. 51, Armoured Cable, with 90° C (195° F) rated, X-linked polyethylene insulated conductors, a concentric ground conductor, and an interlocking aluminium armour jacket.

.4 "A90 ISO-BX" flexible cable to CSA C22.2 No. 51, Armoured Cable, with 90° C (195° F) rated, X-linked polyethylene insulated conductors, a concentric bare ground conductor, an insulated ground conductor, and an interlocking aluminium armour jacket.

.5 "FAS" cable in accordance with requirements of CSA C22.2 No. 208, Fire /Alarm and /Signal Cable, FAS90 shielded or un-shielded as required, 90° C (195° F) rated, consisting of a copper conductor, silicone rubber insulation, and a polyolefin outer jacket.

.6 Equal to Nexans Canada "Corflex" II RA90 flexible cable in accordance with requirements of CSA C22.2 No. 123, Aluminium Sheathed Cable, consisting of single or multiple copper conductors with X-link polyethylene insulation enclosed in a liquid and vapour-tight solid corrugated aluminium sheath and, as required, an overall PVC jacket.

.7 Equal to Nexans Canada "Firex II" TECK 90 cable in accordance with requirements of CSA C22.2 No. 131, Type TECK 90 Cable, consisting of single or multiple copper conductors with X-link polyethylene insulation enclosed in a liquid and vapour-tight solid corrugated aluminium sheath and, where required, an overall PVC jacket.

.2 Low Voltage (24 Volt) Conductors

.1 "T-90" or "RW90" stranded copper conductors as specified above.

.2 Equal to Nexans Canada "Securex II" FAS/LVT/FT1300 volt wire to CSA C22.2 No. 208, Fire /Alarm and Signal Wire, 105° C (220° F) rated, consisting of solid copper conductors (stranded for control wiring), flame retardant PVC insulation, an aluminium/Mylar optional shield with a #22 AWG tinned copper insulation and a drain wire, and, if required for the application, interlocking aluminium armour with or without an overall jacket.

.3 Communications Cable:

.1 All cabling used for Ethernet, Telephone, or other IP-based systems shall follow cabling requirements as outlined in 27 10 00 Structured Cabling.

.3 Connectors

.1 Conductors in Conduit: Except as noted, CSA certified flame resistant thermoplastic, colour coded twist type connectors to suit the system voltage and wire gauge.

.2 Conductors 3/0 AWG and Larger: Long barrel, double crimp, compression type lug connectors, unless otherwise specified.

.3 Armoured Cable: Except as noted, proper squeeze type connectors and plastic anti-short bushings at terminations in accordance with requirements of CSA C22.2 No. 18.3, Conduit, Tubing and Cable Fittings.

.4 Corflex/Teck Cable: Connector and termination hardware supplied by the cable manufacturer to suit the application.

.4 Conductor Pulling Lubricant

.1 Equal to Ideal Industries "Yellow 77" or "ClearGlide", as required.

3 EXECUTION

3.1 INSTALLATION

.1 Conform to the following conductor installation requirements:

.1 Conductor Routing: Conductor routing indicated on the drawings is schematic and approximate. Determine exact routing and conductor lengths at the site. Route conductors to avoid interference with other work. Unless otherwise specified or shown install conductors parallel to building lines.

.2 Conductor Pulling: When pulling conductors into conduit or duct use lubricant and ensure that the conductors are kept straight and are not twisted.

.3 Securing/Supporting Conductors: Conform to the following requirements:

.1 neatly secure exposed conductors in equipment enclosures with proper supports and/or ties

.2 support flexible armoured cable in ceiling spaces and stud walls with steel two hole cable straps to Code requirements

.4 Conductor Splicing: Generally, conductor splicing is not permitted unless otherwise approved by the Consultant, and if approved splicing is subject to the following conditions:

.1 splicing is permitted to extend existing conductors

.2 for thermoplastic insulated conductors, splices are to be made within an approved electrical box with mechanical compression connectors to suit the type and size of conductors, and the box(es) are to be properly identified and locations are to be indicated on “as-built” drawings.

.3 where multiple conductors are spliced:

.1 use properly sized Wing Nut connectors, or approved equal, for up to two 8 AWG or three 10 AWG conductors

.2 use pressure type sleeve cable connectors, splices, tee's, etc. for all larger size connections and terminations

.4 insulate all bare surfaces of splices with Scotch No. 33 tape, heat shrink sleeving, or equivalent.

.5 conductors connected to ground rods for service or equipment grounding or to building structural or architectural elements to be terminated, connected and spliced using:

.1 a thermoweld process

.2 an approved non-mechanical compression type connectors where serviceable

.6 install service and feeder conductors as continuous lengths without breaks, measured and cut based on field-measured dimensions.

.7 do not splice “Corflex” cable unless justified by cable pulling tension calculations and when approved by the Consultant, and, if approved, locate splices where directed by the Consultant

.5 Conductor Termination:

.1 Where a single solid conductor is terminated in a device under one screw or clamping mechanism, no additional terminating hardware is required.

.2 Where multiple or stranded conductors are terminated in a device under one screw or clamping mechanism, self insulated crimpon cable ends or approved equal shall be used up to and including 10 AWG sized conductors. Approved compression lugs shall be used for larger conductor sizes.

.6 Grounding and bonding conductors:

.1 Insulated grounding or bonding conductors shall be the same type as the line conductors.

.2 Each feeder and branch circuit shall be provided with a separate ground conductor sized in accordance with Electrical Code regulations. All 120 V or 347 V (single phase) branch circuits shall be provided with a separate neutral conductor for each circuit.

.2 Installation of distribution and branch circuit conductors

.1 Install all required conductors.

.2 Non-Fire Rated Conductors: Unless otherwise specified herein or on the drawings, non-fired rated conductors are to be used as follows:

.1 unless otherwise specified, conductors within stud wall construction, and in furniture systems to luminaries and wiring devices – AC90 flexible armoured cable, maximum 6 m (20 ft) run permitted

.2 for conductors in accessible ceiling spaces (not walls) to luminaries - AC90 flexible armoured cable, maximum 3 m (10 ft) run permitted

.3 for conductors except as specified above or elsewhere in the Specification or on the drawings – T90 Nylon or RW90

.3 “Corflex” Cable Installation Requirements: Install “Corflex” cable in accordance with the manufacturer’s instructions, including the following requirements:

.1 support and secure overhead suspended “Corflex” cable on a system of cable tray where indicated

.2 secure individual cables to cable tray, or where shown, directly to building surfaces by means of single screw non-ferrous clamps

.3 ground and bond single conductor cable at both ends where the sheath currents do not affect the cable ampacity

.4 for certain areas, where the sheath currents will reduce the cable ampacity, ground and bond the cable at the supply end and isolate the cable at the load end as recommended by the cable manufacturer, and provide a 3/0 AWG green TW ground conductor for each cable, all as per Section 10 of the Electrical Code

.4 “Teck” Cable Installation Requirements: Install “Teck” cable in accordance with the manufacturer’s instructions, including the following requirements:

.1 support and secure overhead suspended “Teck” cable tray where indicated

.2 secure individual cables to cable tray or, where shown, directly to building surfaces by means of single screw non-ferrous clamps

.3 terminate cable with lugs and termination kits supplied with the cable

.5 "NMD-90" Cable Installation Requirements: Install NMD-90 cable in accordance with the manufacturer's instructions, including the following requirements:

.1 install only in areas where combustible construction is used

.2 all cabling to be concealed, no surface or exposed cabling is permitted

.3 secure using only approved clips to joists or studs, do not compress or damage cable jacket

.4 secure cables every 1.5 m (5 ft) when run on the sides of joists or studs and 300 mm (12 in) from each outlet box

.5 where cables pass through a hole in a joist or a stud, bore the hole 32 mm (1.25 in) back from the face of the stud or joist, or protect the cables from screws or driven nails by using approved protection plates

.6 keep cables a minimum of 25 mm (1 in) from heating ducts or use insulation installed between the conductors and heat ducts

.7 where cables run through or along metallic studs, joists, sheathing or cladding, ensure that the cables are:

.1 protected from mechanical damage both during and after installation

.2 protected by an insulation insert secured to the opening in the stud

.8 protect cables from mechanical damage and from driven nails and screws when they are installed behind baseboards or horizontally behind cupboards

.9 where communication cables are to be installed in joists or studs, maintain a minimum separation of 50 mm (2 in); cables may not share same pass-through hole

.6 Conductor Sizing:

.1 do not use conductors smaller than 12 AWG in systems over 30 volts.

.2 conductor sizes indicated on the drawings are minimum sizes and must be increased, where required, to suit length of run and voltage drop in accordance with the voltage drop schedule found at the end of this Section.

.3 all branch circuit wire feeding a 20 A protected lighting circuit to be minimum 10 AWG wire.

.4 all branch circuit wiring feeding a 15 A protected circuit which is over 45 m (150 ft) in length to be minimum 10 AWG wire.

.5 do not use conductors smaller than 8 AWG for exterior luminaire wiring.

.3 Voltage Drop:

.1 Voltage drop in power and control conductors shall be in accordance with the requirements of the Electrical Code. Size conductors, splicing kits, and termination lugs accordingly when sizes are not identified.

.2 Maximum branch wiring distance from panel to load in metres for 120 V single-phase system at 2% voltage drop based on indicated wire size:

Breaker Size (A)	15	20	30	40	50
Max load at 80% (A)	12	16	24	32	40
12 AWG	16.8	12.2	---	---	---
10 AWG	25.9	19.0	---	---	---
8 AWG	39.6	30.4	12.9	---	---
6 AWG	62.4	47.2	32.0	23.6	19.0
4 AWG	99.0	73.1	50.2	38.1	30.4
2 AWG	---	114.3	77.2	57.9	47.2
1 AWG	---	---	96.0	73.1	57.9
1/0 AWG	---	---	---	85.3	68.5
2//0 AWG	---	---	---	102.8	80.7
3/0 AWG	---	---	---	---	95.2

.3 Maximum branch wiring distance from panel to load in metres for 120 V single-phase system at 3% voltage drop based on indicated wire size:

Breaker Size (A)	15	20	30	40	50
Max load at 80% (A)	12	16	24	32	40
12 AWG	24.4	18.3	---	---	---
10 AWG	38.1	29.0	19.1	---	---
8 AWG	59.4	44.2	30.5	22.9	---
6 AWG	91.4	70.1	47.2	35.1	28.2
4 AWG	---	109.7	73.2	54.9	42.7
2 AWG	---	---	114.3	85.3	68.6
1 AWG	---	---	---	103.6	85.3
1/0 AWG	---	---	---	128.0	102.9
2//0 AWG	---	---	---	---	122.9

3.2 SITE QUALITY CONTROL

.1 Site Tests and Inspections:

.1 Conduct field inspection and testing as specified in Section 26 05 00

.1 Feeders and branch circuits rated 100 amperes or greater shall be checked with a 1000 V Meggar for 15 seconds before energization.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, Division 01 – General Requirements, and Section 26 05 00 – Common Work Results for Electrical.

1.2 SUMMARY

.1 Section includes: Provide raceway and boxes for electrical systems, including but not limited to the following:

.1 Electrical conduit system throughout the project unless indicated otherwise. The conduit systems shall consist of all the necessary conduit, fittings, fastenings, boxes, special supports, etc.

1.3 REFERENCES

.1 Abbreviations and Acronyms:

.1 EMT: Electrical Metallic Tubing

.2 FRE: Fibreglass Reinforced Epoxy

.3 GRC: Galvanized Rigid Metal Conduit

.4 PVC: Polyvinyl Chloride

.2 Definitions:

.1 Conduit - The definitions of "Conduit" (Rigid Metal, Rigid PVC, Rigid FRE, Flexible, and Electrometallic Tubing) as defined in the Electrical Safety Code. Other definitions shall be as follows.

.2 Slabbed Conduit - Conduit which is installed within a monolithic concrete floor slab. No slabbed conduit shall be allowed to be installed for this project - use underground conduit where approved.

.3 Underground Conduit - Conduit or duct which is installed below the finished earth grades or below the lower edge of an on grade or subgrade floor slab.

.3 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 26 05 43 Underground Ducts and Ductbank

2 PRODUCTS

2.1 MATERIALS

.1 Conduit, Connectors and Fittings:

.1 Use conduit, connectors, and fittings as standard in the trade, unless noted herein or on the drawings to be of a specific type, manufacturer, trade name, series or catalogue number.

.2 Galvanized Rigid Metal Conduit (GRC):

.1 All fittings to be threaded type. Supply bushings with insulated plastic lining for all conduit terminations.

.2 Electric Metallic Tubing (EMT):

.3 All fittings to be steel set screw or raintight type. Supply bushings with insulated plastic lining for all conduit terminations.

.3 Flexible Conduit:

.1 All box connections to have either a nylon lined connector or be provided with an insuliner sleeve. Include sealing ring for fully sealed connection for liquid tight type.

.2 Supply metallic liquid tight type for all exposed flexible conduit.

.3 Supply non-metallic type flexible conduit for inside concrete block walls.

.4 Concealed flexible conduit to be approved galvanized steel or aluminum (where approved) interlocking type, minimum size 12 mm (1/2 in).

.4 Rigid PVC:

.1 Use approved rigid PVC fittings with solvent cement connections for all joints.

.5 Outlet Boxes:

.1 Use outlet boxes, junction boxes, etc. of the types approved for the application. Use the following types for the noted applications:

.1 Recessed boxes in concrete or masonry - Type MBD or MBS boxes.

.2 Surface mounted with EMT conduit - Type FS or FD boxes.

.3 Surface mounted with rigid conduit - Type FS or FD boxes.

.6 Miscellaneous:

.1 Rigid Metal Expansion Joint - Crouse Hinds "XJ" series with bonding strap or equivalent.

.2 Rigid PVC Expansion Joint - Scepter "O" Ring expansion joint "EJ" series or expansion coupler "EC" series, to suit expected length of movement.

3 EXECUTION

3.1 INSTALLATION / APPLICATION

.1 Application

.1 Galvanized Rigid Metal Conduit (GRC):

.1 Raceway sizes larger than 103 mm (4 in) diameter above grade.

.2 Where installed as an exterior branch circuit above finished grade.

.3 In hazardous locations (complete with sealing type fittings) as classified by the Electrical Code or the Electrical Authority.

.2 Electric Metallic Tubing (EMT):

.1 Conduit sizes 103 mm (4 in) and less, where not specified or required to be otherwise due to special applications or conditions.

.2 To carry branch circuit wiring from local distribution or lighting panels to area circuit junction boxes above ceiling systems.

.3 Flexible conduit:

.1 As branch circuit wiring from area circuit junction boxes above ceiling systems to light fixtures and from outlet boxes to suspended fixtures.

.2 Restrict flexible conduit to less than 3600 mm (12 ft) in length. Suitably clip and support every 900 mm (3 ft) in length the flexible conduit used above ceiling systems.

.3 As a raceway in stud walls or partitions.

.4 Do not use flexible conduit where conduit is run exposed.

.4 Liquid tight flexible conduit:

.1 As the raceway between the distribution conduit and equipment terminal boxes of vibrating and rotating equipment.

.2 Restrict length to be less than 600 mm (24 in).

.5 Rigid PVC or Rigid FRE conduit

.1 As an underground raceway for building services or as a slabbed conduit where approved.

.6 Rigid PVC conduit

.1 As underground raceways for branch circuit wiring to exterior connections.

.7 Rigid PVC duct (DBII)

.1 Use in sizes 50 mm (2 in) and larger where encased in concrete or direct buried for underground communication utilities services.

.8 Use corrosion resistant conduit where indicated on the drawings.

.9 Do not use aluminum conduit on this project.

.2 Installation

.1 Where more than one type of product or method of installation could apply, the most restrictive products and methods of installation shall take precedence.

.2 All conduit connections to be as tight as possible. Failure to tighten any conduit connections in block, tile or concrete elements will result in the element being removed and reinstalled at this Section's expense.

.3 Do not use the conduit system as the ground path for the building wiring system. Supply all wiring systems with a separate copper ground conductor sized accordingly to ensure ground path continuity.

.4 Conceal conduit in all finished wall areas but may be run exposed in service and equipment rooms.

.5 Where conduit is run exposed, run parallel to the building lines. Supply grouped concentric bends where two or more conduits are installed.

.6 Do not install conduit horizontally in masonry walls.

.7 Lay out all conduits and install to avoid the proximity of heating pipes and ducts. Do not run conduit within 900 mm (3 ft) of such pipes and ducts.

.8 Plug conduit ends during construction with plastic push pennies. Cap conduits stubbed for future use with conduit caps and seal, if below grade.

.9 Rigidly and securely support conduit systems with conduit straps to the building structure. Support multiple conduit runs, if not easily attached to the building structure directly, by Unistrut hanger assemblies. Bailing wire or flexible metal strapping will not be accepted.

.10 Concrete encased underground conduits shall be enclosed within a minimum 100 mm (4 in) monolithic poured concrete envelope.

.11 Install underground conduits that are below a building floor slab at a minimum depth of 460 mm (18 in) below the finished surface.

.12 Coordinate all underground conduit routes with other Sections to prevent interference. Install sleeves for all underground conduits passing through structural or foundation elements.

.13 Extend conduits stubbed through equipment bases a minimum of 38 mm (1½ in) above the base.

.14 Install two 32 mm (1¼ in) spare empty conduits stubbed into the ceiling space from the top of all recessed panelboards. Terminate in suitable junction box with blank cover labelled accordingly.

.15 Install a nylon pull cord in all empty conduits. Adhere tags at both ends indicating system and destination. Maintain a pull cord in systems conduits used only to partial capacity.

.16 Colour code all conduit systems throughout the building during installation with a patch of paint at all junction and pull boxes and points of concealment as follows:

.1 Black – Power Distribution (also indicate specific source/panel)

.1 Black/Green – 600/347 V Normal

.2 Black/Blue – 208/120 V Normal

.2 Red – Fire Alarm System (also indicate circuits)

.3 Orange – Emergency/Standby Power System (also indicate specific source/panel)

.1 Orange/Green – 600/347 V Emergency/Standby

.2 Orange/Blue – 208/120 V Emergency/Standby

.3 Orange/Purple – Uninterruptible Power

.4 Yellow – Public Address/Intercom/Audio-Visual Systems

.5 Green – Security System

.6 Purple - Controls

.7 Blue – Telecommunications System

.3 Rigid PVC Conduit:

.1 Bend on site using a non-flame type heat source to accommodate the required contours.

.2 Use conduit fittings, couplings, etc. that are watertight type, fastened with an approved cement.

.3 Do not penetrate fire rated walls, floors, or ceilings.

.4 Partition Walls:

.1 Feed all conduit in demountable, prefabricated or standard stud partition walls into the wall from the ceiling. Make no connections from the floor or walls unless shown on drawings. Terminate conduit in a junction box in the ceiling space within 900 mm (3 ft) of the ceiling system penetration point.

.2 Restrict flexible conduit in demountable or prefabricated partitions to a maximum 25 mm (1 in) size.

.5 Outlet Boxes:

.1 The location of outlets, fixtures, panels, etc., as shown on the drawings, are approximately correct, but the Consultant reserves the right to alter the location of any number of them up to 3000 mm (10 ft) without incurring extra cost, if altered before installation is commenced on any individual item.

.2 In general, Use 100 mm (4 in) octagon boxes for light fixture outlets.

.3 In concrete slabs or walls, use boxes greater than 50 mm (2 in) deep.

.4 In general, in fire rated partitions, install outlet boxes with openings no larger than 160 cm^2 (25 in^2) in area. Install outlet boxes on opposite side or same side of a fire rated partition offset at least one stud space to maintain the integrity of the fire separation.

.1 Refer to code plans indicating fire rated partitions

.2 Where openings exceed this criteria, install intumescent material that comply with ULC fire rated assemblies.

.5 Use watertight with screw fittings and watertight gaskets to install outlet boxes outside of the building.

.6 In general, install outlet boxes of adequate size and required dimensions for all outlet and conduit junctions.

.7 Rigidly secure all outlet boxes in position by approved methods. For those intended for hanging fixtures, supply with fixture studs, self aligning type for sloping ceilings.

.8 Outlet boxes designated for future use, install with blank-metal coverplates. Install coverplates, on outlet boxes designated for other than future wiring devices, in time to be painted over by the painting Section.

.9 Place all pull boxes and terminal boxes in inconspicuous but accessible locations.

.10 Centre all outlets, panelboards, lighting control, panels and equipment on construction panels, wood paneling or boarding, ceiling tile, etc.

.11 Install components or devices such as lighting controls and receptacles or thermostats, etc., which occur one above the other in the same general location, in the same vertical line.

.12 Install adjacent items such as panels and fire hose cabinets, etc., with the tops of their trims in line.

.13 Locate clocks, bells, horns, speakers, etc. as shown or specified. However, mount these items symmetrically in paneling or tiles, and bear proper relationship to doors, ventilation grilles, etc. Where specific heights are not covered, discuss the relation with, and approved by, the Consultant.

.14 In no case shall luminaires, pipes, ducts or other elements be allowed to obstruct clocks, grilles, exit lights, etc.

.15 Mount recessed or surface ceiling mounted components to replace full tiles where possible or be centred on the tile or grid intersections.

.16 Locate lighting controls on the latch side of door or primary leaf within 150 mm (6 in) of the jamb or sidelight. Where light controls are shown on hinge side of single doors, in cases where glazing makes placing the controls on the latch side not possible, ensure that lighting controls are within 150 mm (6 in) beyond door in fully open position and no part extends behind the open door. Verify door swings and primary leaves on double doors before proceeding with installation of the control box and associated conduit/wiring.

.17 Ensure all outlet boxes are installed with vapour barrier protection integral with specific wall or ceiling construction. For each outlet box installed which pierces a vapour barrier, supply an appropriately sized vapour barrier box surrounding outlet box to seal all air leaks and maintain vapour barrier continuity.

.18 In finished areas of the building, conceal as much conduit/wiring as possible. Where in this Section's opinion it is necessary or advantageous to run wiring on the surface, obtain approval from the Consultant before proceeding. Install all surface raceways as metal and manufactured by Wiremold unless otherwise indicated. Install surface raceways at size to suit conductors being carried. Use only approved components, fittings, and methods of securing, joining and supporting surface raceways and outlet boxes. Where surface mount raceways and outlet boxes are used, paint to match the specific wall or ceiling finish by the painting Section.

.6 Mounting Height:

.1 Where receptacles or other devices interfere with heating equipment, mount horizontally in the toespace below the heating unit unless otherwise noted.

.2 For mounting heights of the various system devices not indicated herein refer to the specific system Section or drawing detail.

.3 Verify mounting heights of outlet boxes in special or decorative wall systems prior to rough-in.

.4 For exact mounting heights and requirements of outlets and devices built into millwork or architectural furnishings, refer to elevations and details shown on the architectural drawings. Verify with millwork Section prior to rough-in.

.7 Conduit Seals:

.1 In areas where conduits pass through walls or other building surfaces in which different temperatures exist (i.e. refrigerated spaces or exterior walls and insulated ceilings or roofs, etc.), seal off the conduits with appropriate materials and methods to prevent breathing and subsequent condensation. Complete the sealing such that moisture is not trapped at the seal.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 01 (and Division 20 or 26).

1.2 SUMMARY

.1 Section includes: Provide identification for electrical systems, including but not limited to the following:

.1 Identification nameplates for all electrical apparatus such as: panels, motor starters, switchgear, transformers, disconnect switches, breakers, contactors, and system control panels.

.2 Directory cards for all panelboards such as: power, lighting, low voltage systems, and communications. All power and systems wiring shall be colour coded in accordance with this Section and be provided with appropriate wire markers identifying panel circuits.

2 PRODUCTS

2.1 MATERIALS

.1 Lamicoid Nameplates:

.1 All identification nameplates and nametags unless otherwise specified shall be engraved white letters on black lamicoid stock with bevelled edges. The lamicoid stock shall be 1.5 mm (1/16 in) minimum thickness.

.2 The nameplates shall be engraved with the following information:

.3 Nameplates for panel and cabinet identification shall typically include the following:

LP-A	13 mm (1/2 in) high lettering
120/208 VOLT	8 mm (5/16 in) high lettering
FED FROM MCC-1	8 mm (5/16 in) high lettering

.4 All other electrical equipment shall be typically identified as follows:

SUPPLY FAN SF-1	8 mm (5/16 in) high lettering
208 VOLT - 3 PHASE	8 mm (5/16 in) high lettering
FED FROM MCC-1	8 mm (5/16 in) high lettering

.5 The final wording of all nameplates shall be reviewed and approved by the Owner and Project Manager prior to fabrication.

.2 Panel Directories

.1 Each panel circuit directory card shall have clearly typed information as with the following example:

PANEL NAME:	LP-A
PANEL VOLTAGE:	120/208 VOLT – 3 PHASE
PANEL SUPPLY:	150 AMP

Circuit Number	Load	Room No. or Locations
1	Lighting	143
2	Receptacles	029
2	Supply Fan SF-4	Roof

.2 All systems distribution cabinets shall be complete with a directory card showing circuit numbers, room locations, and a blank column for "REMARKS".

.3 Wire and Cable Colour Coding

.1 All power and systems wiring shall be colour coded as follows:

Power	Phase A	Red
	Phase B	Black
	Phase C	Blue
	Identified (Neutral)	White
	Ground	Bare or Green
Motor Control		Yellow

.2 Provide suitable clip-on or stick-on wire markers for all wires at points of termination and interconnection. Wire markers shall identify panel and circuit number in a clear and logical manner.

3 EXECUTION

3.1 INSTALLATION

.1 Lamicoid nameplates shall be mounted behind the panel door, fastened with contact cement.

.2 Temporary panel directory cards shall be provided and filled in as the circuits are installed. The temporary directory card shall be replaced with a typed permanent directory at job completion.

.3 The panel directory card shall be inserted in the card holder on the inside of the panel door and be protected by a clear plastic sheet.

.4 Feeder cables shall be colour coded in each terminal panel and junction box with a minimum 75 mm (3 in) taped band.

.5 All power and systems junction and terminal box covers shall be marked with permanent black marker as to system installed (i.e. "F.A." for Fire Alarm) and other details such as circuit numbers, detection zone, etc. Exposed boxes shall have marking on inside face of cover.

END OF SECTION

1 GENERAL

1.1 SUMMARY

.1 The Sub-Contractor will provide all distribution equipment required for the complete installation. The Section "Low Voltage Distribution Equipment" will generally refer to such items as switchboards, disconnect switches, breakers, splitters, starters, etc.

.2 Refer to Section 26 05 33 “Raceway and Boxes for Electrical Systems”, 26 05 19 "Wire and Cable" and 26 05 53 "Identification for Electrical Systems" for the additional requirements of materials necessary to complete the work of this Section.

.3 Refer to the "Wiring for Mechanical Equipment Schedule" as shown on the drawings, for details of equipment and components to be provided.

.4 Related sections:

.1 Section 26 05 00 Common Work Results for Electrical

.2 Section 26 05 33 Raceway and Boxes for Electrical Systems

.3 Section 26 05 19 Wire and Cable

.4 Section 26 05 53 Identification for Electrical Systems

1.2 REFERENCES

.1 Reference Codes and Standards: Versions of the following standards current as of the date of issue of the project, apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction.

.1 Ontario Electrical Safety Code

.2 CSA-C17 Alternating - Current Electricity Metering

1.3 SUBMITTALS

.1 All distribution equipment for this project will have shop drawings submitted for review (i.e. panelboards, switchboards, circuit breakers, etc.). Include product characteristics, performance criteria, physical size, finish and limitations.

.2 Maintenance and operating instructions, parts lists, etc., will be provided for switchboards, air circuit breakers, meters, ground fault detectors, or any special function equipment.

.3 Include meter outline dimensions, panel drilling dimensions and installation cut-out template.

1.4 QUALITY ASSURANCE

.1 All equipment will be CSA approved and be finished in ANSI/ASA-61 light grey enamel paint.

.2 All equipment will be manufactured in accordance with the applicable sections of CSA Specification C22.2.

2 PRODUCTS

2.1 CIRCUIT BREAKER PANELBOARDS

.1 Panels will be of the type, with voltage and current rating as indicated on the drawings. The panels will be sized to contain the specified branch breakers with space for future units as indicated.

.2 The bus bars will be copper and a continuous copper ground bus will be provided complete with cable terminals

.3 Panels will be complete with common key locking doors, and no label, stamp, or nameplate on the exterior of the panel trim or door. Provide a directory card and suitable holder mounted on the back of the panel door. Panel enclosure rating will suit application requirement.

.4 Flush mounted panelboards will have doors and trims finished in ANSI/ASA-61 light grey enamel paint. Surface mounted panelboards will have tubs, doors and trims finished in ANSI/ASA-61 light grey enamel paint.

.5 Unless otherwise indicated, circuit breakers will be moulded case type, with required frame size for trip settings as shown on the Drawings. Breakers mounted in panels will be bolt-on type.

.6 Unless otherwise noted all breakers will be rated minimum 14 kA symmetrical interrupting capacity at 600 volts, 3-phase or 10 kA symmetrical interrupting capacity at 208 volts, 3-phase as appropriate and not less than the short circuit capacity as shown on single line diagram drawings.

.7 Switching breakers will be UL SWD rated for switching duty.

.8 The circuit breaker servicing Life Safety Loads such fire alarm control panel will be paint red and lockable.

.9 Provide sprinkler resistant hoods and doors for panelboards installed in sprinklered areas.

2.2 DISCONNECT SWITCHES

.1 Disconnect switches will be heavy duty type with visible blades in the off position, quick- make quick-break operating mechanism, lock-off provision, door/handle interlock with override and will be horsepower and electric heat rated. Switch fuse holders will have reinforced clips. Fuses will be easily removable when the switch is in the off position. All switches will have ample gutter space for top or bottom wiring and be provided with enclosures to suit the specific application.

2.3 MOTOR STARTERS

.1 Manual motor starters for single phase fractional horsepower motors will be equipped with heavy duty toggle mechanism, thermal overload unit, and red neon pilot light. The motor starter will be rated to match the motor requirements and be flush mounted with stainless steel coverplate in finished areas.

.2 Individual combination type motor starters will be complete with fused disconnect switch protection suitable for use with HRC-1-J fuses.

.3 Each magnetic starter will include a 3-phase manual reset overload unit. Motor overload units will be single phase sensitive adjustable thermal type. Provide one normally open and one normally closed extra auxiliary contact in each starter for possible future use.

.4 All two speed starters will be of the type to suit the motor being supplied. Two speed starters will have two sets of overload relays, one for each power supply connection.

.5 All starters will be IEC or NEMA types but must be rated at minimum 15 Ampere continuous current. Starter enclosures will be provided to suit application requirements.

.6 Refer to the wiring for mechanical equipment schedule for indication of the various individual control components to be included with the starters.

.7 Starters controlling power circuits of more than 120 volts will be provided with an integral control circuit transformer with fused secondary. All control wiring and devices will function on a 120 volt control circuit unless otherwise noted.

2.4 CONTACTORS

.1 Supply and install AC contactors complete with hand-off-auto selector switch and pilot light indicating "on" condition for control of loads as shown. Use latching type contactors and appropriate momentary contact type control devices for all non-motor loads unless otherwise specified.

.2 Provide auxiliary contacts, control relays, control transformers, and terminals as required for interlocking and control of equipment as shown. Contactor enclosures will be provided to suit application requirements.

2.5 RELAYS

.1 Supply and install AC relays with required coil and contact rating and pilot light for control of lighting and miscellaneous loads as shown. Provide auxiliary components, control transformers, terminals, control devices, etc., required for proper control and connection.

2.6 FUSES

.1 Fuses will be HRC-1 Class L (over 600 Ampere) or Class J (under 600 Ampere) as appropriate; time delay type unless otherwise indicated. Fuse rating will be as noted for feeders or as required for proper motor protection, if not indicated. Provide as spares, 3 of each type and rating of fuses installed and turn over to Owner at time of building occupancy.

3 EXECUTION

3.1 INSTALLATION

.1 Protect installed products and components from damage during construction. Repair damage to adjacent materials caused by equipment installation

.2 Install equipment in accordance with manufacturer's instructions or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

.3 All equipment installed in this scope will meet clearance requirements of OESC. Any equipment installed that does not meet this requirement will be reviewed with the Consultant.

.4 Mount surface mounted panelboards on surfaces that can support the weight of the equipment. Refer to manufacturer’s instructions for fastening devices specific to surface material. For areas where the surface cannot support the weight of the panelboard, install non-combustible, non-porous materials or structural supports to adequately fasten the panelboard at location shown.

.5 Mounting heights of wall mounted panels will generally be 2000 mm (6'-6") to the top of the panel trim.

.6 Provide preprogrammed contacts for fire alarm shutdown as noted on the drawings. Fire alarm shutdown operation to override all local and remote control. Program display to read “Under Control of Fire Alarm”.

.7 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 01 and Section 26 05 00 Common Work Results for Electrical.

1.2 SUMMARY

.1 Section includes: Provide lighting control, including but not limited to the following:

.1 Work to include all labour, materials, tools, appliances, control hardware, sensors, wiring, junction boxes and equipment necessary for and incidental to the delivery, installation and furnishing of a completely operational standalone lighting control system, as described herein.

.2 All lighting controls shall meet or exceed all locally-enforced energy codes including all mandatory control requirements for Ontario Building Code supplemental standard SB-10 and ASHRAE 90.1.

.3 Control lighting in all spaces within the building and all exterior lighting using the lighting control system. Manual lighting controls may be used where indicated specifically on the drawing.

.4 This section to be read in conjunction with the Lighting Narrative in drawing package and Lighting Narrative Room Designations shown on layout drawings. Refer to Lighting Fixture Schedule on drawings for details about fixture drivers, wattage, fixture mount controls, and dimming methods.

.5 Examine all general specification provisions and drawings for related electrical work required as work under this section.

.6 All lighting control is subject to functional testing. Test all lighting control devices and control system to ensure that control hardware and software are calibrated, adjusted, programmed, and in proper working condition in accordance with this section and the manufacturer’s installation instructions.

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Division 25 Integrated Automation

.2 Section 26 27 26 Wiring Devices

.3 Section 26 50 00 Lighting

.4 Section 26 52 00 Emergency Lighting

1.3 REFERENCES

.1 Abbreviations and Acronyms:

.1 DALI: Digital Addressable Lighting Interface

.2 DMX: DMX512 is a digital communications interface

.3 HMI: Human Machine Interface

.4 NO/NC: Normally Open/Normally Closed contacts

.2 Definitions:

.1 Dual Technology - sensors that combine both passive infrared and another technology into one sensor.

.2 Normally Occupied Spaces - rooms or spaces within the building that are likely to be occupied for 30 minutes or more by a building user.

.3 Occupancy sensor - a motion detecting device used to detect the presence of a person to automatically control lights or temperature or ventilation systems. The sensors use infrared, ultrasonic, sound, microwave, Bluetooth or other technology.

.4 Photosensor - an electronic device that detects the prevailing light level and sends the information either as an analog or a stepped digital output as a relative representation of the light level.

.5 Vacancy Sensor - works like an occupancy sensor; however, lights must be manually turned ON, but will automatically turn OFF when motion is no longer detected. For the purposes of this scope of work the use of Occupancy and Vacancy are equivalent.

.3 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE):

.1 ASHRAE 90.1 Energy Standard for Buildings Except Low Rise Residential Buildings

.2 Canadian Standards Association (CSA):

.1 CSA C22.2 No. 141 Emergency Lighting Equipment

.3 Underwriters Laboratories (UL):

.1 UL 924 Standard for Emergency Lighting and Power Equipment

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Coordinate all work described in this section with all other applicable plans and specifications, including but not limited to wiring, conduit, fixtures, HVAC systems, and building management systems.

1.5 SUBMITTALS

.1 Submittals under this Section shall be in accordance with Section 26 05 00.

.2 Product Data:

.1 Submit manufacturer's Product data sheets for Products proposed for use in the Work of this Section. Include printed technical data, installation instructions and general recommendations for all materials and components. Include certification indicating compliance of materials with project requirements

.3 Shop Drawings:

.1 Complete sets of shop drawings shall be submitted indicating the following:

.1 Wiring/Wireless schematics for typical and standalone room types in this project. (i.e. classroom, private office, lobby, open office, boardroom, etc.).

.2 Multi-button wall switch button configurations for each switch.

1.6 CLOSEOUT SUBMITTALS

.1 Submittals under this Section shall be in conformance with Section 26 05 00.

.2 Test and Evaluation Reports:

.1 Submit cybersecurity report or documentation as specified in Part 2 of this Section.

.2 Submit manufacturer's inspection reports and verifications that the Work of this Section is correctly installed.

.3 Training Material:

.1 Electronic versions of training slides.

.4 Software:

.1 Submit copies of all software and licences required for operation and maintenance of equipment provided.

.2 Provide all software, firmware, and operating system user guides, installation manuals, cybersecurity certificates, and documentation in unsecured searchable PDF format. Provide list of all initial credentials used including passwords to configure system in an encrypted format.

.3 Provide list of all software, firmware, and operating system licence and subscription recurring fees with the Owner’s credentials used to set up accounts. All pricing should be current as of submission date. Include unit cost increases for upgrading or adding additional components beyond what is included in this scope.

1.7 QUALITY ASSURANCE

.1 All sensors, accessories and components must have a recognized certification mark (such as CSA or ULC) or a recognized field evaluation mark by Electrical Authority as designated by the Electrical Code.

.2 All control functions shall operate independent of network connectivity. Controls shall not require connection to the building network or the internet to operate. All dimming preferences and last known switch or dimming level shall not be dependant on network connection.

.3 On restoration of power to controlled fixtures, lighting level shall return to dimming level set before power loss within 5 seconds. If fixture was off prior to loss of power, fixture shall remain off after power restoration.

.4 All installation components shall have an installed base of more than 200 successful sites.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:

.1 Comparable Products from manufacturers listed herein will be accepted provided they meet requirements of this Specification:

.1 Fifth Light/Cooper

.2 Encellium

.3 Hubbell

.4 Leviton

.5 Lutron

.6 nLight/Accuity

.7 Signify/Phillips

.8 WattStopper/Legrand

.2 Requests for substitutions shall be made in conformance with Section 26 05 00.

2.2 PERFORMANCE/DESIGN CRITERIA

.1 Cybersecurity

.1 Complete all communications in a secure manner to prevent unauthorized users from making control decision or manipulating data. Prevent unauthorized users from installing malware onto the system via any communications gateway, mobile application, wireless interface, Human-Machine Interface (HMI), or accessible port.

.2 Supply report or documentation detailing cybersecurity assessment of the software, firmware, communications gateway, mobile applications, wireless interface, HMI, annunciators, remote devices, diagnostic tools, and any other associated accessories detailed in this Section. Cybersecurity documentation or assessment report to include:

.1 known vulnerabilities present in the assets

.2 guide to solutions to reduce cyber threats

.3 identify the attack surface and attack vectors

.4 assets' cyber resiliency to threats and risks including:

.1 ransomware

.2 data leaks

.3 phishing

.4 malware

.5 insider threats

.6 cyberattacks

.5 list with contact information of all 3rd party hardware and software used that are not directly supported by the vendor

.6 inclusion of any 3rd party hardware or software component does not allow the vendor to exclude that component

2.3 OPERATION

.1 Controls:

.1 Ensure that drivers used by lighting manufacturer are compatible with lighting control system or incur all costs for replacement to a compatible unit at no additional cost to the project.

.2 The system shall operate with multiple users in harmony and not react adversely to manual override inputs. Do not impede personal lighting control and the ability to adjust light levels on a per fixture basis.

.3 The following is the hierarchy of lighting control. Any function higher on the list supersedes any function lower.

.1 Life Safety control

.2 Lower and upper trim settings

.3 Manual Local Control

.4 Occupancy

.5 Time of Day programming

.6 Daylight Harvesting

.7 Demand Response

2.4 MATERIALS

.1 Occupancy Sensors:

.1 Line voltage

.1 Wall switch mount sensors in normally occupied spaces:

.1 White,

.2 0-10 V dimming,

.3 Dual technology,

.4 Minimum IR coverage 50 m^2 (500 ft^2), and

.5 Minimum two manual activation buttons to be 160 mm^2 (0.25 in^2) or larger.

.2 Wall switch mount sensors in normally unoccupied spaces with more than one fixture:

.1 White,

.2 Two relays,

.3 Passive Infrared technology,

.4 Minimum IR coverage 50 m^2 (500 ft^2), and

.5 Minimum two manual activation buttons to be 160 mm^2 (0.25 in^2) or larger.

.3 Wall switch mount sensors in normally unoccupied spaces with one fixture:

.1 White,

.2 One relay,

.3 Passive Infrared technology, and

.4 Minimum one manual activation button to be 160 mm^2 (0.25 in^2) or larger.

.2 Low Voltage

.1 Ceiling mount sensors – Dual Technology

.1 Ultrasonic technology

.2 Minimum IR coverage 100 m^2 (1000 ft^2) 360º with adaptable corridor coverage up to 9.75 m (32 ft) when mounted at 3 m (10 ft) above finished floor

.2 Ceiling mount sensors – Passive Infrared only

.1 Minimum IR coverage 100 m^2 (1000 ft^2) 360º when mounted at 3 m (10 ft) above finished floor.

.3 Wall mount sensors

.1 Dual technology

.2 Rotatable knuckle mount for aiming (with lock in place)

.3 Mounting plate for octagonal or square wall box

.4 Minimum IR range of 13.5 m (45 ft) at 90º coverage when mounted 3 m (10 ft) above finished floor

.4 Fixture mount sensors

.1 Refer to lighting fixture schedule for specific details.

.2 Line Voltage Wall Controls:

.1 In finished spaces, supply commercial grade rocker-type switches to match the voltage and amperage level of the circuit supplying the fixtures. Supply 3-way or 4-way switches when shown on the drawings. Provide white nylon cover plates.

.2 Where loads are connected to emergency power, switches shall be red in colour, otherwise colour shall be white.

.3 Supply cover plate suitable for the number of gangs shown on the drawings.

.3 Low Voltage Wall Controls:

.1 Dimming wall switch

.1 Supply dimming wall switch consists of one of the following options. The same type shall be used in all areas of the scope of work, and the switch type will not change from area to area.

.1 a multi-button switch with each ON and OFF activation surface greater than 325 mm^2 (0.5 in^2) and separate raise/lower slider or buttons,

.2 a single or multi-button switch with ON/OFF toggle surface greater than 650 mm^2 (1 in^2) and separate raise/lower slider or buttons,

.3 a single dual-zone switch with separate ON and OFF activation zones with a surface greater than 1300 mm^2 (2 in^2), or

.4 a two-button switch with each ON and OFF activation surface greater than 650 mm^2 (1 in^2).

.2 For switches without separate raise/lower slider or pushbuttons, supply the ON/OFF buttons to raise or lower dimming level with a push and hold:

.1 Pushing the top of the switch will turn lighting on. Push and hold of the top of the switch will gradually raise the dimming level of the lighting.

.2 Pushing the bottom of the switch will turn lighting off. Push and hold of the bottom of the switch will gradually lower the dimming level of the lighting.

.3 Supply white cover plate suitable for the number of gangs shown on the drawings.

.2 Non-dimming wall switch

.1 Supply non-dimming wall switch consists of one of the following options. The switch shall match as closely to the dimming version above.

.1 a single dual-zone switch with separate ON and OFF activation zones with a surface greater than 1300 mm^2 (2 in^2), or

.2 a two-button switch with each ON and OFF activation surface greater than 650 mm^2 (1 in^2).

.2 Supply white cover plate suitable for the number of gangs shown on the drawings.

.3 Multi-button/Scene Switch

.1 Supply low voltage momentary pushbutton switches in multi-button (up to 8 in single gang) configuration. Wall switches shall include the following features:

.1 Supply buttons that are large enough to be engraved. Engrave first set of buttons on each switch.

.2 Include bi-level LEDs to indicate dimming levels.

.3 When room lighting is off, illuminate ON button.

.4 All activation buttons to be 160 mm^2 (0.25 in^2) or larger.

.2 Default button text, unless noted on the drawing, shall be as follows.

.1 ON

.2 OFF

.3 Raise

.4 Lower

.5 Meeting

.6 Present

.7 Confer

.8 Cleaning

.3 Layout of buttons shall have logical arrangement. All configurations are subject to review in shop drawings.

.1 ON shall be on top of switch and OFF shall be at the bottom of switch.

.2 Place “raise” always higher than “lower” and are adjacent.

.3 ON/Raise-on-hold combination button and OFF/lower-on-hold combination button can be used if programming will allow multiple function.

.4 Icons may be used in place of text when appropriate and approved.

.4 Power/Relay Modules:

.1 Supply either power/relay modules that are centralized, multi-room, standalone, or integrated units that house one or multiple relays or dimming modules for controlling fixture, zone, room, or area lighting. Supply control input from lighting control devices. Connect multiple modules for the same control zone to allow seamless operation of controls in that space.

.2 Low voltage sensors and wall controls to communicate with power/relay module(s) that will operate lighting within the room being controlled.

.3 Modules:

.1 Communications capability with low voltage sensors or manual controls within the control zone

.2 Minimum two lighting relays are required for non-dimmable drivers

.3 When dimming is required, use dimming technology to suit fixture or lamp being dimmed

.4 The module may be incorporated or integrated into a driver.

.5 In normally occupied spaces, supply additional NO/NC contact for connection to local low voltage HVAC control unit. If module does not incorporate, then supply an additional external relay to allow this function where required.

.5 Tunable White:

.1 In locations indicated on the floor plans where tunable white is indicated, supply continuous and automatic colour temperature changes based on time of day. Supply all additional modules and interfaces required for tuning the colour temperature. All tunable fixtures must be able to tune lighting between 3000 K and 5000 K.

.2 Where automatic colour temperature in noted, gradually change lighting throughout the day and time of year as programmed by the user. All tunable lighting in the building to follow the same schedule.

.3 Default programming:

.1 3000 K or minimum before sunrise and after sunset

.2 3500 K at 1 hour after sunrise and before sunset

.3 4500 K at 2 hours after sunrise and before sunset

.4 5000 K at 3 hours after sunrise and before sunset

.4 Where manual colour control for a control zone is indicated, supply raise/lower controls in 500 K increments. Include LCD display of current colour temperature. Supply an additional manual control to return to automatic colour temperature control. Control zone to return to automatic colour temperature controls after control zone is turned off.

.5 Supply one central manual colour control, adjacent to central manual control for dimming, that will override automatic colour temperature control for all tunable control zones. This central colour control to have same properties as manual colour control above.

.6 Receptacle Control:

.1 Use receptacle control in all classrooms, meeting rooms and break rooms as minimum requirement as per ASHRAE 90.1.

.2 Equip these control zones with a relay/power supply to control at least 50% of the receptacles within the space.

.3 Controlled receptacles to be green in colour.

.4 Control either through remote relay panel with multiple control zones or individual local units. Supply relays certified by a testing authority for this function at the rated full amperage of the circuit. Relay designated as lighting relays are not acceptable to switch plug loads unless they have been separately certified as suitable for plug loads.

.5 Default control of plug-load relays is by occupancy within the corresponding lighting control zone.

.6 Relay panels shall be controlled via time-of-day control and shall be schedule to shut-off during non-operational hours.

.7 Plug-in type power bars with integrated switching cannot be used to meet this requirement.

.7 Emergency Lighting Control:

.1 Where emergency lighting is required and is installed in a space where lighting control is desired, supply an emergency lighting control unit compliant with UL 924 or CSA C22.2 No. 141. Rooms shown with an emergency battery unit meeting code requirements do not require an emergency lighting control unit.

.2 The emergency lighting control unit allows control of emergency lighting fixtures in tandem with normal lighting in an area while ensuring that emergency lighting will turn on immediately to full brightness upon loss of normal power supplying the control device. Emergency lighting operation is independent for each controlled area and does not require a overall power failure for proper operation.

.3 Supply the device with an integral momentary test switch. Pressing and holding this switch instantly forces the unit into emergency mode and turns on emergency lighting. Releasing the test switch immediately returns the unit to normal operation.

.4 The unit has dedicated leads and 24 V DC source for connection to remote test switch, fire alarm system, or other external system capable of providing a normally closed dry contact closure. Breaking contact between the terminals to force and hold the emergency lighting on until the terminals are again closed. An integral LED indicator indicates the unit’s current remote activation status.

2.5 ACCESSORIES

.1 Spare Components:

.1 Supply and turn over to the owner, after six month service visit, 10 % spare (rounded up) wiring devices, sensors, buttons, control stations, relay modules and relays to allow minor future expansion and ongoing maintenance of lighting control system. Installer may use spare components to adjust owner’s requirements during final testing, one month, and six month visits. These spare components are not a replacement for defective components covered under warranty.

3 EXECUTION

3.1 INSTALLATION

.1 The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only the rooms which are to be provided with sensors, layout is based on coverages in the design basis. Install additional sensors and power supplies/relays as required to provide coverage in the respective control group.

.2 Locate and aim sensors within each space as required for complete and proper volumetric coverage within the range of coverage(s) of controlled areas per the manufacturer's recommendations. Place sensors to have 90% or greater coverage of the controlled zone to accommodate all occupancy habits of single or multiple occupants at any location within the space.

.1 Place occupancy sensors to eliminate activation (or minimize activation, in the case of multiple entries) from outside the space with doors open.

.2 Place photosensors close to sidelights and within toplight vertical sections, with lens not subject to direct exposure to sunlight at all times of the year.

.3 Allow sensors in same control zone to work in conjunction with one another through wired or wireless connections. In rooms with movable dividers, incorporate sensors on dividers that subdivide control zones when dividers are closed and consolidate control zones when dividers are open.

.4 For lighting on emergency circuits in corridors, open areas, or other paths of egress install modules that bring lighting to full output on loss of normal power, fire alarm, or programmed event. At conclusion of event, return lighting brightness to level set before event or normal time-of-day programming.

.5 Non-switch type wall mounted sensors to be mounted at 3 m (10 ft) or 300 mm (12 in) below ceiling, unless otherwise noted.

.6 Proper judgment must be exercised in executing the installation so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural components.

.7 For occupancy sensors with ultrasonic sensors, mount the unit on a vibration free surface and install a minimum of 610 mm (24 in) away from supply ducts and wall mounted discharge ducts.

.8 When installing occupancy sensors in areas where the area is too large to cover with sensors shown on drawings or the space has obstructions that do not meet the minimum coverage requirements, then multiple sensors shall cover space to ensure that the proper coverage is achieved without additional cost to the owner.

.9 When an area is served by lighting of multiple fixture types or daylighting zones, a separate dimming or relay zone shall be provided for each fixture type and daylighting zone.

.10 When serving areas with high ceilings or exterior areas, sensors should be placed at manufacturer's recommended height for coverage and spacing.

.11 Interconnect modules, controls, and sensors via plenum-rated (FT-6) low-voltage network wiring, when routed in plenum, or via wireless connections. Free-air cabling to be neatly supported every 1.5 m (5 ft) to avoid cable laying on ceiling tile. Where cabling route is in exposed space conceal control cabling after any suspension, and suspension cable colour to match power cable colour.

.12 Connect all power/relay modules and relay panels either wired or wirelessly to a networked central control unit either directly or through a series of sub-controllers.

.13 Connect Lighting Control Unit (LCU) to uninterruptible power either via UPS circuit or with integrated battery backup to provide up to 30 minutes run time.

3.2 SITE QUALITY CONTROL

.1 Site Tests and Inspections:

.1 Conduct field inspection and testing as specified in Section 26 05 00.

.2 Field Testing:

.1 Upon completion of the installation, the system shall be completely tested by field technician who will verify all adjustments and sensor placement to ensure a trouble-free lighting control system and compliance with ASHRAE 90.1 functional testing standards.

.2 Each device shall be numbered, labeled and recorded. Tests shall be conducted to ensure that entering the space shall ensure that lighting shall be activated as per requirements and the vacating a space will cause the lighting to turn off within 30 minutes.

.3 After one month and six months of customer use, the installer and/or manufacturer shall return to the site and make any required adjustments to location, control, sensitivity and timing as required by the users based on their feedback. Provide suitable feedback forms to owner's representative two weeks prior to visit. Schedule visits with owner's representative.

.3 Functional Testing:

.1 Perform functional testing in accordance with ASHRAE 90.1 functional testing requirements. Provide final lighting control narrative and room-by-room control requirements.

.2 The individual(s) responsible for the functional testing are not directly involved in either the design or construction of the project and show documentation certifying that the installed lighting controls meet or exceed all documented performance criteria.

.3 At a minimum perform the following procedures:

.1 Confirm the placement, sensitivity and time out adjustments for occupancy sensors yield acceptable performance, lights turn off only after space is vacated and do not turn on unless space is occupied.

.2 Confirm that time switches and programmable schedule controls are programmed to turn the lights off.

.3 Confirm that photosensor controls reduce electric light levels based on the amount of usable daylight in the space as specified.

.4 Lighting control system to be complete, operational and have fully passed functional testing completed within 7 calendar days of full occupancy.

.4 Life Safety Testing:

.1 Ensure lighting control system operates as intended to meet specifications, codes, and standards. Testing to be conducted with IP network connections disabled.

.1 On loss of normal power, lighting on emergency power in paths of egress illuminate to full brightness.

.2 On an alarm or alert signal from the fire alarm panel, lighting on emergency power in paths of egress illuminate to full brightness.

.3 On conclusion of these events, all lighting is restored to the set brightness level at the initiation of the event within 5 seconds. If fixture was off prior to event, fixture remains off after event.

.2 Manufacturer Services:

.1 Have manufacturer's technical representative inspect the Work at suitable intervals during application, and at conclusion of the Work of this Section, to ensure the Work is correctly installed. Submit manufacturer's inspection reports and verifications that the Work of this Section is correctly installed.

3.3 CLOSEOUT ACTIVITIES

.1 Software:

.1 Install, set up, customize, and configure all included software, firmware or operating systems on designated equipment to suit the intended operation.

.2 Submit to Owner's representative all configuration requirements prior to installation including temporary credentials with level of administration access required, operating system, list of IP addresses required with mapping to tag or unique description, firewall configurations, minimum hardware or connection specifications, and any other information to successfully install software or equipment.

.3 Change all usernames and passwords from default for all administrative levels. New passwords to be minimum 12-characters with a unique randomly-generated combination of upper case, lower case, symbols, and numbers or as appropriate for the user interface.

.4 Pay for any software, firmware, and operating system licence and subscription fees for the warranty period and setup accounts with Owner's credentials.

.5 Prior to warranty completion, update or upgrade all installed software to most current version compatible with equipment installed. During warranty period if any cybersecurity threats or known vulnerabilities to software or firmware are provided by the vendor or relevant third-party software company, send immediate notification to Owner with instructions to patch or update software, firmware, or operating system.

.2 Demonstration and Training:

.1 Include the on-site demonstration and training necessary to familiarize the owner's personnel with the operation, use, adjustment, and problem-solving diagnosis of the lighting control system.

.2 Include manufacturer 12-month (from building occupancy) toll-free telephone support for technical questions concerning troubleshooting, re-programming, and technical issues.

.3 Demonstration and training to consist of one half-day on-site session organized by manufacturer at approximately one month after owner occupancy. Contact owner representative within 3 weeks after occupancy to schedule appropriate time and review of trainer generated agenda. Turn over all electronic and hardcopy of all slides and handouts used in training presentation to the owner.

.4 Hands-on demonstration of on-site components to include:

.1 Lighting controls software

.2 Lighting Control Unit locations and interfaces

.3 Scene controls in applicable spaces

.4 Overall manual controls for trim level

.5 Any associated mobile or web applications

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 01 and Section 26 05 00 Common Work Results for Electrical.

1.2 SUMMARY

.1 Section includes: Provide Wiring Devices, including but not limited to the following:

.1 Receptacles

.2 Coverplates

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 26 05 33 - Raceways and Boxes for Electrical Systems

.2 Section 26 09 23 - Lighting Controls

.3 Section 27 05 28 - Pathways for Communications Systems

1.3 REFERENCES

.1 Abbreviations and Acronyms:

.1 AFCI: Arc Fault Circuit Interrupter

.2 GFI/GFCI: Ground Fault Circuit Interrupter

.3 UPS: Uninterruptible Power Supply

.2 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with Section 26 05 00 Common Work Results for Electrical.

.2 Product Data:

.1 Submit manufacturer's Product data sheets for Products proposed for use in the Work of this Section. Include printed technical data, installation instructions and general recommendations for all materials and components. Include certification indicating compliance of materials with project requirements

.1 Special devices not listed in the Schedule of Wiring Devices.

.2 Flat Panel Display outlet boxes

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:

.1 Acceptable Manufacturers:

.1 Hubbell

.2 Legrand - Pass & Seymour

.3 Eaton - Arrow Hart

.4 Bryant

.5 Leviton

.2 Comparable Products from manufacturers not listed herein will be accepted provided they meet requirements of this Specification.

.2 Requests for substitutions shall be made in conformance with Section 26 05 00 Common Work Results for Electrical.

.3 Products listed here are based on products and part numbers manufactured by Hubbell and indicate a level of quality and technical specification and is not an endorsement of the manufacturer.

2.2 MATERIALS

.1 All wiring devices and will be white in colour unless noted otherwise. Device part numbers shown represent required component series and are not meant to be exact part number or identify colour. The following special colours will be used:

.1 Red – Standby, Emergency or Essential Power

.2 Orange – UPS Power

.3 Green – Controlled Circuit

.4 Blue – Surge Suppression

.5 Black – Special receptacle not in CSA 5-15R or 5-20R configurations

.6 If an outlet exhibits more than one of the above properties, then a clear permanently-mounted label will be placed above the device stating all the other functions or properties of this wiring device.

.2 Schedule of Wiring Devices

.1 Standard Devices

Description	CSA/NEMA Configuration	Hubbell Part Number
15 Ampere, 120 Volt, Toggle Type Switch, Heavy Duty (Series includes Single pole, double pole, 3-way, 4-way, locking, pilot light, etc.)	n/a	1200 Series
20 Ampere, 120 Volt, Toggle Type Switch, Heavy Duty (Series includes Single pole, double pole, 3-way, 4-way, locking, pilot light, etc.)	n/a	1220 Series
15 Ampere, 347 Volt, Toggle Type Switch, Heavy Duty (Series includes Single pole, 3-way, and 4-way)	n/a	18200 Series
20 Ampere, 347 Volt, Toggle Type Switch, Heavy Duty (Series includes Single pole and 3-way)	n/a	18220 Series
15 Ampere, 120 Volt, Duplex Receptacle (Series includes standard, tamper resistant, isolated ground, weather resistant, corrosion resistant, etc.)	5-15R	5262 Series
20 Ampere, 120 Volt, T-Slot, Duplex Receptacle (Series includes standard, tamper resistant, isolated ground, weather resistant, corrosion resistant, etc.)	5-20R	5362 Series
15 Ampere, 120 Volt, GFCI Duplex Receptacle	5-15R	GFRST15
20 Ampere, 120 Volt, T-Slot, GFCI Duplex Receptacle	5-20R	GFRST20
15 Ampere, 120 Volt, GFCI Weather Resistant Duplex Receptacle	5-15R	GFWRST15
20 Ampere, 120 Volt, T-Slot, GFCI Weather Resistant Duplex Receptacle	5-20R	GFWRST20
30 Ampere, 120/250 Volt, Dryer Receptacle, Black	14-30R	HBL9430A
50 Ampere, 120/250 Volt, Range Receptacle, Black	14-50R	HBL9450A

Description	CSA/NEMA Configuration	Hubbell Part Number
20 Ampere, 120 Volt, Locking Single Receptacle, Black	L5-20R	2310
20 Ampere, 250 Volt, Locking Single Receptacle, Black	L6-20R	2320

.2 Special mounting and accessories

.1 Flat Panel Display Wall box – 2-gang recessed FPTV Connection Enclosure Hubbell NSAV62M. Provide steel cover. Provide standard power kit and 1-gang decorator wall plate for Audio Visual or Telecommunications. For use with surface mounted flat screen displays only.

.2 Quad receptacle types are not permitted and will be substituted for two duplex receptacles ganged together.

.3 Provide other special wiring devices as noted on the drawings to the same quality as those listed within the “Schedule of Wiring Devices”.

.3 Receptacle Control

.1 Controlled receptacles should be clearly identified with green colour, controlled symbol, and the words “CONTROLLED” on the receptacle face of each receptacle being controlled. A clear permanently-mounted label will be placed above the receptacle stating “THIS OUTLET CONTROLLED BY OCCUPANCY”.

.2 Receptacle within the following spaces must be controlled wired or wirelessly via lighting control system as detailed in Section 26 09 23 Lighting Controls: conference rooms, rooms used primarily for printing and/or copying functions, breakrooms, and classrooms.

.4 Coverplates

.1 Coverplates for wall mounted wiring devices in finished areas will be smooth 302 stainless steel type. Where ganged devices have different colours, coverplate colour shall be white.

.2 Flush floor receptacles will be provided complete with a carpet flange to match floor box colour where applicable.

.3 In unfinished areas or surface mounted devices, coverplates will be galvanized type with rounded corners and back boxes will be cast type.

.4 Provide gasketed ‘While-in-Use’ or Extra Duty polycarbonate cover Hubbell RW58300 for all devices exposed to weather or water splashing. Cover will have ability to install padlock to restrict access and removal of installed plugs.

.5 Provide proper ganged coverplates and backboxes for all grouped outlets. Provide internal barriers between receptacles from different panels, and between receptacles and extra low voltage outlets.

3 EXECUTION

3.1 INSTALLATION

.1 All switches controlling a connected load in excess of 10 amperes will be 20 ampere rated type.

.2 Mounting heights of the wiring devices will be as follows unless subject to special installation conditions, or otherwise indicated on floor plans or dimensioned interior elevations (Mounting heights refer to the centre of the outlet box):

.1 Light Switches and Control Devices 1100 mm (43”).

.2 Wall Outlets and Receptacles 460 mm (18") or 150 mm (6”) above countertop or back splash as applicable.

.3 In barrier-free spaces and suites, mount light switches and control devices at 1050 mm (41.5”) above finished floor.

.3 Coverplates will be installed flush and level.

.4 Install wiring devices after wall construction and painting is complete.

.5 All wiring devices shown as being relocated on drawings will be replaced with new device and coverplate and will be connected to the existing circuit.

.6 Install all wall switches with the OFF position down. All CSA 5-15R and 5-20R configuration receptacles will be installed so the ground is in the bottom position.

.7 Where electrical outlets and wall mounted heating units occur at the same height and location, the outlets will be mounted below or beside the heater, unless noted otherwise.

.8 Work top mounted outlets will be above floor monument type securely fastened to work surface using a threaded connection to conduit system. Provide all required fittings, inserts and accessories required for approved mounting and connection.

.9 Outlets installed in millwork will be standard wall mounted versions, flush mounted into face of the appropriate vertical surface. Refer to millwork elevations and sections for further details.

.10 Install Tamper Resistant receptacles in dwelling units and child care facilities or other areas where children may be present including hotel guest rooms, preschools, and elementary education facilities.

.11 Receptacles not on isolated ground will have a green bond wire bonded to the device grounding terminal, the back box it is located in, and bonded to the branch circuit panelboard ground bus.

.12 Prior to rough-in for wall outlets for flat screen displays, coordinate mounting height such that flat screen mounting bracket is not interfering with wall outlet. Care should be taken to ensure wall outlet is completely behind flat screen display when mounted. If outlet is completely behind flat screen cover will not be installed.

.13 All outlets installed in exterior locations will be weather resistant type and will be protected with an Extra Duty or while-in-use cover for allowing outlet to be covered even while in use.

3.2 SITE QUALITY CONTROL

.1 Site Tests and Inspections:

.1 When installation is complete, test operation of all devices. All defective devices shall be replaced and all defective wiring shall be repaired.

.1 Switches should be operated to ensure load is switching as expected.

.2 For CSA 5-15R and 5-20R configuration receptacles should be tested with handheld plug-in receptacle tester for open circuits, and reversed wiring. GFCI test shall be completed on all GFCI receptacles and circuits.

.3 For receptacles of other configurations, a multimeter shall be used to preform similar tests.

.2 Non-Conforming Work:

.1 Defective materials or quality of work, whenever found, at any time prior to acceptance of the work, shall be rejected regardless of previous inspection. Inspection will not relieve responsibility but is a precaution against oversight or errors.

.2 Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to the satisfaction of the Consultant at no additional cost to the Owner.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, Division 01 – General Requirements, and Section 26 05 00 – Common Work Results for Electrical.

1.2 SUMMARY

.1 Section includes: Provide fuses, including but not limited to the following:

.1 HRC Fuses

.2 Fuse Storage Cabinet

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

.1 CAN/CSA C22.2 No. 106 – HRC – Miscellaneous Fuses

.2 CSA 248 – Fuses for Supplementary Overcurrent Protection (600 Volts, Maximum)

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with Section 01 33 00 - Submittals.

.2 Product Data:

.1 Submit manufacturer's Product data sheets for Products proposed for use in the Work of this Section. Include printed technical data, installation instructions and general recommendations for all materials and components. Include certification indicating compliance of materials with project requirements

1.5 MAINTENANCE MATERIALS SUBMITTALS

.1 Spare Fuses:

.1 Supply a complete set of spare fuses in original packaging for all fused secondary distribution equipment. Quantity of spare fuses to match fuses installed.

.2 Unless otherwise specified, store the spare fuses in fuse storage cabinets.

2 PRODUCTS

2.1 MANUFACTURERS

.1 Single source responsibility: Obtain each type of product in this Section from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

2.2 MATERIALS

.1 General

.1 Fuses are to be CSA certified and marked in accordance with the following Standards:

.1 HRC fuses – CAN/CSA C22.2 No. 106.

.2 Plug and cartridge fuses – CSA 248.

.2 HRC fuses are to have an interrupting capability of 200,000 A symmetrical.

.3 Unless otherwise specified, fuses are to be the products of one manufacturer.

.4 Fuse type references L1, L2, J1, R1, etc., have been adopted for use in this Specification.

.2 Fuse Types:

.1 Fuse types are to be as follows:

.1 HRC-J fuses (formerly Class J):

.1 Type J1, time delay, capable of carrying 500% of its rated current for 10 s minimum.

.2 Type J2, fast acting.

.2 HRC-L fuses (formerly Class L):

.1 Type L1, time delay, capable of carrying 500% of its rated current for 10 s minimum.

.2 Type L2, fast acting.

.3 HRCI-R fuses (formerly Class R – for UL Class RK1 fuses, peak let-through current and 12t values are not to exceed limits of UL 198E table 10.2):

.1 Type R1 (UL Class RK1, time delay, capable of carrying 500% of its rated current for 10 s minimum to meet UL Class RK1 maximum let-through limits.

.2 Type R2, time delay, capable of carrying 500% of its current for 10 s minimum.

.3 Type R3 (UL Class RK1), fast acting Class R, to meet UL Class RK1 maximum let-through limits.

3 EXECUTION

3.1 INSTALLATION

.1 Fuses:

.1 Install fuses for secondary distribution equipment in accordance with equipment specifications and drawing requirements. Ensure that the correct fuses are assigned to each electrical circuit.

.2 Generally, fuses are to be as follows:

.1 Motor loads, elevators & transformers: type J1 for up to and including 600 amperes and type L1 for ratings above 600 A.

.2 Service entrance feeder circuits: type J2 for up to and including 600 amperes and type L2 for ratings above 60 A.

.3 Other service and equipment: a type either indicated on the drawings, specified with the equipment, or required for the purpose.

.3 Ensure that circuit fuses are fitted to physically matched mounting devices. Provide Class R rejection clips for HRCI-R fuses.

.2 Fuse Storage Cabinets:

.1 Install a spare fuse storage in each electrical room housing fused distribution equipment. Confirm exact locations prior to installation.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, Division 01 – General Requirements, and Section 26 05 00 – Common Work Results for Electrical.

1.2 SUMMARY

.1 Section includes: Provide disconnect switches.

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 26 28 13 Fuses

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

.1 CSA – C22.2 No. 4 – Enclosed and Dead-Front Switches

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with Section 01 33 00 - Submittals.

.2 Product Data:

.1 Submit manufacturer's Product data sheets for disconnect switches and accessories proposed for use in the Work of this Section. Include printed technical data, installation instructions and general recommendations for all materials and components. Include certification indicating compliance of materials with project requirements

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules, and Specification:

.1 Acceptable manufacturers are:

.1 Rockwell Automation/Allen-Bradley

.2 Eaton

.3 Siemens

.4 Schneider Electric

.2 Requests for substitutions shall be made in conformance with Section 26 05 00

.3 Single source responsibility: Obtain each type of product in this Section from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

2.2 MATERIALS

.1 All disconnect switches are to be in accordance with requirements of CSA – C22.2 No. 4.

.2 Disconnect Switches:

.1 Heavy-duty front operated switches each in accordance with CSA – C22.2 No. 4, each complete with a red handle suitable for padlocking in the “off” position, and a NEMA/ EEMAC enclosure.

.2 Fusible units are to be complete with fuse clips in accordance with CSA-C22.2 No. 39, Fuseholder Assemblies and to suit fuse types specified below.

.3 Unless otherwise scheduled or specified fuses are to be equal to English Electric Ltd. HRC fuses, Form I Class “J” for constant running equipment and Form II Class “C” for equipment that cycles on and off.

.4 Provide viewing window that will allow visibility of the position of the blades.

.5 Enclosures: Unless otherwise specified, contactor enclosures are to be in accordance with the following NEMA/EEMAC ratings:

.1 All enclosures located in sprinklered areas – Type 2.

.2 All enclosures exposed to the elements – Type 3R, constructed of stainless steel.

.3 All enclosures inside the building in wet areas – Type 3R, constructed of stainless steel.

.4 All enclosures in washdown or food preparation areas - Type 12X, constructed of stainless steel.

.5 All enclosures in explosion rated area – Type 7 with exact requirements to suit the area and application.

.6 All enclosures except as noted above – Type 1.

3 EXECUTION

3.1 INSTALLATION

.1 Disconnect Switches:

.1 Install all required disconnect switches in accordance with drawing plans, schedules, details, and requirements of the Specification.

.2 Install fuses for fusible disconnects.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, Division 01 – General Requirements, and Section 26 05 00 – Common Work Results for Electrical.

1.2 SUMMARY

.1 Section includes: Provide contactors, including but not limited to the following:

.1 Contactor

.2 Enclosure

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction.

.1 Canadian Standards Association (CSA):

.1 CSA C22.2 No. 14 – Industrial Control Equipment

.2 National Electrical Manufacturers Association (NEMA)

.1 NEMA ICS2 – Controllers, Contactors and Overload Relays

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with Section 26 05 00

.2 Product Data:

.1 Submit manufacturer's Product data sheets for Products proposed for use in the Work of this Section. Include printed technical data, installation instructions and general recommendations for all materials and components. Include certification indicating compliance of materials with project requirements

.2 Product data is to include:

.1 Enclosure rating

.2 Short circuit withstand rating

.3 Nameplate information and schematic wiring diagram

.3 Manufacturer Reports:

.1 Start-Up and Site Certification Reports: Submit start-up and site certification reports as specified in Part 3 of this Section.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:

.1 Acceptable manufacturers are:

.1 Rockwell Automation/Allen-Bradley

.2 Eaton

.3 Siemen

.4 Schneider Electric

.2 Requests for substitutions shall be made in conformance with Section 26 05 00

.3 Single source responsibility: Obtain each type of product in this Section from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

2.2 MATERIALS

.1 Contactors:

.1 Supply in accordance with the requirements of CSA C22.2 No. 14 and NEMA ICS2.

.2 Modular design, factory assembled, electrically held (unless otherwise noted), full size contactors in accordance with requirements of CSA C22.2 No. 14 and NEMA ICS2. Unless otherwise shown or specified each contactor is to be complete with a nameplate, and the following:

.1 A padlockable enclosure with conduit knockouts and mounting screw holes conforming to requirements specified below.

.2 Enclosed contacts with closed contact indication.

.3 Unless otherwise indicated, two NC and two NC auxiliary plug-in contacts.

.4 A continuously rated interchangeable coil.

.5 Side access, finger-safe field wiring terminals to suit conductors indicated.

.6 A manual operator.

.7 Optional factory installed accessories consisting of:

.1 A hand-off-selector switch.

.2 2 identified pushbuttons, 1 green for power on, and 1 push-to-test.

.3 A fuse and transformer kit.

.4 a fused door interlock disconnect switch.

.3 Enclosures: Unless otherwise specified, contactor enclosures are to be in accordance with the following NEMA/EEMAC ratings:

.1 All enclosures located in sprinklered areas – Type 2.

.2 All enclosures exposed to the elements – Type 3R, constructed of stainless steel.

.3 All enclosures inside the building in wet areas – Type 3R, constructed of stainless steel.

.4 All enclosures in washdown or food preparation areas - Type 12X, constructed of stainless steel.

.5 All enclosures in explosion rated area – Type 7 with exact requirements to suit the area and application.

.6 All enclosures except as noted above – Type 1.

3 EXECUTION

3.1 INSTALLATION

.1 Installation Of Contactors

.1 Provide contactors where shown and secure in place.

.2 Connect each contactor with wiring in conduit in accordance with drawing requirements.

.3 Do all required interlocking work in accordance with drawing control diagrams and control sequence requirements.

3.2 SITE QUALITY CONTROL

.1 Manufacturer Services:

.1 When contactor installation is complete, arrange and pay for the manufacturer to visit the site to check the installation, and to supervise all required testing and adjusting. Submit a copy of a report from the manufacturer which certifies that each contactor has been properly installed and connected, and has been checked and adjusted, as specified in Part 1 of this Section.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

.1 Comply with the General Conditions of the Contract, the Supplementary Conditions, Division 01 – General Requirements, and Section 26 05 00 – Common Work Results for Electrical.

1.2 SUMMARY

.1 Section includes: Provide motor starters, including but not limited to the following:

.1 Motor Starters

.2 Accessories

.2 Related sections: The following is included for reference only and shall not be presumed complete:

.1 Section 26 28 13 Fuses

1.3 REFERENCES

.1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction

.1 Canadian Standards Association (CSA):

.1 CSA-C22.2 N0. 14 – Industrial Control Equipment

.2 CAN/CSA-60947-4-1 – Low Voltage Switchgear and Controlgear-Part 4-1: Contactors and Motor Starters-Electromechanical Contactors and Motor Starters

.3 CAN/CSA-C22.2 No. 248.1 – Low-Voltage Fuses

.4 CSA-C22.2 No. 106 – HRC-Miscellaneous Fuses

1.4 SUBMITTALS

.1 Submittals under this Section shall be in accordance with Section 26 05 00.

.2 Product Data:

.1 Submit manufacturer's Product data sheets for Products proposed for use in the Work of this Section. Include printed technical data, installation instructions and general recommendations for all materials and components. Include certification indicating compliance of materials with project requirements

.2 Submit product data sheets for all products specified in this Section. Include all construction and performance details.

2 PRODUCTS

2.1 MANUFACTURERS

.1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:

.1 Acceptable starter manufacturers are:

.1 Rockwell Automation/Allen-Bradley

.2 Danfoss

.3 Eaton

.4 Siemens

.5 Schneider Electric

.2 Requests for substitutions shall be made in conformance with Section 26 05 00.

.3 Single source responsibility: Obtain each type of product in this Section from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

2.2 MATERIALS

.1 Motor Starters: Motor starters are to be in accordance with all standards listed in Part 1 of this Section.

.1 General: General requirements for motor starters are as follows:

.1 All motor starters must be capable of starting the associated motors under the imposed loads.

.2 Confirm that starter voltage matches the motor prior to ordering.

.3 Unless otherwise specified, all motor starters (and disconnect switches) are to have a 50,000 symmetrical SCIA (short circuit interrupting ampacity).

.4 Equip starters with accessories and modifications as per the drawing motor starter schedule.

.5 Equip every starter associated with a building fire alarm system fan shutdown with a double voltage relay with suitable coil voltage.

.2 Single Phase Motor Starters: Unless otherwise specified or scheduled single phase motor starters are to be manual motor starting switches, each suitable in all respects for the motor it controls and complete with a neon “ON” pilot light, a snap action toggle operator designed to prevent the switch from being held closed under a sustained motor overload, an enclosure to suit the application, and properly sized thermal overload protection which can be reset by moving the toggle to the “OFF” position.

.3 Starters For Three Phase Motors Less Than 25 HP: Unless otherwise specified, starters for 3-phase motors less than 25 HP are to be combination "quick-make" and "quick-break" fused disconnects and full voltage non-reversing across-the-line starters, each complete with a properly sized thermal overload relay per phase, a 120 volt holding coil, and an enclosure to suit the application.

.4 Starters For Three Phase Motors 25 HP to 150 HP: Unless otherwise specified, starters for 3-phase motors 25 HP to 150 HP are to be reduced voltage, non-reversing, auto-transformer type starters complete with 1 properly sized thermal overload relay per phase, and an enclosure to suit the application.

.5 Starters For Three Phase Motors 150 HP and Larger: Unless otherwise specified, starters for 3-phase motors 150 HP and larger are to be reduced voltage, non-reversing, closed transition "wye-delta" starters complete with 1 properly sized thermal overload relay per phase, and an enclosure to suit the application.

.6 Starters For 2-Speed Double Winding Motors: Generally, as specified above but suitable for the motor and equipped with a 45 second time delay to permit the equipment to coast down to low speed before it is operated at low speed.

.7 Starters For 2-Speed Single Winding Motors: Generally, as specified above but suitable for the motor and equipped with a 45 second time delay to permit the equipment to coast down to low speed before it is operated at low speed.

.8 Starters For Reversible Motors For Cooling Towers: Generally as specified above but suitable for the motor and equipped with a 45 second time delay to allow the fan(s) to coast down to a stop before being operated in reverse rotation.

.9 Enclosures: Unless otherwise specified, contactor enclosures are to be in accordance with the following NEMA/EEMAC ratings:

.1 All enclosures located in sprinklered areas – Type 2.

.2 All enclosures exposed to the elements – Type 3R, constructed of stainless steel.

.3 All enclosures inside the building in wet areas – Type 3R, constructed of stainless steel.

.4 All enclosures in washdown or food preparation areas - Type 12X, constructed of stainless steel.

.5 All enclosures in explosion rated area – Type 7 with exact requirements to suit the area and application.

.6 All enclosures except as noted above – Type 1.

2.3 ACCESSORIES

.1 Fuses

.1 Fuses: Unless otherwise scheduled or specified, English Electric Ltd. HRC fuses, Form I Class "J" for constant running equipment and Form II Class "C" for equipment that cycles on and off.

.2 Warning Signs

.1 Supply warning signs at starter locations where required, for example: “Motor is Under Remote Control and May Start At Any Time Without Warning”.

.2 Appropriately sized white PVC warning signs with red lettering, screw holes, and stainless steel screws.

3 EXECUTION

3.1 INSTALLATION

.1 Installation Of Motor Starters and Accessories:

.1 Unless otherwise shown or specified, provide a starter for each item of motorized equipment as indicated on the drawings. Refer to the drawing Motor Starter Schedule.

.2 Single Phase Motor Starters: Unless otherwise specified or shown on the drawings, mount single phase motor starters adjacent to the equipment they serve.

.3 Warning Signs: Install with stainless steel screws.

.2 Interface with Other Work:

.1 Electrical Wiring Work For Mechanical Work

.1 Refer to the electrical work Section entitled Basic Electrical Materials and Methods.

END OF SECTION

1 GENERAL

1.1 SUMMARY

.1 The lighting fixtures shall be provided complete with lamps, ballasts, drivers, lenses, etc., and they shall be compatible with the various building elements that affect the installation and operation of the units.

1.2 REFERENCES

.1 Provide fixtures that will met the requirements of the various active government incentive programs such as Save-on-Energy, High Performance New Construction prescriptive path, etc.

1.3 SUBMITTALS

.1 Shop drawings for luminaires indicating lighting performance details, fixture construction details, air control and ductwork connection details, etc., and pictures of each type of lighting fixture shall be submitted for review.

.2 Shop drawings shall be submitted for LED drivers, ballasts, and bulbs for all fixtures to be installed. These shall be submitted separately from the lighting fixtures being installed and should indicate each fixture the product is installed.

.3 Fixtures shall not be released prior to review of the shop drawings. Cancellation charges will not be paid for changes to fixtures made before the fixture cuts have been reviewed.

1.4 QUALITY ASSURANCE

.1 All lighting fixtures and components must be CSA approved, ULC approved, or approved by Special Inspection from the Electrical Safety Authority.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Light fixtures must be shipped in individual containers. The fixtures must be stored in a dry area protected from the elements and physical damage.

2 PRODUCTS

2.1 LED LIGHT FIXTURES

.1 LED monochrome lighting fixture shall have lighting that shall a minimum CRI of 85 for regularly occupied spaces, a minimum CRI of 70 for exterior, and a minimum of 75 for all other spaces. All lighting shall have IESNA LM-79 and LM-80 testing reports and life calculations based on TM-21. Exterior and interior area lighting shall have a minimum efficacy of 80 lumens per watt.

.2 LED drivers shall have minimum lifespan equal or better than the lifespan of the projected L70 lifespan of the LED lamps it serves. Drivers shall be integrated into the fixture if serving only that fixture or remote if the driver serves more than one fixture. All drivers shall be dimmable using 0-10V dimming technology unless noted otherwise. LED drivers shall have high power factor.

.3 All LED lighting and drivers used in exterior or unheated applications shall provide start-up and operation in temperatures from -30 °C to +50 °C.

.4 Colour-changing LED lighting controllers shall allow DMX interface to allow colour-changing and intensity controls.

2.2 LAMPS

.1 All lamp sizes and types shall be as designated on the "Fixture Schedule" or as required by the fixture manufacturer.

.2 Where identical fixture types are installed in the same room or area, lamps shall have no variation in colour temperature.

.3 Self-contained lamps are lamps that include both the light source (LED or fluorescent) and the driver/ballast in one fixture and which installs into a standard incandescent socket. These lamps shall provide a lumen output comparable to their incandescent counterpart and shall have a colour temperature that closely matches the remaining fixtures in the space and a CRI>80.

2.3 LENSES

.1 All flat plastic lenses shall be a minimum 3.2 mm (1/8") thick acrylic type with no mid-span sag.

.2 All special lenses shall be as specified in fixture schedule.

2.4 ACCESSORY PRODUCTS

.1 Air control and slot provision where applicable shall be fully co-ordinated with the Mechanical Contractor for a fully compatible installation. Set dampers to fully blank of air slots where instructed.

2.5 SOURCE QUALITY CONTROL

.1 Lighting fixtures shall be provided with all auxiliary components and mounting hardware required for installation in the building as intended. Verify all catalog numbers with descriptions given including mounting, lamp type and quantity.

3 EXECUTION

3.1 INSTALLATION

.1 Ensure that both recessed and surface mounted light fixtures mounted as part of a suspended ceiling system are adequately supported. Fixtures shall not be suspended directly from the ceiling system supporting grid, but must be supported directly from the building structure.

.2 Surface mounted fixtures on T-Bar ceilings may be supported using a minimum of two "Caddy" IDS clips from the ceiling suspension grid and which are also separately connected to the building structure.

.3 Co-ordinate the requirements of the ceiling system supports with the Ceiling Contractor prior to fixture installation. Fixture safety chains or wires shall also be provided as required by regulatory agencies. The method of attaching suspension wires and safety chains or wires to fixtures and building elements, shall be discussed with and approved by the Consultant prior to installation. Where the structural system is to have a fireproofing material applied, attach all structural system fasteners in advance of the fireproofing.

.4 Pendant mounted fixtures shall have a deep canopy cover to fully cover the supporting outlet box and render it inconspicuous. Provide a self-aligning type cover and support for fixtures mounted to sloped surfaces.

.5 Electrical wiring or components shall not be attached to the ceiling system suspension wires.

.6 For exact details of fixture installation in valances, bulkheads, millwork, etc., refer to the Architectural Drawings.

.7 All electrical fixtures are to be delivered to the site with the specified finish. Where required colour or finish is not available from the fixture manufacturer, the Contractor shall obtain such from an approved paint shop.

3.2 FIELD QUALITY CONTROL

.1 Check all lighting fixtures prior to their installation to ensure that they are the specified and approved fixtures for the project. Check the fixture catalogue number, frame and mounting arrangement, lens type, reflector type, lamp socket position, lamp type, fixture operating voltage, etc.

.2 The locations of fixtures are shown generally on the electrical drawings. For accurate locations refer to the architectural reflected ceiling plans (indoor) or landscape drawings (outdoor).

3.3 CLEANING

.1 Clean all lenses and interior of all fixtures.

END OF SECTION

1 GENERAL

1.1 GENERAL INSTRUCTIONS

.1 Comply with General Conditions of the Contract, Supplementary Conditions and requirements of Division 01. This section will also comply with 26 05 00 Common Work Results for Electrical.

1.2 SUMMARY

.1 Provide Exit Lighting as shown on the drawings and in the lighting fixture schedule. Exit Lighting will be fed from an AC voltage dedicated circuit connected to emergency source and a DC voltage source connected to the emergency battery lighting system.

.2 Provide complete 12 volt DC emergency battery lighting system for the building areas indicated. The emergency battery units will be located as indicated on the drawings. The emergency battery system will provide emergency power automatically on failure of the normal power supply system. When the normal power supply system is restored, the emergency battery unit will restore itself automatically to the charging condition.

.3 Related Sections:

.1 Section 26 05 19 Wire and Cable

.1 Section 26 05 33 Raceway and Boxes for Electrical Systems

1.3 REFERENCES

.1 Reference Codes and Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction.

.1 CSA C22.2 No. 141 Emergency lighting equipment

.2 CAN/CSA C860 Performance of internally lighted exit signs.

.3 Ontario Building Code

.4 Ontario Electric Safety Code

1.4 SUBMITTALS

.1 Complete sets of shop drawings will be submitted indicating the following:

.1 System components, specifications, and dimensions.

.2 Battery Calculations.

.3 Wiring schematics.

.2 For Closeout submittals provide the following:

.1 Emergency lighting runtime test report

2 PRODUCT

2.1 APPROVED MANUFACTURERS

.1 Listed below are manufacturers that will provide complete emergency and exit lighting systems. Equivalent emergency and exit lighting systems by other manufacturers and/or engine manufacturer may be accepted subject to review by the consultant. Emergency and Exit Lighting by the following manufacturers will be considered for use on this project:

.1 Aimlite

.2 Beghelli

.3 Emergi-lite

.4 Lumacell

.5 Stanpro>

2.2 EXIT LIGHTING

.1 Housing: cold rolled steel minimum 1.0 mm (1/25 in) thick, die-cast or anodized extruded aluminum frame, white finish c/w universal mounting system.

.2 Face and back plates: extruded aluminum alloy white colour.

.3 Graphic: Green “running man” pictogram.



.4 Lamps: LED type, 120 V AC and DC emergency power source, maximum 5 watts consumption.

.5 Designed for minimum 50,000 hours of continuous operation without re-lamping.

.6 Exit lighting arrows: exit lighting will be capable of no arrows or configuration with arrows facing left, right, up, down, upper right, upper left, lower right, or lower left. “Running man” pictogram will also be capable of facing either right or left. Refer to drawings for orientation required for each exit lighting unit.

.7 Photoluminescent Exit signage is not permitted.

2.3 EMERGENCY BATTERY UNITS

.1 The self-powered battery units will be a sheet steel ventilated type enclosure with a removable front cover. The cabinets will be painted with a corrosion resistant undercoat inside and have a low gloss white enamel exterior finish. The side panel of the battery cabinets will contain an AC on light, charge light and test switch. A supply line fuse will be provided inside the cabinet. The emergency battery unit will be rated for AC power supply and be equipped with a grounded plug and power cord, minimum 4' in length for power supply connection.

.2 The emergency batteries will be long life sealed lead-acid (SLA) type and be VRLA technology totally maintenance free with a minimum life expectancy of 10 years.

.3 All emergency battery lighting heads on unit battery and remote will be LED type.

.4 The battery capacity will be sized to supply the number of fixtures indicated on the drawings, plus have an additional 50 watts spare capacity for future heads. The batteries will be capable of providing power to the fixtures for 90 minutes without dropping below ninety-one (91) percent of the rated battery voltage.

.5 The emergency battery charger will be a solid state, fully automatic rectifier type with Hi and Lo charging rates to re-charge the batteries to their rated capacity from a discharged condition in less than 24 hours.

.6 The emergency battery units will be complete with the following options:

.1 Electrolyte low level alarm.

.2 Battery disconnect switch (70 % of normal voltage).

.3 Time delay relay to maintain emergency lighting for 10 minutes, powered from the battery charger, following restoration of normal power.

.4 Auto test and automated self-diagnostic circuitry complying with CSA and building code requirements.

.7 Mounting platforms and accessories will be provided for a permanent and safe installation of the battery unit.

3 EXECUTION

3.1 EXIT LIGHTING

.1 Ensure that exit lighting AC circuit breaker is locked in on position

.2 Install exit lighting as indicated, in accordance with building code requirement.

3.2 EMERGENCY BATTERY UNITS

.1 Provide grey coloured conductors in a separate conduit system, for the DC wiring. The wire will be sized to limit voltage drop to furthest fixture to 5 percent. Connect battery units to remote lamp heads and exit lighting emergency sockets in an approved manner.

.2 Emergency lighting will be so arranged that the failure of any one lamps will not leave in total darkness the area normally illuminated by it.

.3 Unit equipment will be installed in such a manner that it will be automatically actuated upon failure of the power supply to the normal lighting in the area covered by that unit equipment.

.4 Install battery unit mounting shelf at 2000 mm (80 in) above finished floor.

.5 All battery units will have a logged runtime test completed prior to occupancy to ensure compliance with building code requirements.

END OF SECTION

1 GENERAL

1.1 SUMMARY

.1 Provide electrical equipment and appliances of the types specified herein and shown on the drawings. The <Contractor/Sub-Contractor> shall provide collars and tailpieces to enable service connectors to be made by specified trades.

1.2 SUBMITTALS

.1 Equipment and device shop drawings shall be submitted for review.

2 PRODUCTS

2.1 BATTERY CLOCKS

.1 Supply and install battery operated indicating clocks at locations shown on plans and as instructed on site. Clocks shall be Edwards Cat. No. 2941-5BS, single face, surface mounting 300 mm diameter round clock with convex shatterproof crystal, grey finish case, black/red Arabic numerals and white face in a 12/24 hour style II arrangement with two number rings, black minute and hour hands, red sweep second hand and 1.5V quartz crystal movement. Install a 1.5V 'C' size alkaline battery in each clock and mount to a suitable hanger and secure with an appropriate safety chain."

2.2 ELECTRIC HEATING UNITS

.1 Provide complete electric heating units including all accessories and controls as specified on the drawings.

3 EXECUTION

3.1 INSTALLATION

.1 Install surge suppressors adjacent to protected device or panel and hard wired into power supply circuit. Connect units in accordance with manufacturer's instructions and install disconnect and overcurrent protection as required by Electrical Safety Authority.

.2 Mount clocks at 2400 mm or 300 mm (8'-0” or 1'-0") below ceiling whichever is lower. Install using an appropriate clock hanger and provide a safety chain.

.3 For power supply to service poles provide power supply grid of receptacles in ceiling space as indicated. For communications wiring provide zone conduits in ceiling space as indicated.

.4 Install all electric heaters, controls and associated equipment in accordance with the manufacturer's instructions and Electrical Safety Code regulations.

END OF SECTION

1 GENERAL

1.1 GENERAL INSTRUCTIONS

.1 Comply with General Conditions of the Contract, Supplementary Conditions and requirements of Division 01. This section will also comply with 26 05 00 Common Work Results for Electrical.

1.2 SUMMARY

.1 Provide alterations to the existing fire detection and alarm system to suit the specific building requirements as indicated in this scope of work.

.2 The existing fire alarm control panel, fire alarm devices, and existing components are to be reused and expanded to suit this scope of work. The system alterations will consist of new and relocated initiating devices, signalling devices, supervisory circuits, and components as specified herein.

.3 At the completion of the scope of work, the modified fire alarm system will be a fully functional system and will be compliant with all local, provincial, and federal codes and standards.

.4 Modify the existing fire alarm graphics to suit changes.

.5 Connect devices to existing fire alarm system with wire and conduit as required by code, standards, and equipment manufacturer. Provide any components, expansion cabinets, re-programing, and make any modifications necessary to the fire alarm control panel.

.6 Related Sections:

.1 Section 08 30 00 Specialty Doors and Frames

.2 Division 21 Fire Suppression

.3 Division 23 Heating, Ventilating, and Air Conditioning (HVAC)

.4 Section 26 05 19 Wire and Cable

.5 Section 26 05 33 Raceway and Boxes for Electrical Systems

.6 Section 26 05 53 Identification of Electrical Systems

1.3 REFERENCES

.1 Reference Codes and Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction.

.1 CAN/ULC S524 Installation of Fire Alarm Systems

.2 CAN/ULC S536 Inspection and Testing of Fire Alarm Systems

.3 CAN/ULC S537 Verification of Fire Alarm Systems

.4 CAN/ULC S561 Installation & Services for Fire Signal receiving Centre Equipment

.5 Technical Standards & Safety Authority (TSSA)

.6 Ontario Fire Code (OFC)

.7 Ontario Building Code (OBC)

.8 Ontario Electrical Safety Code (OESC)

1.4 QUALITY ASSURANCE

.1 In the case of any discrepancy between these specifications, the project drawings, and any applicable local codes, the installed Fire Alarm / Life Safety System will comply with the most stringent requirement.

.2 Provide passive fire alarm graphic displays at annunciator and control panel location. Fabrication of the graphic display will be by an approved signage supplier or the fire alarm supplier.

.3 Employ fully trained mechanics who are regularly employed in the field of graphics design and/or sign production to create the fire alarm zoning graphic.

1.5 SUBMITTALS

.1 Submittals under this Section will be in accordance with General Conditions, Section 01 33 00 – Submittals, and Section 26 05 00 - Common Work Results for Electrical.

.2 Submit the following as part of the Shop Drawings:

.1 System component numbers and dimensions.

.2 Fire Alarm Zoning Graphic.

1.6 RELATED WORK

.1 Coordinate work in this Section with all related Sections. Work and/or equipment provided in other Sections and related to the fire detection and alarm system will include, but not be limited to:

1.7 SYSTEM OPERATION

.1 All fire alarm stations, thermal detectors, products of combustion detectors, notification appliances, sprinkler system flow switches, and sprinkler/standpipe tamper switches will be fully supervised.

.2 All integrated life safety system equipment will be arranged and programmed to provide an integrated system for the early detection of fire, the notification of building occupants, the automatic summoning of the local fire department, the override of the HVAC system operation, and the activation of other auxiliary systems to inhibit the spread of smoke and fire, and to facilitate the safe evacuation of building occupants. In all operating modes, the processing of fire alarms will have the highest priority.

.3 The system will contain all required components for alarm receiving circuits and signal circuits as shown on the drawings. The system will be so arranged that the operation of any manual station or automatic thermal or smoke detector or sprinkler flow switch will activate system signalling sequence. All system circuits, wiring and devices will be fully supervised for faults. A circuit fault such as an open or ground or actuation of a valve tamper switch will sound the trouble signal but will not cause a false alarm.

1.8 SYSTEM PROVISIONS

.1 The system will display both alarm and trouble indications from each fire alarm detection zone. The activities of the system will be complete with custom labels, indicating the exact location of the activity, and will be displayed on the fire alarm control panel and remote annunciator panels.

.2 As a result of alarm conditions received the fire alarm control panel will automatically operate specified control points such as transmitting a signal to the fire signal receiving centre to summon the fire department, or stopping recirculating fan systems, etc.

2 PRODUCTS

2.1 GENERAL

.1 Provide all modifications and additions to the existing installations to incorporate the new control equipment and other work and comply with the latest codes and regulations. Consult the manufacturer to verify the existing system provisions and include all necessary modifications to comply with the system requirements as described.

.2 Replace all existing system wiring as required to comply with new system specified requirements. Upgrade existing wiring arrangements to suit zoning changes, the addition of initiating and signal devices in existing areas, etc. Existing conduit and raceways may be used for new wiring where appropriate.

.3 All equipment and components will be the manufacturer's current model. The materials, appliances, equipment and devices will be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling fire alarm system. The authorized representative of the manufacturer of the major equipment, such as control panels, will be responsible for the satisfactory installation of the complete system. Provide, from the acceptable manufacturer's current product lines, equipment and components, which comply, with the requirements of these specifications.

.4 The system will utilize node-to-node, direct wired, multi-priority peer-to-peer network operations. The system will utilize electronically addressed, smoke detectors, heat detectors and input/output modules as described in this specification.

.5 All integrated life safety system equipment will be arranged and programmed to provide an integrated system for the early detection of fire, the notification of building occupants, the automatic summoning of the local fire department, the override of the HVAC system operation, and the activation of other auxiliary systems to inhibit the spread of smoke and fire, and to facilitate the safe evacuation of building occupants. In all operating modes, the processing of fire alarms will have the highest priority.

2.2 CONTROL PANEL

.1 The Fire Alarm Control Panel (FACP) is existing with remote annunciator panels.

.2 Consult the manufacturer to verify existing system provisions and the compatibility of the new control equipment with existing system and provide all necessary modifications to existing wiring or control panel accordingly.

2.3 SYSTEM CONFIGURATION

.1 Each addressable analog loop will be circuited so device loading is not to exceed 80 % of loop capacity in order to allow for the addition of future devices.

.2 Provide alarm receiving modules as required in the control panel for all alarm receiving circuits. Modules will include an individual amber trouble lamp for each alarm receiving circuit to indicate the source of any faults.

.3 The alarm receiving circuits will have Class "A" operation. A single break or grouped fault in the wiring to any initiating device will cause a trouble signal but will not affect detection of an alarm from any initiating device while this fault exists.

.4 Provide supervisory receiving modules as required in the control panel for all supervisory circuits. Modules will include individual alarm and trouble lamps for each supervisory circuit to indicate circuit condition.

.5 The supervisory circuits will have Class "B" operation. A single break or ground fault in the wiring to any initiating device will provide a trouble signal. A supervisory circuit alarm condition will activate trouble sequence only.

.6 Provide audible signal circuit modules as required in control panel for all signal circuits.

.7 Provide auxiliary control relay modules as required in control panel for all auxiliary control circuits. Modules will include individual trouble lamps for each circuit and supervised on-off-auto control switch for manual circuit operation override.

.8 The signal and auxiliary control circuits will have Class "B" operation. A single break or ground fault in the wiring to any audible signal or control device will produce a trouble signal.

.9 Provide sufficient spare capacity to assure that the addition of five (5) audible devices can be supported without the need for additional control components (power supplies, signal circuit modules, batteries, etc.)

.10 Provide sufficient spare capacity to assure that the addition of three (3) visual devices can be supported without the need for additional control components (power supplies, signal circuit modules, batteries, etc.)

.11 Provide a dedicated 24 V DC circuit as required to feed all auxiliary relays required for inductive loads. Circuits will be supervised via an end-of-line relay and addressable input module. Auxiliary relays will not derive their power from the starter or load being controlled

2.4 SYSTEM DEVICES

.1 All new and existing/re-used system devices will be fully compatible with existing control equipment and match in operation and performance characteristics of the existing system. All signal devices and manual stations will be identical in appearance and function. All accessories will be supplied by the fire alarm manufacturer.

.2 Supply system devices where indicated on the drawings and described below.

Manual Stations types to be operable using one hand, without requiring tight grasping, pinching with fingers or twisting of the wrist, and with a force of not more than 22.2 N and include:

(1) Manual Station, Single Stage, single-action lever, extruded aluminum with NO/NC contacts.

.2 Manual stations will include these accessories where required:

(1) Where surface mounted, use a vendor-approved surface wall box.

(2) In public spaces, a vendor-approved polycarbonate lift-type shield and frame that fits easily over manual station. The shield will have integrated battery-operated high dB sounder on cover lift.
(3) Use manufacturer-approved manual station lowering kit to adjust height of existing manual stations.

.3 Automatic thermal detectors types include:

(1) Fixed and Rate of Rise Heat Detector. 57 ºC (135 ºF), separate mounting base.
(2) Fixed and Rate of Rise Heat Detector. 90 ºC (194 ºF), with addressable module.
(3) Fixed Temperature Heat Detector. 57 ºC (135 ºF), separate mounting base.
(4) Fixed Temperature Heat Detector. 90 ºC (194 ºF), with addressable module.

.4 Where indicated to provide a fire detector, provide suitable thermal detector listed above.

.5 Automatic smoke detectors types include:

(1) Photoelectric Area Type with separate mounting base
(2) Photoelectric Type Duct Smoke Detector with housing, Form-C shut down relay and LED remote indicator and sampling tubes to suit duct dimensions and key-operated remote test station. Provide wall mount remote indicator minimum 300 mm (1 ft) below ceiling at detector location.
(3) Photoelectric Smoke and Fixed Temperature Type- intelligent multi-sensor detector. The smoke detector will be modular and allow for replacement of the photoelectric chamber
(4) Ionization, Photoelectric and Heat Type - multi-sensor detector with a separate mounting base.

.6 The intelligent Analog detectors will be suitable for mounting on any detector-mounting base.

(1) Standard Detector Mounting Bases - The base will be capable of supporting one Remote Alarm LED Indicator. Provide remote LED alarm indicators where shown on the plans.
(2) Relay Detector Mounting Bases – The base will be provided for area smoke detectors as indicated on plans to provide a remote alarm indication or perform auxiliary functions as applicable. Relay bases to be 4 wire version with end of line relay. Power source for relay activation to be run separately from detection circuit to allow multiple unit operation. The relay will be a bi-stable type and selectable for normally open or normally closed operation. The position of the contact will be supervised
(3) Isolator Detector Mounting Bases – The base's respective detector processor will control the operation of the isolator base. Following a short circuit condition, each isolator/detector will be capable of performing an internal self-test procedure to re-establish normal operation.

.7 Input modules will have a minimum of 2 diagnostic LEDs mounted behind a finished cover plate. A green LED will flash to confirm communication with the loop controller. A red LED will flash to display alarm status.

(1) Single Input Module - (Waterflow Detectors, Tamper Switches etc.) The Single Input Module will provide one (1) supervised Class B input circuit capable of a minimum of 4 personalities, each with a distinct operation. The single input module will support the following circuit types: Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.), Normally-Open Alarm Delayed Latching (Waterflow Switches), Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.), Normally-Open Active Latching (Supervisory, Tamper Switches).

(2) Dual Input Module - The Dual Input Module will provide two (2) supervised Class B input circuits each capable of a minimum of 4 personalities, each with a distinct operation. The dual input module will support the following circuit types: Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.), Normally-Open Alarm Delayed Latching (Waterflow Switches), Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.), Normally-Open Active Latching (Supervisory, Tamper Switches).

(3) Single Input Signal Module - The Single Input (Single Riser Select) Signal Module will provide one (1) supervised Class B output circuit capable of a minimum of 2 personalities, each with a distinct operation. When selected as a telephone power selector, the module will be capable of generating its own “ring tone”. The single input signal module will support the following operations: Audible/Visible Signal Power Selector (Polarized 24 V DC @ 2 A).

(4) Control Relay Module - The Control Relay Module will provide one form “R” dry relay contact rated at 2 A @ 24 V DC to control external appliances or equipment shutdown. The control relay will be rated for pilot duty and releasing systems. The position of the relay contact will be confirmed by the system firmware.

.8 End of Line Resistors complete with a flush stainless steel coverplate appropriately marked and must be CSA or CAN/ULC approved.

.3 Provide appropriate wire guard installed over detector for detector protection where shown on drawings.

.4 Notification appliances will be as follows:

.1 Bells: 150 mm (6 in) diameter or 250 mm (10 in) as shown, 24 V DC polarized single stroke type fire alarm bells. The signal bells will be furnished complete with an adaptaplate with plug-in receptacle.

.2 Strobes: synchronized strobe with a field selectable output of 15, 30, 75 or 110 cd; complete with red finish. To be selected for 15 cd unless noted otherwise noted on plans. When surface mounted use surface wall box with a colour to match device. Strobes in sleeping rooms will have minimum output of 177 cd.

.3 Trim Plates: Provide trim plates for two-gang or 100 mm (4 in) square boxes.

.5 Fire Alarm Zoning Graphic

.1 Provide Fire Alarm Zoning Graphic to replace existing and adjacent to each control panel and annunciator.

.2 Sample Graphic

(1) Submit a sample of the graphic to the Consultant prior to the colouring and final framing process for approval.

.3 Rejections

(1) Defective materials or workmanship whenever found at any time prior to final acceptance of work will be rejected regardless of previous inspection. Inspection will not relieve responsibility but is a precaution against oversight and error.

.4 Colour

(1) Building walls: Black
(2) Symbols and Text: Black ("You are here" marker to be red).
(3) Zones: Each zone to be a different colour as selected by the graphic designer to ensure contrast between adjacent zones and text. Text colour should be changed to white if contrast improves text legibility when placed on dark background colour.

.5 Materials will be new and in perfect condition, free from defects impairing physical or appearance performance.

.6 Graphic: 450 mm x 600 mm (18 in x 24 in) or sized to match existing in high impact styrene with screened graphics. Zone colours will be as selected by the Consultant from the standard range samples provided by the supplier of the graphic.

.7 Frame: Clear anodized aluminum picture frame with nominal 19 mm (3/4 in) face width.

.8 Protective Covering: Minimum 3 mm (1/8 in) thick, non-glare acrylic.

.9 Text font will be a light sans serif typeface and have a minimum text size of 10 point. All text should be upright and horizontal regardless of the rotation of the plan.

.10 The following information is required to be shown on the fire alarm zoning graphic:

(1) All exterior and interior walls,
(2) All stairs and elevators,
(3) All door openings,
(4) Exit door locations indicated with arrows pointing out from door and "Exit" label,
(5) "You are here" marker and text,
(6) North arrow,
(7) Annunciator panel location(s),
(8) Fire alarm zones and zone designations, and
(9) Legend.

.11 Floor plan shall be rotated and oriented such that when viewing the graphic, and standing in directly in front of it, the direction the viewer is looking towards is up on the floor plan.

3 EXECUTION

3.1 GENERAL

.1 The entire system will be installed in accordance with the latest edition of CAN/ULC-S524 and the approved manufacturer’s manuals and wiring diagrams. Furnish all labour, conduit, wiring, outlet boxes, junction boxes, cabinets and similar devices necessary for a complete, functional life safety fire alarm system. Provide all necessary power supply, interconnecting and remote signal wire in dedicated conduit throughout and installed in accordance with the manufacturer’s wiring diagrams and the requirements of the Building Code, Electrical Code, and Inspection Authorities. All penetration of floor slabs and fire separations will be fire stopped in accordance with all local fire codes.

.2 Take alternate measures in co-ordination with the Owner during any temporary interruption or reduction of fire alarm detection or signalling to ensure the safety of the building occupants. These measures shall be approved by the local fire department and be conveyed to them in writing in accordance with the requirements of the Fire Code.

3.2 WORK WITH EXISTING FIRE ALARM PANEL

.1 Consult the manufacturer to verify the existing system provisions, the compatibility of the new control equipment with existing system and provide all necessary modifications to existing wiring or control panel accordingly, to accommodate the system alterations and comply with the system requirements.

.2 Remove all special modifications upon completion of system wiring and device upgrade. All existing auxiliary control circuits will be reconnected to new control to operate in the specified manner

.3 The manufacturer will supply reasonable amounts of technical information with respect to any changes necessary to accommodate the system alterations.

.4 Modifications to the fire alarm control panel to accommodate the system alterations will be by the manufacturer’s technician.

.5 Provide all rewiring and modifications to existing circuit arrangements to comply with the new system circuit zoning, devices and wiring requirements.

.6 It is the intention to install new fire alarm devices and wiring without any interruption of the existing fire alarm system protection to occupied areas of the building in the building. Maintain fire alarm system operation during construction in accordance with Ontario Fire Marshall’s *Guidelines for Maintaining Fire Safety During Construction in Existing Buildings*. Any required testing of the fire alarm system during construction must be proceeded by a warning and announcement to the appropriated supervisory personnel. Arrange the time and duration of testing with the Owner to cause minimal disturbance and inconvenience to all concerned.

.7 Take alternate measures in co-ordination with the owner during any temporary interruption or reduction of fire alarm detection or signalling to ensure the safety of the building occupants such as a fire watch. These measures will be approved by the local fire department and be conveyed to them in writing in accordance with the requirements of the Authority Having Jurisdiction (AHJ).

3.3 WIRING

.1 Fire alarm system wiring will be sized and colour coded in accordance with manufacturer's and Electrical Code requirements, (minimum 14 AWG - signal and control circuits, minimum 18 AWG - annunciation, minimum 16 AWG detection and supervisory circuits, minimum 12 AWG power supply).

.2 All fire alarm system wiring will be provided with a separate insulated ground conductor sized in accordance with Electrical Code regulations. All signal and auxiliary wiring will be installed as standard Class 'B' type in a separate conduit system and an alarm receiving wiring will be installed as Class ‘A’ type in two runs of conduit in accordance with this specification and Electrical Code requirements complete with recessed device boxes for approved component mounting.

.3 Connect auxiliary control circuits to the system to provide proper equipment operation. Provide in-line fuse protection at control panel for all auxiliary control circuits.

.4 Wiring connections will be made as shown on drawings. Final connection to panel will not be applied to the circuit until the representative of the manufacturer has approved the connections to the control equipment.

.5 Wiring requirements for shielding certain conductors from others or routing in a separate raceway will be as recommended by the manufacturer's documentation and included in the bid.

3.4 INSTALLATION

.1 Mounting heights of equipment will be as follows:

Device	Mounting Height
Manual Stations	1100 mm (43 in) to centre of back box New stations installed at existing locations will be re-positioned to new mounting height.
Audible Signals (wall mounted)	2300 mm (90 in) or 300 mm (12 in) below ceiling, to top of device, whichever is lower.
In-suite Audible Signals with Silencing	1050 mm (41 in) to centre of back box
Visual Signals (wall mounted)	2300 mm (90 in) to top of lens.
Panels	2000 mm (80 in) to top of trim.
End of line resistors	1800 mm (6 ft) to centre of device.

.1 New devices installed at existing locations will also be mounted at these mounting heights.

.2 Locate detectors as shown considering spacing and mounting requirements contained in CAN/ULC-S524. Locate detectors away from radiating surfaces or positions affected by ventilation grilles.

.3 End-of-line resistors will be furnished as required for mounting as directed by the manufacturer. These devices are not shown on plans but shall be located in public spaces.

.4 Connect supervisory device contacts to the system to indicate a trouble condition on the appropriate supervisory zone. Connect auxiliary control circuits to the system to provide proper equipment operation. Provide in-line fuse protection at control panel for all auxiliary control circuits.

.5 Connect auxiliary control circuits to the system to provide proper equipment operation. Provide in-line fuse protection at control panel for all auxiliary control circuits.

3.5 FIELD QUALITY CONTROL

.1 The manufacturer will make a complete inspection of all installed fire alarm equipment including each and every component such as signal devices, initiating devices, annunciation and control equipment, etc. in accordance with CAN/ULC-S537 to ensure the following:

.1 That the system is complete and in accordance with the specifications.

.2 That the system is connected according to ULC requirements.

.3 That the system is installed in accordance with the manufacturer's recommendations.

.4 That the regulations concerning the supervision of components have been adhered to.

.2 Any subsequent changes to conform to the above will be done with technical advice supplied by the manufacturer.

.3 The manufacturer will supply reasonable amounts of technical information with respect to any changes necessary. During the period of inspection by the manufacturer, this Section will make available to the manufacturer, appropriate staff as designated by the manufacturer.

.4 On completion of the inspection, the manufacturer will provide the Consultant with a certificate together with detailed inspection record sheets, confirming that the system is installed in accordance with the above outlined requirements. The manufacturer will also confirm in writing that all authorized building personnel have been instructed as to system operation, maintenance procedures, etc.

.5 All costs involved in this inspection both from the manufacturer and this Section’s work, will be included with the total tender price.

.6 It will be the responsibility of this Section to assure that construction debris does not adversely affect any sensing devices installed as part of this project. Should it be deemed necessary by the Consulting Engineer, End-User, or AHJ, this Section will be responsible for the cleaning of all smoke detectors prior to final acceptance.

3.6 THIRD-PARTY VERIFICATION

.1 Verification shall be carried out in accordance to CAN/ULC-S537 Verification of Fire Alarm Systems. The Third-party verifier shall provide a Verification Certificate and Verification Report to show compliance with CAN/ULC-S537 Verification of Fire Alarm Systems.

.2 Verification must be carried out by an agency (or individual) acceptable to the Authority Having Jurisdiction, who can demonstrate they have the sufficient training or experience, and who is not the installing contractor, fire alarm manufacturer, or involved in the design or installation of the fire alarm system.

.3 All fire alarm system testing and verification will use only safe, non-damaging test methods in accordance with CAN/ULC-S536. Open flame or smoke will not be used for any on-site testing of detection devices for proper operation.

3.7 AUDIBILITY TESTING

.1 All rooms within the scope of work shall be tested with a professional sound level meter that has an accuracy of ± 1.5 dB. Sound level meter used in testing shall be the same for all areas of the building for both with alarm and without. Tester will be calibrated immediately before and after the audibility measurements are taken based on ANSI S1.40, Specifications for Acoustical Calibrators.

.2 Sound level measurements shall be taken in accordance to CAN/ULC-524 Appendix C - Sound Level Measurements with the following additional requirements.

.1 Tester will perform all tests with all doors and windows closed and when unusual noises are not present.

.2 Tester will perform test to get ambient noise level without alarm to measure ambient sound level and perform the test again with the with alarm to measure alarm sound level.

.3 All test results should be tabulated showing the following columns: room number/name, building code minimum sound level, ambient noise level, and alarm noise level

3.8 FIREWATCH

.1 If during the course of construction, the fire alarm system or zones within the building are required to be fully or partially shut down for any period of time, provide a Firewatch for all the affected areas in accordance with the Fire Code during that time period. This Firewatch should be in place for the entire duration of the shutdown.

3.9 SEQUENCE OF OPERATION

.1 All fire safety within the building will follow the requirements set out in the building's existing Fire Safety Plan.

.2 The overall operation of the existing fire alarm panel will not change. All new or relocated devices added to the system shall function in the same manner as all other existing devices.

END OF SECTION

26-7857-RFT - Kitchener Waterloo Collegiate and Vocational School Health and Physical Education Renovation

Opening Date: April 10, 2026 2:30 PM

Closing Date: April 30, 2026 2:00 PM

Schedule of Prices

* Denotes a "**MANDATORY"** field

Do not enter $0.00 dollars unless you are providing the line item at zero dollars to the Board.

Bid Price Form

The amounts stipulated on the Bid Price Form(s) are intended to cover the cost of the complete Work as described in this Procurement and must remain fixed and firm for the term of the Contract unless otherwise specified in this Procurement.

All prices shall be in Canadian Funds, Free On Board (FOB) Destination, and Freight Prepaid (Board locations). and shall be exclusive of Harmonized Sales Tax (HST) but shall include all materials, labour, equipment, disbursements, expenses, insurance, bonding, customs charges, freight, shipping and handling costs, travel costs and all other charges of every kind attributable to the Work and Services provided.

Bid Price includes Cash Allowance

Line Item	Description	Unit of Measure	Quantity	Bid Price *	Total
1	As per scope of work outlined in 26-7857-RFT Kitchener Collegiate Institute - Health and Physical Education Renovation	Lump Sum	1		
				Subtotal:	

Summary Table

Bid Form	Amount
Bid Price Form	
HST (13%)	$ 0.00
Total Contract Amount:	

Bid Questions

Bidder Instructions

Answer all questions that are marked Mandatory.

Bill S-211 - This enactment enacts the Fighting Against Forced Labour and Child Labour in Supply Chains Act, which imposes an obligation on certain government institutions entities to ensure measures are taken to prevent and reduce the risk that forced labour or child labour is used by suppliers or in their supply chains. The Board principles align with Bill S-211. Please confirm that your organization will comply with this Act. YES or NO. If no, please explain.	
As per the “Ontario Business” definition as per the BOBI Act is a supplier, manufacturer or distribution of any business structure; conducts its activities on a permanent basis in Ontario; and has either a) its headquarters or main office in Ontario, or b) at least 250 full-time employees in Ontario at the time of the applicable procurement process. Does your company qualify as an Ontario Business under the BOBI Act? YES or NO	
is your company a Canadian business? YES or NO	
Is your company a U.S. business, as defined by the Ontario Treasury Board / Management Board of Cabinet (TB/MBC) as a supplier, manufacturer or distributor of any business structure (includes a sole proprietorship, partnership, corporation or other business structure) that: has its headquarters or main office located in the U.S., and has fewer than 250 full-time employees in Canada at the time of the applicable procurement process? Yes or No. (Comments are allowed).	

Specifications

Bidder's Contact Information

A Project Manager and Site Supervisor to manage and supervise the Work, must be named in this form. A dedicated Site Supervisor shall be in full-time attendance at the Place of the Work while the Work is being performed. Personnel will be subject to Board approval and may not be changed without prior written approval from the Board.

Note: resumes are required to be uploaded in the document section.

Title	Name	E-mail	Cell Phone Number	
Project Manager				*
Site Supervisor				*

Documents

It is your responsibility to ensure the uploaded file(s) is/are not defective or corrupted and are able to be opened and viewed by the Owner. If the attached file(s) cannot be opened or viewed, your Bid Submission may be rejected.

- Project Manager * (mandatory)
- Site Supervisor * (mandatory)
- Certificate of Recognition (COR) Certification * (mandatory)

BONDING UPLOAD SECTION

Refer to the Bonding Requirements Section of the Terms and Conditions.

Instructions to Bidders

Bidders shall upload their electronically verifiable and enforceable (e-Bond) format for Bid Deposit Bond and Agreement to Bond separately in this section. If both Bonds are in the same file, please upload it to both fields and indicate one is a copy.

Tender # and Project Title must be included on the Bonds.

Bonding requirements are based on the total base bid amount, inclusive of all applicable taxes.

- Bid Deposit Bond * (mandatory)
- Agreement to Bond * (mandatory)

Addenda, Terms and Conditions

I/We have read and understand this Bid Solicitation document, and agree to perform the Work required in accordance with this Bid

Solicitation document, including all addenda, at the price(s) detailed in the Bid.

I/We confirm that:

1. The person named in this Bid is authorized to sign and electronically submit this Bid through the Bidding System.

2. I/We meet all mandatory requirements of the Bid Solicitation document.

3. The bid will remain open for a specified acceptance period after the Closing Time. The Board may, at any time within this period, accept the Bid whether or not any other Bid has previously been accepted.

4. All prices provided in the Bid will remain fixed and firm for the duration of the term of the agreement, unless specified otherwise.

5. All prices provided in my/our Bid are in Canadian funds and include all charges of every kind attributable to the Work. Harmonized Sales Tax will be extra and not shown, unless specified otherwise.

6. To the best of my/our knowledge and belief:

a) the information provided in the Bid is correct; and

b) the Bid is made without any comparison of figures or arrangement with any other individual, corporation or person submitting a Bid for the same Work and is in all respects fair and without collusion or fraud.

7. I/We comply with the all applicable Board policies, provincial, and federal laws, and are aware of the Board's "Principles of Business Conduct" and will comply.

8. I/We agree and understand that the recommendation to award the Work may be subject to the approval from the Board as well as availability of funds.

9. I/We agree to be bound by the terms and conditions of the Bid Solicitation document and submit this Bid on behalf of the Bidder.

☐ I have the authority to bind the Bidder.

The Bidder/Proponent is to declare any actual, potential or perceived conflict of interest that could arise from submitting the Bid/Proposal.

Do you have a potential conflict of interest?

○ **Yes** ○ **No**

The Bidder acknowledges and agrees that the addendum/addenda below form part of the Bid Solicitation Document.

Please check the box in the column "**I have reviewed this addendum"** below to acknowledge each of the addenda.

File Name	I have reviewed the below addendum and attachments (if applicable)	Pages
There have not been any addenda issued for this bid.		