

Conseil Scolaire Viamonde

RFQ # 25-51

Renovations at École Élémentaire Jeanne-Lajoie

150 Carnforth Road, North York, Ontario

“Issued for Permit & Tender”

Project 24195

DATE March 20, 2025



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ARCHITECTURAL				
A000	OBC Matrix, Drawing List and Location Plan	2	-	Mar. 20, 2025
A201	First Floor Demolition and Key Plan	2	-	Mar. 20, 2025
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A207	Part Reflected Ceiling Plans	2	-	Mar. 20, 2025
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A301	Part East Elevations	2	-	Mar. 20, 2025
A302	Part West Elevations & Details	2	-	Mar. 20, 2025
A301	Part North and South Elevations	2	-	Mar. 20, 2025
A401	Stage Section and Elevation	2	-	Mar. 20, 2025
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A905	Elevation Photos	2	-	Mar. 20, 2025
A906	Elevation Photos	2	-	Mar. 20, 2025
A907	Elevation Photos	2	-	Mar. 20, 2025
A908	Elevation Photos	2	-	Mar. 20, 2025
A909	Elevation Photos	2	-	Mar. 20, 2025
A910	Elevation Photos	2	-	Mar. 20, 2025
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Dwg. No.	Title	Issue No.	Rev. No.	Issue Date
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M-2.2	Part 1 st Floor Demolition Plan - HVAC	2	-	Mar. 19, 2025
M-2.3	Part 1 st & 2 nd Floor New Plan - HVAC	2	-	Mar. 19, 2025
M-2.4	Part 1 st Floor New Plan - HVAC	2	-	Mar. 19, 2025
M-3.1	Part 1 st Floor Demolition Plan – Plumbing & Drainage	2	-	Mar. 19, 2025
M-3.2	Part 1 st Floor Demolition Plan – Plumbing & Drainage	2	-	Mar. 19, 2025
M-3.3	Part 1 st Floor New Plan – Plumbing & Drainage	2	-	Mar. 19, 2025
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E-1.2	Electrical Details	2	-	
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End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Work covered by contract documents
- .2 Owner
- .3 Location of the site
- .4 Scheduling requirements
- .5 Site access .
- .6 Work sequence
- .7 Contractor use of premises
- .8 Work by others
- .9 Engineer design
- .10 Designated substances: ACM and others
- .11 Building smoking environment
- .12 Special conditions
- .13 Integrated systems testing
- .14 Site security
- .15 "By Others"
- .16 Protection of Drawings

1.2 Work Covered by Contract Documents

- .1 Work of this Contract comprises the renovations to École Élémentaire Jeanne-Lajoie as indicated on the Contract Drawings and specifications.

1.3 Owner

- .1 Conseil Scolaire Viamonde

1.4 Place of the Work

- .1 The Work of this Contract is located at 150 Carnforth Road, North York, ON.

1.5 Scheduling Requirements

- .1 Refer to Instructions to Bidders

1.6 Metric Project

- .1 This project is to be based on The International System of Units (SI). Measurements are expressed in metric (SI) units.
- .2 All dimensions are to be shown in meters and millimeters.

1.7 Site Access

- .1 Access to the site to be arranged by the Owner.
- .2 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work
- .3 Provide secure construction fencing as specified and where indicated.

1.8 Work Sequence

- .1 Construct Work continuously.

1.9 Contractors Use of Premises

- .1 Contractor has restricted use of site until Substantial Performance.

1.10 Work by Others

- .1

1.11 Engineer Design

- .1 Where specifications require work to be designed by an engineer, engage an engineer licensed in the Province of Ontario to design such work. Refer to Section 01 78 00.

1.12 Designated Substances: ACM and Others

- .1 The Owner shall provide any prospective constructor or contractor a copy of building ACM surveys and information on designated substances that are known or suspected of being present within the area or scope of work.
- .2 The General Contractor shall ensure that a copy of the ACM survey is provided to each contractor and subcontractor who will be working on the Project.
- .3 Any findings of undeclared ACM, or damaged ACM that could pose a risk to workers is to be brought to the attention of the Owner immediately, and work is to be stopped.
- .4 All project design and construction activities must be carried out in compliance with the Regulations and the Owner's Asbestos Management Program.
- .5 No asbestos-containing materials, as defined by O. Reg. 278/05, may be specified or used in any project.

1.13 Verification

- .1 All dimensions shall be verified on site, and all necessary modifications and adjustments shall be made as necessary to suit.

1.14 Building Smoking Environment

- .1 Smoking and vaping are prohibited in all work places within the Owner's buildings and on the Owner's property.

1.15 Special Conditions

- .1 The following general and special conditions apply:
 - .1 All existing surfaces and finishes are to be repaired wherever damaged during the course of the Work.
 - .2 Wherever existing floor and wall finishes are to be removed, include full removal down to the existing substrate of all tile, base, mortars, grouts, waterproofing membranes and adhesives in accordance with TTMAC recommended procedures. Patch and repair existing substrate to the quality required by the new finish material manufacturer for the installation of their products.

- .3 All openings in existing fire rated assemblies or fire separations which are created by the removal of existing services, plumbing, conduit, ductwork, fittings fixtures or accessories are to be firestopped to maintain the integrity of the existing construction.
- .4 All exposed interior surfaces except prefinished surfaces shall be painted whether referred to in the specifications and drawings or not.

1.16 Site Security

- .1 Daily Inspection: Provide inspection of the work areas daily while the work is in progress and take whatever measures are necessary to secure the construction zones from theft, vandalism and unauthorized entry.

1.17 "By Others"

- .1 The term "by others" where it is used in the contract documents means that work shown or described in the contract documents and labeled with this designation is not included in the specific sub-trade's scope of work but will be required to be done within the General Contractor's contract.

1.18 Use of Drawings

- .1 Drawings are not to be scaled.
- .2 Copies of architectural and structural "issued for construction" drawings in digital format will be made available for the contractors use under the following conditions.
 - .1 Copyright remains with BBA.
 - .2 The drawings will only be used for shop drawings for this project and not be put to any other use.
 - .3 BBA assumes no liability for errors or omissions in the drawings. The Contractor assumes all risk and expenses associated with the use of drawings in the production of his work.
 - .4 References to BBA and other Consultants must be deleted from the title block.
 - .5 The Contractor signs a release available from BBA that addresses the above items in more detail. (Sample attached as Appendix 'A')
- .3 Arrangements for use of Sub-Consultant drawings must be made with the Appropriate Sub-Consultant.

1.19 Protection of Drawings

- .1 Copyright of electronic document belongs to the Consultant. Electronic documents may not be forwarded to others, transmitted, downloaded or reproduced in any format, whether print or electronic, without the express, written permission of the copyright owner.
- .2 Drawings, specifications and other contract related documents which are posted on Contractor controlled websites for access by sub-trades and suppliers, shall be posted only on password protected platforms with access only to those parties with an expressed interest in the Project.
- .3 Provide Consultant and Owner with access to such websites as noted above.

PART 2 PRODUCTS

3.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.2 Not Used

.1 Not used

End of Section

SAMPLE

[Date]

[CONTRACTOR'S COMPANY]

ADDRESS

CITY, PROVINCE, POSTAL CODE]

Attention: [INSERT CONTACT NAME]

At your request, BBA will provide electronic files for your convenience and use in the preparation of your shop drawings for Project Name, subject to the following terms and conditions:

Our electronic files are compatible with [AutoCAD 2020 (**)]. We make no representation as to the compatibility of these files with your hardware or your software beyond the specified release of the referenced drawings.

Data contained on these electronic files are part of our instruments of service, and at all times remain the exclusive property of Barry Bryan Associates and copyright is reserved. The electronic files shall not be used by you for any purpose other than as a convenience in the preparation of shop drawings for the referenced project. You further agree not to transfer these electronic files to others without the prior written consent of Barry Bryan Associates. Any other use or reuse by you or by others will be at your sole risk and without liability or legal exposure to us. You agree to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against us, our officers, directors, employees, agents or other project consultants that may arise out of or in connection with your use of the electronic files.

Furthermore, you shall, to the fullest extent permitted by law, indemnify and hold us harmless against all damages, liabilities or costs, including reasonable attorneys' fees and defence costs, arising out of or resulting from your use of these electronic files, or from the use by others, should they have obtained them from you.

These electronic files are not construction documents. Differences may exist between these electronic files and corresponding hard-copy construction documents. We make no representation regarding the accuracy or completeness of the electronic files you receive. In the event that a conflict arises between the hard-copy construction documents prepared by us and the electronic files, the hard-copy construction documents shall govern. You are responsible for determining if any conflict exists.

Due to the nature of the design and construction process, the drawings on these electronic files may not be fully coordinated, may change, and may not incorporate revisions, change orders, or addenda. By your use of these electronic files, you are not relieved of your duty to fully comply with the contract documents, including, and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate your work with that of other contractors for the project.

Because information presented on the electronic files can be modified, unintentionally or otherwise, we require all indications of our ownership and/or involvement be removed from each electronic display.

We will furnish you electronic files upon your written request.

Under no circumstances shall delivery of the electronic files for use by you be deemed a sale by us, and we make no warranties, either express or implied, of merchantability of fitness for any particular purpose. In no event shall we be liable for any loss of profit or any consequential damages as a result of your use or reuse of these electronic files.

Barry Bryan Associates

[CONTRACTOR FIRM NAME]

PART 1 GENERAL

1.1 Consultants

- .1 ARCHITECT:
Barry Bryan Associates
201 - 250 Water Street
Whitby, Ontario L1N 0G5
Tel: (905) 666-5252
Fax: (905) 666-5256
Attention: Mr. William Weima
- .2 STRUCTURAL ENGINEER:
Barry Bryan Associates
201 - 250 Water Street
Whitby, Ontario L1N 0G5
Tel: (905) 666-5252
Fax: (905) 666-5256
Attention: Mr. David Bovill, P.E., P. Eng.
- .3 MECHANICAL ENGINEER:
Giallanardo Engineering Inc.
220-4450 Highway #7
Woodbridge, Ontario L4L 4Y7
Tel: (905) 265-1052
Attention: Mr. Jeremy Hogan, P.Eng.
- .4 ELECTRICAL ENGINEER:
HCC Engineering Limited
40 Eglinton Avenue East, Suite 401
Toronto, Ontario M4P 3A2
Tel: (416) 932-8393
Attention: Mr. Phoenix Chen, P. Eng.

PART 2 PRODUCTS

3.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.2 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Cash Allowances

1.2 References

- .1 Canadian Construction Documents Committee CCDC2-2020 Stipulated Price Contract including the Supplementary Conditions.

1.3 Cash Allowances

- .1 Refer to General Conditions, GC4.1.
- .2 Unless otherwise specified, Cash Allowances shall cover the cost of the materials and equipment delivered F.O.B. job site, and all applicable taxes, except Harmonized Sales Tax. The Contractor's handling costs on the site, labour, installation costs, overhead and profit and other expenses shall be included separately in the Stipulated Price and not in the Cash Allowance.
- .3 Where it is specified that a Cash Allowances is to include both supply and installation costs, such allowances shall cover the cost of the materials and equipment delivered and unloaded at the site, all applicable taxes and the contractor's handling costs on the site, labour and installation costs and other expenses, except overhead and profit which shall be included separately in the Stipulated Price.
- .4 If the cost of the Work covered by Cash Allowances, when determined, is more or less than the allowance, the Contract Sum shall be adjusted accordingly.
- .5 In the event that the cost of the work covered by Cash Allowances should exceed the cash allowance, while the Contract Sum will be adjusted in conformity therewith, there shall be no adjustment to the Contractor's fee or other expenses such as overhead or profit, it being understood and agreed that the contract sum includes the Contractor's expenses and profit for all Cash Allowances whether or not they are exceeded.
- .6 Progress payments on accounts of work authorized under Cash Allowances shall be included in monthly certificate for payment.
- .7 Expenditures from Cash Allowances shall be authorized by Site Instruction, Change Directive or Change Order.
- .8 Cash Allowance for independent inspection and testing shall cover the cost of such services as provided by independent testing agency only. The Contractor's cost for labour, overhead and other expenses related to independent inspection and testing shall be included separately in the Stipulated Price and not in the Cash Allowance.
- .9 Cause the work covered by Cash Allowances to be performed for such amounts and by such persons as the Consultant may select and direct or as required by the project drawings and specifications.
- .10 Amount of each allowance, for Work specified in respective specification Sections is as follows:
 - .1 Independent Inspection and Testing:
 - .2 Supply only of Finishing Hardware:

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Requests for Information.
- .2 Submittal Procedures.
- .3 Screening of RFI's.
- .4 Response to RFI's.
- .5 Response Timing.

1.2 Request for Information (RFI)

- .1 A request for information (RFI) is a formal process used during the Work to obtain an interpretation of the Contract Documents or to obtain additional information.
- .2 An RFI shall not constitute notice of claim for a delay.

1.3 Submittal Procedures

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Number RFI's consecutively in one sequence in order submitted, in numbering system as established by the Contractor.
- .3 Submit one distinct subject per RFI form. Do not combine unrelated items on one form.
- .4 RFI Form:
 - .1 Submit a draft "Request for Information" form to be approved by the Owner and Consultant.
 - .2 Submit RFI's to the Consultant on approved "Request for Information" form. The Consultant shall not respond to an RFI except as submitted on this form.
 - .3 Where RFI form does not have sufficient space to provide complete information thereon, attach additional sheets as required.
 - .4 Submit with RFI form all necessary supporting documentation.
- .5 RFI Log:
 - .1 Maintain log of RFI's sent to and responses received from the Consultant, complete with corresponding dates.
 - .2 Submit updated log of RFI's at each construction meeting.
- .6 Submit RFI's sufficiently in advance of affected parts of the Work so as not to cause delay in the performance of the Work. Costs resulting from failure to do so will not be paid by the Owner.
- .7 Only the Contractor shall submit RFI's to the Consultant.
- .8 RFI's submitted by Subcontractors or Suppliers directly to the Consultant will not be accepted.

1.4 Screening of RFI's

- .1 Contractor shall satisfy itself that an RFI is warranted by undertaking a thorough review of the Contract Documents to determine that the claim, dispute, or other matters in question relating to the performance of the Work or the Interpretation of the Contract Documents cannot be resolved by direct reference to the Contract Documents. Contractor shall describe in detail this review on the RFI form as part of the RFI submission. RFI submittals that lack such detailed review

description, or where the detail provided is, in the opinion of the Consultant, insufficient, shall not be reviewed by the Consultant and shall be rejected.

1.5 Response to RFI's

- .1 Consultant shall review RFI's from the Contractor submitted in accordance with this section with the following understandings:
 - .1 Consultant's response shall not be considered as a Change Order or Change Directive, nor does it authorize changes in the Contract Price or Contract Time or changes in the Work.
 - .2 Only the Consultant shall respond to RFI's. Responses to RFI's received from entities other than the Consultant shall not be considered.

1.6 Response Timing

- .1 Allow 5 Working Days for review of each RFI by the Consultant.
- .2 Consultant's review of RFI commences on date of receipt of RFI submission by the Consultant from Contractor and extends to date RFI returned by Consultant.
- .3 When the RFI submission is received by Consultant before noon, review period commences that day. When RFI submittal is received by Consultant after noon, review period begins on the next Working Day.
- .4 If, at any time, the Contractor submits a large enough number of RFI's or the Consultant considers the RFI to be of such complexity that the Consultant cannot process these RFI's within 5 Working Days, the Consultant will confer with the Contractor within 3 Working Days of receipt of such RFI's, and the Consultant and the Contractor will jointly prepare an estimate of the time necessary for processing same as well as an order of priority among the RFI's submitted. The Contractor shall accommodate such necessary time at no increase in the Contract Time and at no additional cost to the Owner.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Submittals.
- .2 Schedules.
- .3 Format.
- .4 Submission.
- .5 Critical Path Scheduling.
- .6 Submittals Schedule.

1.2 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

1.3 Schedules Required

- .1 Submit schedules as follows:
 - .1 Construction Progress Schedule.
 - .2 Submittal Schedule for Shop Drawings and Product Data.
 - .3 Submittal Schedule for Samples.
 - .4 Product Delivery Schedule.
 - .5 Cash Allowance Schedule for purchasing Products or Services.
 - .6 Shutdown or closure activity.

1.4 Format

- .1 Prepare schedule in form of a horizontal bar chart using Microsoft Project 2016 or later.
- .2 Provide a separate bar for each major item of work, trade or operation.
- .3 Split horizontally for projected and actual performance.
- .4 Provide horizontal time scale identifying first work day of each week.
- .5 Format for listings: chronological order of start of each item of work.
- .6 Identification of listings: By Systems description.

1.5 Submission

- .1 Submit initial format of schedules within 10 working days after award of Contract.
- .2 Submit schedules in electronic format, by email as PDF files.
- .3 Consultant will review schedule and return reviewed copy within 10 days after receipt.
- .4 Resubmit finalized schedule within 7 days after return of reviewed copy.
- .5 During progress of Work revise and resubmit schedule as directed by Consultant.
- .6 Submit revised progress schedule with each application for payment.

- .7 Distribute copies of revised schedule to:
 - .1 Job site office.
 - .2 Subcontractors.
 - .3 Other concerned parties.
 - .4 Instruct recipients to report to Contractor within 10 days, any problems anticipated by timetable shown in schedule.

- .8 Table current and up to date schedule at each regular site meeting.

1.6 Critical Path Scheduling

- .1 Include complete sequence of construction activities.
- .2 Schedules shall represent a practical plan to complete the work within the Contract period, and shall convey the plan to execute the work. Schedules as developed shall show the sequence and interdependencies of activities required for complete performance of the work.
- .3 The submittal of schedules shall be understood to be the Contractor's representation that the schedule meets the requirements of the Contract Documents and that the work will be executed in the sequence and duration indicated in the schedule.
- .4 Failure to include any element of work required for performance of the Contract or failure to properly sequence the work shall not excuse the Contractor from completing all work within the Contract Time.
- .5 All schedules shall be developed utilizing industry standard 'best practices' including, but not limited to:
 - .1 No open-ended activities.
 - .2 No use of constraints other than those defined in the Contract Documents without the prior approval of the Consultant.
 - .3 No negative leads or lags.
 - .4 No excessive leads or lags without prior justification and approval from the Consultant.
 - .5 For individual schedule construction activities, do not exceed 14 days in duration without prior approval of the Consultant. Subdivide activities exceeding 14 days in duration to an appropriate level.
 - .6 Sufficiently describe schedule activities to include what is to be accomplished in each work area. Express activity durations in whole days. Clearly define work that is to be performed by subcontract.
 - .7 Create the schedule in conformance with the work-hours and constraints set forth in these Contract Documents.
- .6 Include dates for commencement and completion of each major element of construction.
- .7 Show projected percentage of completion of each item as of first day of month.
- .8 Indicate progress of each activity to date of submission schedule.
- .9 Show 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.

- .10 Provide a narrative 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 prime contractors.

1.7 Submittals Schedule

- .1 Include schedule for submitting shop drawings, product data, and samples. Indicate manufacture and delivery lead times into the shop drawing submittal schedule.
- .2 Indicate dates for submitting, review time, resubmission time, and last date for meeting fabrication schedule.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Construction Documentation.

1.2 Construction Documentation

- .1 This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - .1 Daily construction reports.
 - .2 Material location reports.
 - .3 Field condition reports.
 - .4 Special reports.

1.3 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Field Condition Reports: Submit at time of discovery of differing conditions.
- .3 Special Reports: Submit at time of occurrence.

1.4 Coordination

- .1 Coordinate preparation and processing of reports with performance of construction activities and with reporting of separate Contractors.

1.5 Reports

- .1 Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project Site:
 - .1 List of Subcontractors at Project Site.
 - .2 Approximate count of personnel at Project Site.
 - .3 Equipment at Project Site.
 - .4 Material deliveries.
 - .5 High and low temperatures and general weather conditions.
 - .6 Accidents.
 - .7 Meetings and significant decisions.
 - .8 Stoppages, delays, shortages, and losses.
 - .9 Meter readings and similar recordings.
 - .10 Emergency procedures.
 - .11 Orders and requests of authorities having jurisdiction.
 - .12 Change Orders received and implemented.
 - .13 Work Change Directives received and implemented.
 - .14 Clarifications requested, received, and implemented.
 - .15 Services connected and disconnected.
 - .16 Equipment or system tests and startups.
 - .17 Partial Completions and occupancies.
 - .18 Substantial Performances authorized.

- .2 Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project Site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project Site.
- .3 Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

1.6 Special Reports

- .1 Prepare Coordination Memoranda for distribution to each Contractor involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings. Provide copy to the Consultant.
- .2 Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required. All such memoranda must be directed through the Consultant.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Administrative
- .2 Requests for Information
- .3 Shop Drawings and Product Data
- .4 Interference Drawings
- .5 Progress Photographs
- .6 Samples
- .7 Mock-Ups
- .8 Certificates and Transcripts

1.2 Administrative

- .1 Submit to Consultant submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for 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 units.
- .4 Where items or information is not produced in metric units converted values are acceptable.
- .5 Verify field measurements and affected adjacent work are coordinated.
- .6 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review.
- .7 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant's review.
- .8 Keep one reviewed copy of each submission on site.

1.3 Requests for Information (RFI's)

- .1 Refer to Section 01 26 15 – Requests for Information

1.4 Shop Drawings and Product Data

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures, product data and other data which the Contractor provides to illustrate details of a portion of Work.
- .2 Coordinate each submission with requirements of Work and Contract Documents. Individual submissions will not be reviewed until all related information is available.
- .3 Submit shop drawings bearing stamp and signature of qualified professional Engineer registered or licensed in the Province of Ontario where required by the individual specification sections. Each submittal and each resubmittal must bear the stamp of the Engineer
- .4 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.

- .5 Prior to submission to Consultant, review all submitted drawings. By this review, Contractor represents to have determined and verified field measurements, site conditions, materials, catalogue number and similar data and to have checked and coordinated each drawing with the requirements of Work and of Contract Documents. Contractor's review of each drawing shall be indicated by stamp, date and signature of a responsible person.
- .6 At time of submission, notify Consultant in writing of any deviations in drawings from the requirements of the Contract Documents.
- .7 Allow ten days for Consultant's review of each submission.
- .8 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.
- .9 Make any changes in submitted drawings which Consultant may require, consistent with Contract Documents and resubmit unless otherwise directed by Consultant. When resubmitting, notify Consultant in writing of any revisions other than those requested by Consultant.
- .10 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.
- .11 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 adjacent work.
- .12 After Consultant's review, distribute copies.

- .13 Submit one electronic copy in PDF format of shop drawings for each requirement requested in specification Sections and as Consultant may reasonably request.
 - .14 Submit electronic copy in PDF format of product data sheets or brochures for requirements requested in Specification Sections and as requested by Consultant where shop drawings will not be prepared due to standardized manufacture of product.
 - .15 Delete information not applicable to project.
 - .16 Supplement standard information to provide details applicable to project.
 - .17 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, copies will be returned, and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
 - .18 The review of shop drawings by the Consultant is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that the Consultant approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.
- 1.5 Interference Drawings
- .1 Prepare interference drawings to coordinate the installation of the work of all sections, within available space. Conflicts between trades which could be determined beforehand, by the careful coordination and preparation of interference drawings, shall be corrected at no expense to the Owner.
 - .2 Prepare interference drawings of all buried services as necessary to avoid conflicts with new or existing structures, foundations or services.
 - .3 Submit interference and equipment placing drawings as specified in Section 01 71 00, when requested by the Consultant.
- 1.6 Progress Photographs
- .1 Progress photograph to be electronically formatted and labelled as to location and view.
- 1.7 Samples
- .1 Submit for review samples as requested in respective specification Sections. Label samples with origin, manufacturer, product information, applicable specification section, and intended use.
 - .2 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.
 - .3 Where colour, pattern or texture is criterion, submit full range of manufacturer's samples.

- .4 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.
- .5 Make changes in samples which Consultant may require, consistent with Contract Documents.
- .6 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.8 Mock-Ups

- .1 Erect mock-ups in accordance with 01 45 00 - Quality Control.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Administrative
- .2 Fires
- .3 Disposal of Wastes
- .4 Drainage
- .5 Site Clearing and Plant Protection
- .6 Pollution Control
- .7 Unanticipated Soil Contamination

1.2 References

- .1 Statutes of Canada 1999 Chapter 33.
 - .1 Canadian Environmental Protection Act 1999.
 - .2 SOR/2003-289. Federal Halocarbon Regulations, 2003.
 - .3 Transportation of Dangerous Goods Act, 1992 (1992, c. 34)
- .2 OPSS 805 "Construction Specification for Temporary Erosion and Sediment Control Measures".
- .3 Province of Ontario Environmental Protection Act, R.S.O. 1990, c. E.19
- .4 Ontario Regulation O Reg 406/19 On-Site and Excess Soil Management

1.3 Administrative

- .1 Comply with all federal, provincial, and municipal regulatory requirements and guidelines for environmental protection and natural resource conservation, including those referenced above.
- .2 Failure to comply with environmental requirements may result in a stop work order or assessment of damages commensurate with repair of damage.
- .3 It is the Contractor's responsibility to be aware of environmental requirements and the best management practices and pollution control measures necessary to meet them.
- .4 It is the Contractor's responsibility to obtain and abide by permits, licenses and compliance certificates at appropriate times and frequencies as required by the authorities having jurisdiction.
- .5 All hazardous materials are to be stored with secondary containment

1.4 Fires

- .1 Fires and burning of rubbish on site not permitted.

1.5 Disposal of Wastes

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.6 Drainage

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing deleterious substances into waterways, sewer or drainage systems.
- .3 Protect storm drains against entry by sediment, debris, oil, or chemicals.

- .4 Control disposal or runoff of water containing deleterious substances or other harmful substances in accordance with local authority requirements.

1.7 Site Clearing and Plant Protection

- .1 Protect trees and plants on site and adjacent properties.
- .2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
- .4 Restrict tree removal to areas indicated.
- .5 Prevent unnecessary disturbance of topsoil and underlying soil from vehicles and heavy equipment.
- .6 Minimize stripping of topsoil and vegetation.
- .7 Comply with the requirements of Ontario Regulation O. REG 406/19, "On-Site and Excess Soil Management", for the importation of new soils and fill materials and the exportation, removal and disposal off-site, of excavated materials. Complete testing of imported and exported materials as required. Unless noted elsewhere, costs for such testing is the responsibility of the contractor and is not included in any allowances. Maintain and submit to authorities having jurisdiction all required test reports, certificates and documentation.

1.8 Pollution Control

- .1 Maintain, inspect, and repair temporary erosion and pollution control features installed under this contract on a weekly basis. Submit inspection logs to the Owner when requested.
- .2 Control emissions from equipment and plant to conform to federal, provincial, and municipal requirements.
- .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .4 Take all measures necessary to prevent material and mud tracking on adjacent roads and streets.
- .5 Use mechanical sweepers as often as necessary to keep adjacent roads and streets clean of material and mud that is deposited from this project.
- .6 On site disposal or clean out of concrete trucks is not permitted. Any spillage of concrete onto asphalt or other surfaces must be cleaned up before spillage sets.

1.9 Unanticipated Soil Contamination

- .1 Should unanticipated soil contamination be discovered:
 - .1 Stop work and assess the situation for safety.
 - .2 If situation does not appear to be safe, evacuate workers from area.
 - .3 If safe to do so, take immediate steps to control any spread of contamination, in accordance with Contractor's spill prevention and response plan.
 - .4 Immediately contact the Consultant.

- .2 Removal and disposal off site of contaminated materials shall comply with the requirements of Ontario Regulation O Reg 406/19 On-Site and Excess Soil Management.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Requirements for quality of work.
- .2 Requirements for material inspection and testing.
- .3 Requirements for determination of defective materials and work.

1.2 References

- .1 CSA Group (CSA)
 - .1 CSA-A23.1-14/ CSA-A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete.
 - .2 CSA S16.1:19 Design of Steel Structures.
 - .3 CSA S304.1-04 (R2019) - Design of Masonry Structures
 - .4 CSA W47.1:19 Certification of Companies for Fusion Welding of Steel Structures.
 - .5 CSA W59-18 Welded Steel Construction (Metal Arc Welding)
- .2 Canadian Institute of Steel Construction (CISC)
 - .1 CISC Code of Standard Practice for Structural Steel.
- .3 OPSS Ontario Provincial Standard Specifications.

1.3 Regulatory Requirements

- .1 Products and services provided to complete the Work shall meet or exceed requirements of specified standards, municipal by-laws, building codes and referenced documents.

1.4 Independent Inspection and Testing

- .1 Independent Inspection and Testing Consultants will be engaged on behalf of the Owner, for the purpose of inspecting and/or testing individual portions of the Work. The initial cost of such services will be included in the Contract Price, as allocated under Section 01 21 13 - Cash Allowances.

1.5 Responsibilities

- .1 Inspection and Testing Consultants shall:
 - .1 Provide inspection and testing specified,
 - .2 Inform the Contractor and Consultant immediately upon observance of materials, systems, or procedures not in compliance with the specifications, and
 - .3 Submit complete reports to the Contractor and the Consultant in a timely manner.
- .2 Contractor shall:
 - .1 Ensure the quality control requirements of the Contract are implemented.
 - .2 Provide access to the Work for Inspection/Testing Consultants, and
 - .3 Inform the Inspection/Testing Consultants in advance of day and time required for inspection and tests.
- .3 Consultant
 - .1 The Consultant will make final decisions on changes to the scope of work of inspection and testing that may affect the Contract Price.
 - .2 When informed of any material procedure or test result that does not meet or exceed the specifications, the Consultant will respond in an expedient manner to resolve the issue.

1.6 Access to Work

- .1 Allow inspection & testing company's access to the Work, as well as off-site manufacturing and fabrication plants.

1.7 Work Subject to Inspection and Testing

- .1 Refer to individual specification sections for requirements for inspection and testing.
- .2 Provide additional inspection and testing beyond that listed in the specifications where directed by the Consultant.

1.8 Reports

- .1 Submit inspection and test reports to the Consultant.
- .2 Provide copies to Subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.
- .3 Submit one copy of inspection and test reports to the Building Official having jurisdiction, where required by that official.
- .4 The cost of tests beyond those called for in the Contract Documents or beyond those required by the law of the Place of Work shall be appraised by the Consultant and may be authorized as recoverable.

1.9 Mockups

- .1 Refer to Section 01 45 00 – Quality Control.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Inspection and Testing – General

- .1 Furnish test results and mix designs as may be requested.
- .2 The cost of tests and mix designs beyond those called for in the Contract Documents or beyond those required by the law of the Place of Work shall be appraised by the Consultant and may be authorized as recoverable.

3.2 Inspection and Testing – Procedures

- .1 Notify the appropriate agency and Consultant in advance of the requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or 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 the Work.

- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store, cure and inspect test samples.

3.3 Quality of Work

- .1 Quality of the Work shall be first class, 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 person or anyone unskilled in their required duties. The Consultant reserves the right to require the dismissal from the site, of workers deemed incompetent, careless, insubordinate or otherwise objectionable.

3.4 Defective Materials and Work

- .1 Where evidence exists that defective work has occurred, or that work has been carried out incorporating defective products, the Consultant may have independent tests, inspections, or surveys performed in order to determine if work is defective.
- .2 Tests, inspections, or surveys carried out under these circumstances will be made at the Contractor's expense in the event of defective work, or at the Owner's expense where work is in conformance. Where tests incorporate a number of samples, payment will be assessed, by the Consultant, based on the ratio of conforming to non-conforming results. This does not include re-testing of soil compaction during placement, where evidence exists of non-conformance with the Contract documents, but rather only if re-testing is called for after completion of compaction.

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 References
- .2 Owner's Regulations
- .3 Standards and Definitions
- .4 Designated Substances
- .5 Hazardous Materials
- .6 Spills Reporting
- .7 Protection of Water Quality
- .8 Potable Water Systems
- .9 Soils Management
- .10 Access for Inspection and Testing
- .11 Other Regulatory Requirements

1.2 References

- .1 Perform Work in accordance with Ontario Building Code (OBC), National Fire Code of Canada (NFC), the Canadian Electrical Code CSA C22.1:21, including all Supplements and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Where a material is designated in the Contract Documents for a certain application, unless otherwise specified, that material shall conform to standards designated in the Code. Similarly, unless otherwise specified, installation methods and standards of workmanship shall also conform to standards invoked by the aforementioned Code.
- .3 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.
 - .3 Manufacturer's instructions.
- .4 Where requirements of Contract Documents exceed Code requirements provide such additional requirements.
- .5 Where the Building Code or the Contract Documents do not provide all information necessary for complete installation of an item, then the manufacturer's instructions for first quality workmanship shall be strictly complied with.

1.3 Owner's Regulations

- .1 Conform to requirements, regulations and procedures of the Owner.

1.4 Standards and Definitions

- .1 Where a reference is made to specification standards produced by various organizations and agencies, conform to latest edition of standards, as amended and revised to date of Contract.
- .2 Have a copy of each specified standard which relates to your work available on the site to be produced immediately on Consultant's request.

1.5 Designated Substances

- .1 Known designated substances are identified in the Designated Substance Report provided by the Owner.
- .2 Stop work immediately when material resembling asbestos, mould or any other designated substance which is not identified in the Designated Substance Report is encountered during the course of the work. Notify Owner and Consultant immediately.
- .3 The Owner will arrange for independent testing of suspected designated substances and removal of such substances encountered on the site during the course of the work which are not identified in the Designated Substance Report.

1.6 Hazardous Materials

- .1 Definition: "Hazardous Material" is material, in any form, which by its nature, may be flammable, explosive, irritating, corrosive, poisonous, or may react violently with other materials, if used, handled or stored improperly. Included are substances prohibited, restricted, designated or otherwise controlled by law.
- .2 Provide SDS for all materials brought to the Place of Work.
- .3 Hazardous Materials will not be introduced for experimental or any other use prior to being evaluated for hazards.
- .4 Make known to the Consultant those hazardous materials or designated substances intended to be used in the workplace and receive permission to use before introducing to the Owner's property.
- .5 Many common construction materials such as asbestos pipe and various insulations are designated substances and shall not be used under any circumstances.

1.7 Spills Reporting

- .1 Spills or discharges of pollutants or contaminants under the control of the Contractor, and spills or discharges of pollutants or contaminants that are a result of the Contractor's operations that cause or are likely to cause adverse effects shall forthwith be reported to the Consultant. Such spills or discharges and their adverse effects shall be as defined in the Environmental Protection Act R.S.O. 1999.
- .2 All spills or discharges of liquid, other than accumulated rain water, from luminaries, internally illuminated signs, lamps, and liquid type transformers under the control of the Contractor, and all spills or discharges from this equipment that are a result of the Contractor's operations shall, unless otherwise indicated in the Contract, be assumed to contain PCB's and shall forthwith be reported to the Consultant.
- .3 This reporting will not relieve the Contractor of his legislated responsibilities regarding such spills or discharges.

1.8 Protection of Water Quality

- .1 No waste or surplus organic material including topsoil is to be stored or disposed of within 30 metres of any watercourses. Run-off from excavation piles will not be permitted to drain directly into watercourses. Where this measure is not sufficient or feasible to control sediment entering the watercourses, sedimentation traps or geo-textile coverage will be required.
- .2 If de-watering is required, the water shall be pumped into a sedimentation pond or diffused onto vegetated areas a minimum of 30 metres from any watercourses and not pumped directly into the

watercourses.

- .3 Provide all de-watering and sedimentation control required to properly complete the work of this contract.
- .4 Supply, install and maintain silt/sediment control fencing along the edge of the site to intercept construction runoff silt, to the satisfaction of the Owner.

1.9 Potable Water Systems

- .1 Potable water systems in completed buildings must meet criteria and guidelines established by Provincial and Municipal authorities, prior to occupancy by the Owner.
- .2 Upon completion, submit testing certificates verifying water quality and water systems meets all applicable Provincial and Legislated Standards

1.10 Soils Management

- .1 Comply with the requirements of Ontario Regulation O. REG 406/19, "On-Site and Excess Soil Management", for the importation of new soils and fill materials and the exportation, removal and disposal off-site, of excavated materials. Complete testing of imported and exported materials as required. Unless noted elsewhere, costs for such testing is the responsibility of the contractor and is not included in any allowances. Maintain and submit to authorities having jurisdiction all required test reports, certificates and documentation.

1.11 Access for Inspection and Testing

- .1 Cooperate fully with and provide assistance to, all outside authorities including Building Inspectors, utilities, testing agencies and consultants, with the inspection of the Work.

1.12 Other Regulatory Requirements

- .1 Conform to the requirements of the Ontario Ministry of Transportation, Regional and Local authorities regarding transportation of materials.
- .2 Obtain required road occupancy permits.
- .3 Pay any required roadway damage deposits required by the local municipality.
- .4 Conform to the requirements of the Ontario Ministry of the Environment.
- .5 Conform to the requirements of the Ontario Ministry of Labour.
- .6 Conform to the requirements of the local Conservation Authority.
- .7 Conform to all applicable local by-laws, regulations and ordinances.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Inspection
- .2 Independent Inspection Agencies.
- .3 Access to Work
- .4 Procedures
- .5 Rejected Work
- .6 Reports
- .7 Contractors Responsibilities
- .8 Tests and Mix Designs
- .9 Mock-Ups
- .10 Equipment and Systems.

1.2 Inspection

- .1 Contractor is responsible for Quality Control (QC).
- .2 Allow Owner and Consultant 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.
- .3 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant instructions, or law of Place of Work.
- .4 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.
- .5 Consultant will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Owner shall pay cost of examination and replacement.

1.3 Independent Inspection Agencies

- .1 Independent Inspection and Testing Agencies will be engaged by Contractor for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the Contractor and paid from the cash allowances specified in Section 01 21 13. Refer to Section 01 29 83 - Payment Procedures for Testing Laboratory Services.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant at no cost to Owner. Pay costs for retesting and re-inspection.

1.4 Access to Work

- .1 Allow inspection and testing agencies access to Work, off site manufacturing and fabrication plants.

- .2 Co-operate to provide reasonable facilities for such access.

1.5 Procedures

- .1 Notify Owner and Consultant 48 hours in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays 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

1.6 Rejected Work

- .1 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 Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other work damaged by such removals or replacements promptly.
- .3 If in opinion of Consultant it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Consultant will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Consultant.

1.7 Reports

- .1 Submit electronic .pdf format inspection and test reports to Consultant.
- .2 Provide copies to Subcontractor of work being inspected or tested or manufacturer or fabricator of material being inspected or tested.

1.8 Contractors Responsibilities

- .1 Be responsible for the execution of the Construction Quality Plan and is to pay all costs for the execution of the Construction Quality Plan. Designate an experienced site representative for carrying out the Construction Quality Plan.
- .2 Provide the Owner with a completed quality product for the Work. Contractor shall be responsible for any costs associated with re-testing and reperforming the Work as a result of the Contractor's poor performance or workmanship or other failure to comply with the Contract Documents.
- .3 All Work shall be done by persons qualified in their respective trades, and the workmanship shall be first-class in every respect. Contractor is responsible for ensuring employees are appropriately trained. All materials and equipment furnished shall be the best of their respective kinds for the intended use and unless otherwise specified, same shall be new and of the latest design.
- .4 The Consultant will have the authority to reject Work that does not conform to the Contract Documents or may require special inspection or testing, whether or not such Work is to be then fabricated, installed or completed.
- .5 Failure by a Contractor to conduct its operations, means and methods and coordinate proper sequencing of the Work may cause the Owner to withhold payment or any other means deemed

necessary to correct non-conforming Work.

- .6 The Owner shall engage a testing firm to perform such engineering laboratory services and on-site inspection as deemed necessary by the Owner. The testing firm will determine compliance with the requirements of the Contract Documents. This Work will not be a service to the Contractors for the performing of tests and checking of materials required of the Contractors.
 - .7 Copies of test and inspection reports will be furnished to the Contractor. The laboratory and its representatives will be instructed to promptly call to the attention of the Contractor, any instance of non-compliance with the requirements of the Contract Documents. Failure to so notify the Contractor shall not relieve the Contractor of any of its responsibilities for compliance or making good workmanship or materials which are not in compliance with the requirements of the Contract Documents. The agency shall notify the Consultant and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services
 - .8 Contractor's construction materials, procedures and work shall be subject to specified testing procedures and shall be in conformance with the Contract Documents as verified by Testing Agency.
 - .9 Cooperate with the testing firm and provide labor to assist with sample preparations where applicable.
 - .10 Except where specifically indicated to be provided by another entity as identified, inspections, tests, and similar quality control services including those specified to be performed by independent agency are the Contractor's responsibility, and costs thereof are not to be included in contract sum.
 - .11 Cooperate with independent agencies performing required inspections, tests, and similar services. Provide auxiliary services as reasonably requested, including access to Work, the taking of samples or assistance with the taking of samples, delivery of samples to test laboratories, and security and protection for samples and test equipment at Project site.
 - .12 Coordination: Contractor and each engaged independent agency performing inspections, tests, and similar services for project are required to coordinate and sequence activities so as to accommodate required services with minimum delay of Work and without the need of removal/replacement of work to accommodate inspections and tests. Scheduling of times for inspections, tests, taking of samples, and similar activities is Contractor's responsibility.
 - .13 Where sampling and testing is required for Sections of Work listed in the Contract Documents, the tests shall be performed by an independent testing lab and paid for by the Contractor.
 - .14 Test procedures to be used shall be submitted for approval of the Consultant where other than those specified are recommended by the testing agency.
 - .15 Testing Agency Duties: The independent Testing Agency engaged to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with the Owner, the Consultant and Contractors in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.
 - .16 Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.
- 1.9 Tests and Mix Designs
- .1 Furnish test results and mix designs as requested.

1.10 Mockups

- .1 Prepare mockups for Work specifically requested in specifications.
- .2 Construct in locations acceptable to Consultant.
- .3 Prepare mockups for Consultant's review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mockups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 Mock-ups may remain as part of Work unless indicated otherwise.

1.11 Equipment and Systems

- .1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Appointment and payment.
- .2 Manufacturer's field review.

1.2 Related Sections

- .1 Particular requirements for testing and inspection to be carried out by testing laboratory designated by the Consultant are specified under various sections of the specifications.
- .2 Balancing and testing of systems under Divisions 21 through 28.

1.3 Appointment and Payment

- .1 From time to time during the progress of the Work, the Owner will require that testing and inspection be performed to determine that materials provided in the Work meet the requirements of the Contract Documents.
 - .1 Subcontractors shall verify with Contractor, in writing, portions of the Work that will require testing and/or inspection prior to commencing such affected work.
- .2 The Owner will appoint testing and inspection companies, representing, reporting and responsible to the Owner. Cost of testing and inspection will be authorized as a disbursement of the Cash Allowances as specified in Section 01 21 13 unless otherwise indicated or specified and except for the following:
 - .1 Testing and inspection required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Testing and inspection performed exclusively for Contractor's convenience.
 - .3 Testing, adjusting and balancing of conveying systems, mechanical and electrical equipment and systems. Refer to mechanical specifications for in-contract air-balancing.
 - .4 Mill tests and certificates of compliance.
 - .5 Tests specified to be carried out by Contractor under supervision of the Consultant.
 - .6 Where tests or inspections by designated testing laboratory reveal work not in accordance with the Contract requirements, Contractor shall pay costs for additional tests or inspections as Consultant may require to verify acceptability of corrected work.
 - .7 Additional testing required because of changes in materials, proportions of mixes, requested by the Contractor or Subcontractors as well as any extra testing of materials occasioned by lack of identification or failure of such materials being replaced to meet requirements of the Contract Documents or testing of structure or elements including load testing, shall be carried out at no additional cost to the Owner.
 - .8 Where evidence exists that defective workmanship has occurred or that the Work has been carried out incorporating defective materials, the Consultant reserves the right to have tests, inspections or surveys performed, analytical calculation of structural strength made and the like in order to help determine the extent of defect and whether such work must be replaced. Tests, inspections or surveys carried out under these circumstances will be made at the Contractor's expense and will not be paid for by the Owner.
 - .9 Testing and compliance letters specified in other Sections.
- .3 Inspection and testing company shall submit monthly invoice original to the Contractor for review, relating invoices to tests and inspection reports. Provide original receipts for disbursements. Invoices will be forwarded by Contractor to the Consultant for inclusion in progress payment application.

- .4 The Consultant will work with the Owner's representative and the Contactor's commissioning team to review the work of the Contract during closeout procedures. The Contractor shall be responsible to correct all deficiencies as reported by the Consultant and Owner's representative, and in accordance with the Contract documents. Refer to Sections 01 77 00.
- .5 Testing and Inspection shall be performed by qualified and/or certified personnel under professional supervision or performed directly by a professional engineer qualified in conformance with applicable codes and certification programs.
- .6 Requirements of regulatory agencies:
 - .1 Testing shall be conducted in accordance with the requirements of the Building Code.
 - .2 Obtain certification where required by the building code and standards.
- .7 Cooperation with testing and inspection company.
 - .1 Provide inspection company with materials and installation information as required or as requested.
 - .2 Provide access to the work for representatives of the inspection and testing companies.
 - .3 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.
 - .4 Cooperate with testing and inspection companies and give adequate notification of any changes in source of supply, additional work shifts or other proposed changes.
 - .5 No Product nor part of the Work shall be installed before it is tested when a test is specified or required, nor shall work be executed where a test or inspection is required and the inspector cannot attend. Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by the Consultant.
 - .6 Cooperate in permitting access to the Work for testing and inspection company wherever Work is in progress, or wherever Products, materials or equipment are stored prior to shipping.
 - .7 Supply labour required to assist testing and inspection company in sampling and making tests.
 - .8 Repair work damaged as a result of testing and inspection work.
 - .9 Costs of above labour and material shall be borne by applicable Subcontractors.
 - .10 The testing and inspection service does not relieve the Contractor of responsibility for normal shop and site inspection, and quality control of production.
 - .11 Pay costs for removal and replacement of Work, or for remedial measures necessitated by faulty workmanship and materials which fail to meet requirement specified.
- .8 Prepare schedule for testing and inspection in accordance with Section 01 33 00 and as follows:
 - .1 Establishing Schedule:
 - .1 By advance discussion with the selected testing laboratory, determine the time required by the laboratory to perform its tests and issue each of its findings.
 - .2 Allow required time within Construction Schedule
 - .2 Adherence to Schedule:
 - .1 Contractor shall advise testing and inspection laboratory in advance when testing of the Work is required.
 - .2 When testing and inspection laboratory is ready to test according to predetermined schedule, but is prevented from testing or taking specimens due to incompleteness of the parts of the Work scheduled for testing and inspection, extra costs for testing attributable to the delay may be back-charged to the Contractor at no increase in the Contract Price.
 - .3 Notify Contractor and inspection company at least 3 Working Days before work required to be inspected commences, and arrange for a meeting at the Place of the Work, to be held one Working day before the work starts with the following present:
 - .1 Contractor, a principal of the Sub-contractor whose work is to be inspected or tested, testing and inspection company, manufacturer's representative and Consultant.

- .4 Give 2 Working Days prior notice to inspection company of the commencement of each phase of the Work requiring inspection and provide inspection company with materials and installation information.

- .9 Reports and Documents:
 - .1 Testing and Inspection companies shall submit shop inspection and site inspection reports within 5 Working days of each inspection.
 - .2 Distribute reports as follows:
 - .1 Owner.
 - .2 Consultant.
 - .3 Contractor.
 - .4 Consulting engineers as applicable.
 - .3 Inspectors shall submit a written report on each inspection or test, including pertinent data such as conditions at the Place of the Work, dates, test references, locations of tested materials, actual product identification, procedures and descriptions, site instructions given, recommendations and/or any other information required by standard applicable reporting of tests and inspections.
 - .4 Clearly indicate in report failure of Product or procedures to meet applicable standards, give recommendations for retesting or correction. Contact Consultant immediately when Product or procedure fails to meet applicable standards.
 - .5 Upon completion of those parts of the Work subject to independent testing and inspection, submit to the Consultant duplicate certificates of acceptance of the installation issued by independent testing and inspection company.

- .10 Inspection and Test Specimens:
 - .1 Testing and inspection will generally consist of procedures listed in the following paragraphs, but additional tests may be performed as required to verify conformance to Contract Documents.
 - .2 Specimens and samples for testing, unless otherwise specified in the Contract Documents, will be taken by the testing laboratory; sampling equipment and personnel will be provided by the testing laboratory; and deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.
 - .3 Testing and inspection company shall take samples necessary to verify quality as specified by applicable standards or as specified herein. Taking of samples shall not endanger the structure or life and shall be taken so as to best represent the Work as a whole.
 - .4 Samples shall be handled, packaged, stored and delivered so as to best ensure the validity of tests that will be performed on them. Sample handling where required shall duplicate conditions at the Place of the Work (such as site cured concrete cylinders).

- 1.4 Manufacturer's Field Review
 - .1 Where manufacturer's field review is specified, manufacturer's representative shall review the relevant parts of work at the Place of Work, or wherever such affected work is in progress, to ensure that work is being executed in accordance with manufacturer's written recommendations.
 - .2 Manufacturer's field review is to ensure that the Products specified are being used in the Work and are being applied on surfaces prepared in accordance with their recommendations and the requirements of the Contract Documents.
 - .3 Manufacturer's representative shall undertake such review weekly, or additionally as necessary, to determine that the work is in accordance with manufacturer's written recommendations.
 - .4 Manufacturer's representative shall submit a type written report on manufacturer's letterhead within 2 Working Days after each field review. Report shall document manufacturer's

representative's field observations and recommendations.

- .5 Manufacturer's field review reports to be prepared and distributed following the procedures specified for pe reparation and submittal of testing and inspection reports given above.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Temporary utilities

1.2 Installation and Removal

- .1 Provide temporary utilities and controls in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.3 Dewatering

- .1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.4 Water Supply

- .1 Existing sources of water can be made available to the Contractor at no charge, subject to operational requirements. Arrange for connection and pay all costs for installation, maintenance and removal. Conversions or alterations to existing sources of water to meet construction requirements are the responsibility of the Contractor.
- .2 The points of delivery and limits on amount available will be determined on site by the Owner whose written permission must be obtained before any connection is made.

1.5 Temporary Heating and Ventilation

- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
- .2 Construction heaters used inside building must be vented to outside or be flameless type. Solid fuel salamanders are not permitted, unless prior approval is given by the Consultant.
- .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 safe working environment.
- .4 Maintain temperatures of minimum 10° C in areas where construction is in progress.
- .5 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 atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in 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.

- .6 Permanent heating system of building may not be used when available, unless there are savings to the Contract Price and Consultant's written permission is obtained stating conditions of use, provisions relating to guarantees on equipment and operation and maintenance of system. Be responsible for damage to heating system if use is permitted.
- .7 On completion of Work for which permanent heating system is used, replace filters.
- .8 Ensure Date of Substantial Performance and warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Consultant.
- .9 Pay costs for maintaining temporary heat, when using permanent heating system. Owner will pay utility charges when temporary heat source is existing building equipment.
- .10 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform to 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.
- .11 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.6 Temporary Power and Light

- .1 Existing sources of electric power can be made available to the Contractor. Conversions or alterations to existing sources of electric power to meet construction requirements are the responsibility of the Contractor.
- .2 The points of delivery and limits on amount available will be determined on site by the Owner whose written permission must be obtained before any connection is made.
- .3 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Consultant provided that guarantees are not affected.

1.7 Temporary Communication Facilities

- .1 Provide and pay for temporary telephone, fax, cellular data, lines and all equipment necessary for Contractor's own use.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Construction aids.
- .2 Site storage.
- .3 Construction parking
- .4 Offices
- .5 Equipment, tool and material storage.
- .6 Sanitary facilities.
- .7 Signage.
- .8 Shoring

1.2 References

- .1 CSA Group (CSA)
 - .1 CAN/CSA Z321-96 (R2006) Signs and Symbols for the Workplace
 - .2 CAN/CSA Z797-18 Code of Practice for Access Scaffold

1.3 Installation and Removal

- .1 Provide construction facilities in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.4 Scaffolding

- .1 Scaffolding in accordance with CSA Z797.
- .2 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms and temporary stairs.
- .3 Enclose and heat scaffolding during cold weather.

1.5 Hoisting

- .1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment.
- .2 Hoists and cranes shall be operated by qualified operator.

1.6 Site Storage/Loading

- .1 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.

1.7 Construction Parking

- .1 Parking will be permitted on site at areas designated by the Owner provided it does not disrupt performance of Work or ongoing Owners operations.
- .2 Provide and maintain adequate access to project site.
- .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.

1.8 Offices

- .1 General Contractor and Subcontractors may provide their own offices as necessary and subject to site constraints. Direct location of these offices.

1.9 Equipment, Tool and Material Storage

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

1.10 Construction Signage

- .1 Direct requests for approval to erect a Contractor signboard to Consultant.
- .2 Signs and notices for safety and instruction shall be in English. Graphic symbols shall conform to CAN/CSA Z321.
- .3 Post "Construction Zone" signage outside barrier and entrance to all work areas.
- .4 Maintain approved signs and notices in good condition for duration of project and dispose of off-site on completion of project.
- .5 Install signage to direct site traffic and deliveries to the Construction work areas.

1.11 Shoring

- .1 Examine the site to determine the conditions under which work will be performed.
- .2 Contractor shall formulate his own conclusions as to the extent of the existing conditions and shoring required.
- .3 The method of shoring shall be according to the Contractor's and his Engineer's directions.
- .4 All existing loads must be shored prior to commencement of demolition and removal of load bearing elements.
- .5 All shoring and frame braces must be supplied with a safe load rating which must not be exceeded. Install in accordance with manufacturer's recommended procedures and safety guidelines. Ensure that the safe load conditions of the shoring are not exceeded by dead, live or construction loads.
- .6 All shoring shall be subject to the Consultant's review and approval prior to commencing demolition work.
- .7 Completely remove all shoring after new structure is installed and all concrete is set.
- .8 Submit shoring drawings and a proposed installation procedure stamped by a professional engineer registered in the Province of Ontario. Procedures shall follow the information provided on these drawings. The shoring design engineer shall be retained and paid for by the Contractor. The shoring engineer shall review all existing conditions on site prior to completing shoring design.

- .9 Removal of existing materials without proper engineered shoring is a safety hazard and will not be permitted.
- .10 Make good all damage to the existing structure and adjoining structures and bear full responsibility for failure to provide adequate shoring.
- .11 The failure or refusal of the Consultant to suggest the use of shoring, shall not in any way or to any extent relieve the Contractor of any responsibility concerning the condition of the work or of any of their obligations under the Contract, nor impose any liability on the Owner or their agents; nor shall any delay, whether caused by any action or want of action on the part of the Contractor, or by any act of the Owner, or their agents, or employees, relieve the Contractor from necessity of properly and adequately protecting the existing structure from collapse or damage, nor from and of his obligations under the Contract relating to injury to persons or property, nor entitle him to any claims for extra compensation or an extension in schedule.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Barriers.
- .2 Environmental Controls.
- .3 Traffic Controls.
- .4 Fire Routes.

1.2 Installation and Removal

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.3 Site Fencing

- .1 Contractor's lay-down area as designated by the Owner must be secure and there must be no access by unauthorized persons. Provide temporary fencing around whole work site. Use modular free-standing fencing: galvanized, minimum 1.8m high, chain link or welded steel mesh, pipe rail. Provide one lockable truck entrance gate and at least one pedestrian door as directed. Equip all gates with locks and keys. Maintain fence in good repair.

1.4 Hoarding

- .1 Erect temporary site enclosure using modular freestanding fencing: galvanized, minimum 1.8 m high, chain link or welded steel mesh, pipe rail. Provide one lockable truck entrance gate and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys. Maintain fence in good repair.

1.5 Guard Rails and Barricades

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs and wherever else necessary to prevent accidental falls.
- .2 Provide as required by governing authorities.

1.6 Traffic Barriers

- .1 Where indicated, provide precast concrete barriers conforming to ASTM C825 - 19 Standard Specification for Precast Concrete Barriers.
- .2 Provide sufficient barriers as necessary to protect the public and Owner from construction traffic.
- .3 Remove barriers on completion.

1.7 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 and snow loading.

1.8 Dust Tight Screens

- .1 Provide dust tight 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.

1.9 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.

1.10 Protection of Building Finishes

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Consultant locations and installation schedule 3 days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

1.11 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.

1.12 Public Traffic Flow

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

1.13 Fire Routes

- .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Product quality, availability, storage, handling, protection, and transportation.
- .2 Manufacturer's instructions.
- .3 Quality of Work, coordination and fastenings.
- .4 Dielectric Separation
- .5 Tolerances for Execution of Work.
- .6 Protection of Work in progress.
- .7 Existing Utilities

1.2 Definition – Basis of Design

- .1 Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
 - .1 Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.
- .2 Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
 - .1 Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
- .3 Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 01 33 00 -Submittal Procedures.

1.3 Quality

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.
- .4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.4 Availability

- .1 Review product delivery requirements and anticipate foreseeable supply delays for any items. 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.
- .2 In 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 right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.5 Storage, Handling and Protection

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Consultant.
- .9 Touch up damaged factory finished surfaces to Consultant's satisfaction. Use touch up materials to match original. Do not paint over name plates.

1.6 Transportation

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Transportation cost of products supplied by Owner will be paid for by Owner. Contractor shall be responsible for the unloading, handling and storage of such products.

1.7 Manufacturer's Instructions

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify 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 re installation at no increase in Contract Price or

Contract Time.

1.8 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.
- .2 Immediately notify Consultant if required Work is such as to make it impractical to produce required results.
- .3 Do not employ anyone unskilled in their required duties. Consultant reserves right to require dismissal from site, workers deemed incompetent or careless.
- .4 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Consultant, whose decision is final.

1.9 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.

1.10 Concealment

- .1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation, inform Consultant if there is interference. Install as directed by Consultant.

1.11 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.

1.12 Location of Fixtures

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform Consultant of conflicting installation. Install as directed.

1.13 Fastenings

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

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 No. 304 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 Dielectric Separation

- .1 Ensure that a dielectric separator is provided in a permanent manner over entire contact surfaces to prevent electrolytic action (galvanic corrosion) between dissimilar materials. Similarly, prevent corrosion to aluminum in contact with alkaline materials such as contained in cementitious materials.

1.16 Tolerances for Execution of Work

- .1 Unless specifically indicated otherwise, Work shall be installed plumb, level, square and straight.
- .2 Unless acceptable tolerances are otherwise specified in specification sections, or are otherwise required for proper functioning of equipment, site services and mechanical and electrical systems:
 - .1 “Plumb and level” shall mean plumb or level within 1 mm in 1m.
 - .2 “Square” shall mean not in excess of 10 seconds lesser or greater than 90 degrees.
 - .3 “Straight” shall mean within 1 mm under a 1 m long straight edge.
 - .4 “Flush” shall mean within:
 - .1 6 mm for exterior concrete, masonry and paving materials.
 - .2 1 mm for interior concrete, masonry, tile and similar surfaces.
 - .3 0.5 mm for other interior surfaces.
- .3 Allowable tolerances shall not be cumulative

1.17 Protection of Work in Progress

- .1 Adequately protect Work completed or in progress. Work damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by Consultant, at no increase in Contract Price or Contract Time.
- .2 Prevent overloading of any part of building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of the Consultant.

1.18 Existing Utilities

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants and pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

1.19 Hazardous Materials

- .1 Report any found or suspected hazardous materials to the Owner.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Safety Requirements
- .2 Fire Protection
- .3 Accident Reporting
- .4 Records on Site

1.2 References

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Fire Commissioners of Canada, FC 301, Standard for Construction Operations.
- .3 National Fire Protection Agency (NFPA)
 - .1 NFPA 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations
- .4 Occupational Health and Safety Act.
 - .1 R.R.O. 1990, Reg. 860: Workplace Hazardous Materials Information System (WHMIS)
 - .2 O. Reg. 632/05: Confined Spaces
- .5 Ontario Building Code.

1.3 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit to Owner and Consultant copies of the following documents, including updates issued:
 - .1 Notice of Project filed with Provincial Ministry of Labour or equivalent for Place of Work
 - .2 Site-specific Health and Safety Plan prior to commencement of work on the work site. Plan shall include but not be limited to the following:
 - .1 Name and contact info of Contractor's Health and Safety Representative for Work Site; including twenty-four (24) hour emergency contact phone numbers.
 - .2 Phone numbers of local fire, police, and ambulance outside of 911 services.
 - .3 Location of nearest medical facility and level of injury that each can service.
 - .3 Submit to the Owner, Consultant and Municipal Fire Department, for review, a "Fire Safety Plan" conforming to Section 2.14 of the National Fire Code of Canada. Maintain a copy of the "Fire Safety Plan" on site.
 - .4 Copies of certification for all employees on site of applicable safety training including, but not limited to:
 - .1 WHMIS.
 - .2 Fall arrest and protection.
 - .3 Suspended Access Equipment.
 - .4 Erection of Scaffolding.
 - .5 License for powder actuated devices.
 - .5 On-site Contingency and Emergency Response Plan addressing:
 - .1 Standard procedures to be implemented during emergency situations.
 - .2 Preventative planning and protocols to address possible emergency situations.
- .3 Guidelines for handling, storing, and disposing of hazardous materials that maybe encountered on site, including measures to prevent damage or injury in case of an accidental spill.
- .4 Incident and accident reports, promptly if and upon occurrence
 - .1 Reports or directions issued by authorities having jurisdiction, immediately upon issuance from that authority.
 - .2 Accident or Incident Reports, within 24 hours of occurrence.

- .5 Submit other data, information and documentation upon request by the Consultant as stipulated elsewhere in this section.

1.4 Compliance Requirements

- .1 Comply with the latest edition of the Ontario Occupational Health and Safety Act, and the Regulations made pursuant to the Act.

1.5 Constructor

- .1 Notify all regulatory bodies required for construction activities, (i.e., Notice of Project, employer notification, etc.). Notifications shall include, but not be limited to, the notification requirements laid out in OHS Act Sec 51-53 and the requirements of Ontario Regulation 213/91 for Construction Projects, Sections 5, 6 and 7. For the purpose of this contract the Contractor shall be the "Constructor".
- .2 The "Constructor" will be solely responsible for the safety of all persons on the Site.

1.6 Safety Requirements

- .1 Observe and enforce all construction safety measures and comply with the latest edition and amending regulations of the following documents and in the event of any differences among those provisions, the most stringent shall apply:
 - .1 Occupational Health and Safety Act and Regulations for Construction Projects, August 1997, Ontario Regulation 213/91 including amendments.
 - .2 Hazardous Products Act and Canada Labour Code.
 - .3 The Workplace Safety and Insurance Board, O. Reg 454.
 - .4 Ontario Building Code Act, Ontario Regulation 332/12 including amendments.
 - .5 National Building Code of Canada, Part 8: Safety Measures on Construction and Demolition Sites.
 - .6 National Fire Code of Canada.
 - .7 NFPA 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations, 2013 Edition
 - .8 Environmental Protection Act.
 - .9 The Power Commission Act.
 - .10 The Boiler and Pressure Vessels Act.
 - .11 The Elevators and Lifts Act.
 - .12 The Operating Engineer's Act.
 - .13 Municipal statutes.
- .2 Obey all Federal, Provincial and Municipal Laws, Acts, Statutes, Regulations, Ordinances and By-laws which could in any way, pertain to the work outlined in the Contract, or to any employees of the Contractor. Satisfy all statutory requirements imposed by the Occupational Health and Safety Act and Regulations made thereunder, on a Contractor, and Constructor and/or Employer with respect to or arising out of the performance of the Contractors obligations under this Contract.
- .3 Working at Heights: The supervisor of the project, will be responsible to ensure that his employees and subcontractors/suppliers have current Working at Heights and Fall Protection certification.
- .4 The supervisor of the project will be responsible for his employees and subcontractors/suppliers maintaining standard safety practices, as well as the specific safety rules listed below, while working on the Owner's property.
- .5 The Owner reserves the right to order individuals to leave the site if the individual is in violation of

- any safety requirement or any Act. Any expense incurred will be the responsibility of the Contractor.
- .6 Notify the Owner should any hazardous condition become apparent.
 - .7 Enforce the use of CSA approved hard hats, reflective vests and safety boots for all persons entering or working at the construction site. Refuse admission to those refusing to conform to this requirement.
 - .8 Provide safeguard and protection against accident, injury or damage to any person on the site, adjacent work areas and adjacent property.

1.7 Confined Space

- .1 Confined Space: Where applicable, provide the Consultant and all Regulatory Authorities with a copy of the Contractors' Confined Space Entry Procedure. In the event that defined procedures are not available, abide by the applicable requirements of the Occupational Health and Safety Act and all regulations made thereunder.
- .2 Persons intended to work in confined spaces, as defined by the Owner, must have formal training in performing work in confined spaces.
- .3 Provide proof of valid certificates of such training for all workers prior to entry of such workers into confined spaces.
- .4 Provide all necessary safety equipment for entry into confined spaces.
- .5 Where workers are required to enter a confined space, as defined by the OHSA, O. Reg. 632/05 Section 221.2, ensure that workers of the Contractor and all Subcontractors follow the requirements of the above legislation, including but not limited to:
 - .1 Having a method for recognizing each confined space to which the program applies
 - .2 Having a method for assessing the hazards to which workers may be exposed
 - .3 Having a method for the development of confined space entry plans (which include on-site rescue procedures)
 - .4 Having a method for training workers
 - .5 Having an entry-permit system.
 - .6 Supply the necessary tools and equipment to perform the confined space entry. These items include, but are not limited to, required documentation, gas detectors, breathing equipment, fall protection and rescue equipment.

1.8 Safety Meetings

- .1 Site toolbox safety meetings will be held weekly for all Contractor employees and all sub trade contractors.
- .2 Where a Joint Health and Safety Committee is required on a project, workers and supervisors, selected, as members of the committee must attend.

1.9 Workplace Hazardous Materials Information System (WHMIS)

- .1 Be familiar with WHMIS regulations and be responsible for compliance.
- .2 Provide to the Consultant a list of Designated Substances that will be brought to the site prior to commencing work. Safety Data Sheets (SDS) and the hazardous material inventory for each substance listed must be kept on the Project.

- .3 Be responsible for all other requirements of regulations as applicable to Employers.
- .4 All controlled products to be properly labelled and stored.
- .5 Immediately inform Owner and Consultant if any unforeseen or peculiar safety-related factor, hazard, or condition becomes evident during performance of Work.

1.10 Fire Protection

- .1 Provide and maintain safeguard and protection against fire in accordance with current fire codes and regulations.
- .2 Provide temporary fire protection throughout the course of construction. Particular attention shall be paid to the elimination of fire hazards.
- .3 Comply with the requirements of FCC No. 301 Standards for Construction Operations issued by the Fire Commissioner of Canada and the National Building Code.
- .4 Provide and maintain portable fire extinguishers during construction, in accordance with Part 6 of the National Fire Code of Canada 2015 and NFPA 241.
- .5 Maintain unobstructed access for firefighting at all areas in accordance with the National Building Code of Canada.

1.11 First Aid

- .1 Provide such equipment and medical facility as required by WSI Act to supply first aid services to anyone who may be injured at the place of Work. Report all accidents or injuries to the proper authorities and to the Owner and Consultant.

1.12 Accident Reporting

- .1 Investigate and report incidents and accidents as required by Occupational Safety and Health Act, and the Regulations made pursuant to the Act.

1.13 Records on Site

- .1 Maintain on site a copy of the safety documentation as specified in this Section and any other safety related reports and documents issued to or received from the authorities having jurisdiction.
- .2 Upon request, make copies available to the Consultant.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Field Engineering survey services.
- .2 Recording of subsurface conditions found.

1.2 References

- .1 Owner's identification of existing survey control points and property limits.

1.3 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit name and address of Surveyor to Consultant.
- .3 On request of Consultant, submit documentation to verify accuracy of field engineering work.
- .4 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform to Contract Documents.

1.4 Examination of Work and Site

- .1 Examine the site and existing building to be fully informed of their particulars as related to the Work.
- .2 Verify dimensions of completed Work in place before fabrication of Work to be incorporated with it. Ensure that all necessary job dimensions are taken for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of such dimensions.
- .3 No claims for extra payment will be paid for extra work made necessary or for difficulties encountered due to conditions of the site which were visible or reasonably inferable from an examination of the site at the time prior to tender closing date and furthermore, failure of the Contractor to visit and examine the site shall be deemed a waiver of all claims for extra payment due to any condition of the site existing prior to tender closing date.
- .4 As-found damage: Record by photography and submit evidence to Consultant before commencing work, any found damaged surfaces or materials adjacent to new work, and not included under scope of this new work. Remedial work to any damage, not so recorded, shall be the responsibility of the Contractor.

1.5 Qualifications of Surveyor

- .1 Qualified registered land surveyor, licensed to practice in Place of Work, acceptable to Consultant.

1.6 Survey Reference Points

- .1 Existing 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 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 surveyor to replace control points in accordance with original survey control.

1.7 Existing Services

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Consultant of findings. The Contractor is responsible for coordination of all utility locates.
- .2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut off points as directed by Consultant.
- .3 Where Work involves breaking into or connecting to existing services, carry out work at times directed by authorities having jurisdiction, with minimum of disturbance to building occupants, pedestrian and vehicular traffic.
- .4 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.
- .5 Install temporary drain plugs to prevent construction debris from blocking pipes downstream of the work.
- .6 All existing concrete floor slabs shall be scanned prior to any cutting or breaking of concrete. Employ a qualified concrete scanning company or inspection and testing agency to scan and map floor slabs for reinforcing, plastic and metal conduit, piping, grounding cables, embedment and the like. Map all slabs and provide copies to the Owner and Consultant.

1.8 Location of Services, Equipment and Fixtures

- .1 Location of services, equipment, fixtures and outlets indicated on drawings or specified are to be considered as approximate.
- .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. Include existing equipment which affects or will be affected by the work.
- .3 Inform Consultant of impending installation and obtain approval for actual location.
- .4 Location of site services where required, is approximate and is based on information provided by the Owner. Undertake all locates to determine exact locations of existing services and lay out new services to avoid any conflicts with new building elements, including site improvements, building foundations and other new or existing services.
- .5 Submit field drawings and interference drawings to indicate relative position of various services and equipment. Refer to requirements for interference drawings specified elsewhere.
- .6 Prepare interference and equipment placing drawings to ensure that all components will be properly accommodated within the spaces provided.
- .7 Prepare drawings to indicate coordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment apparatus and connections are coordinated.
- .8 Ensure that clearances required by jurisdictional authorities and clearances for proper

maintenance and access are indicated and maintained.

- .9 Submit interference drawings to Owner and Consultant in accordance with Section 01 33 00.
- .10 Unless specifically indicated by the Consultant, interference drawings will be received for information only and will not be reviewed.

1.9 Records

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 Record locations of maintained, re-routed and abandoned service lines.

1.10 Subsurface Conditions

- .1 Promptly notify Consultant in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.
- .2 After prompt investigation, should Consultant determine that conditions do differ materially, instructions will be issued for changes in Work.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Requirements and limitations for cutting and patching the Work.

1.2 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit written request and obtain Consultant's approval in advance of cutting or alteration which affects:
 - .1 Structural integrity of any element of Project.
 - .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
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .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 separate contractor.
 - .7 Date and time work will be executed.

1.3 Materials

- .1 As specified and required for original installation.
- .2 Requests for change in materials shall include documentation indicating conformance to project requirements and intent.

1.4 Definitions

- .1 Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- .2 Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

PART 2 PRODUCTS

2.1 Materials

- .1 General: Comply with requirements specified in other Sections.
- .2 In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
- .3 If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Consultant for the visual and functional performance of in-place materials.

PART 3 EXECUTION

3.1 Preparation

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

3.2 General

- .1 Carry out all cutting, fitting and patching required for the work of the Contract.
- .2 Repair all wall and floor surfaces where items have been removed.
- .3 Make good all finishes as required.
- .4 Repaint damaged wall surfaces.
- .5 Fit several parts together, to integrate with other Work.
- .6 Uncover Work to install ill-timed Work.
- .7 Remove and replace defective and non-conforming Work.
- .8 Provide cutting and patching of all openings in non-structural elements of Work as necessary to complete installation of mechanical and electrical Work. Include complete removal and replacement of such elements as necessary to provide construction access.
- .9 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .10 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .11 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools are not allowed on masonry work without prior approval.
- .12 Restore work with new products in accordance with requirements of Contract Documents.
- .13 Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .14 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with "ULC approved firestopping material, full thickness of the construction element. Include any openings in existing building elements created by removal of existing services or equipment.

- .15 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

3.3 Cutting and Patching

- .1 General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
- .2 Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- .3 Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- .4 Temporary Support: Provide temporary support of work to be cut.
- .5 Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- .6 Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 - Summary of Work.
- .7 Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- .8 Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - .1 In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - .2 Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - .3 Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - .4 Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 - .5 Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - .6 Proceed with patching after construction operations requiring cutting are complete.
- .9 Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - .1 Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - .2 Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and

refinishing.

- .1 Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - .2 Restore damaged pipe covering to its original condition.
 - .3 Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, colour, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform colour and appearance.
 - .1 Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 - .4 Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 - .5 Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- .10 Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.4 Subfloor Levelling

- .1 Where existing flooring is to be removed from floor slabs to remain, including ceramic tile flooring, carefully remove all flooring, grout, adhesives, waterproofing membranes and the like down to the base slab. Clean, patch and repair slab where damaged with concrete or acceptable leveling compound in accordance with new flooring manufacturer's instructions and ASTM F710. Refer to original building drawings and remove and replace existing concrete floor toppings as necessary and where required.
- .2 Where new flooring is to be installed on new concrete slab or on framed floors, subfloor shall be levelled in accordance with flooring manufacturer's specifications and tolerances and with ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

3.5 Fire Barrier Seals

- .1 Ensure fire separations are maintained as indicated on the drawings. patch and firestop all penetrations accordingly.

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Progressive Cleaning
- .2 Final Cleaning

1.2 References

- .1 National Fire Protection Association (NFPA)
 - .1 NFPA 241-22 Standard for Safeguarding Construction, Alteration, and Demolition Operations.

1.3 Project Cleanliness

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by the Owner. Do not burn waste materials on site.
- .3 Clear snow and ice from access to building, bank/pile snow in designated areas only.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use clearly marked separate bins for recycling.
- .7 Clean interior areas prior to start of finishing work and maintain areas free of dust and other contaminants during finishing operations.
- .8 Store volatile waste in covered metal containers and remove from premises at end of each working day.
- .9 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

PART 2 PRODUCTS

2.1 Products

- .1 All cleaning materials and products shall be low VOC type. Submit list of cleaning products including SDS for approval prior to commencement of cleaning operations.
- .2 Use only cleaning materials recommended by manufacturer of surface to be cleaned and recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.1 Final Cleaning

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .5 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors and ceilings.
- .6 Clean lighting reflectors, lenses, and other lighting surfaces. Clean and/or replace lamps, light fixtures, grilles and lenses.
- .7 HEPA vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .8 Thoroughly vacuum clean interior of electrical equipment.
- .9 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.
- .10 Clean and seal concrete floor surfaces with non-skid matte sealer.
- .11 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .12 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.
- .13 Broom clean and wash exterior paved areas, walks, steps and surfaces; rake clean other surfaces of grounds.
- .14 Remove dirt and other disfiguration from exterior surfaces.
- .15 Clean and sweep roofs. Clear all drains, scuppers, gutters and downspouts.
- .16 Remove debris and surplus materials from crawl spaces and other accessible concealed spaces.
- .17 Remove snow and ice from access to building.
- .18 Under direction of Consultant, aim adjustable luminaires.

3.2 Waste Management and Disposal

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Construction Waste Management and Disposal.

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 References.
- .2 Submittals.
- .3 Definitions.
- .4 Waste Management Goals for the Project.
- .5 Documents.
- .6 Waste Management Plan.
- .7 Materials Source Separation Program.
- .8 Disposal of Wastes.
- .9 Scheduling.
- .10 Storage, Handling and Protection.
- .11 Application.
- .12 Diversion of Materials.

1.2 References

- .1 O. Reg. 102/94 Waste Audits and Waste Reduction Work Plans.
- .2 O. Reg. 278/05 Occupational Health and Safety Act

1.3 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit a completed Waste Management Plan (WMP) prior to project start-up.

1.4 Definitions

- .1 Waste Management Plan (WMP): Contractor's approved overall strategy for waste management including waste reduction workplan and materials source separation program.
- .2 Materials Source Separation Program (MSSP): Consists of a series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .3 Separate Condition: Refers to waste sorted into individual types.

1.5 Waste Management Goals for the Project

- .1 The Owner has established that this Project shall generate the least amount of waste possible and that processes shall be employed that ensure the generation of as little waste as possible including prevention of damage due to mishandling, improper storage, contamination, inadequate protection or other factors as well as minimizing over packaging and poor quantity estimating.
- .2 Of the waste that is generated, the waste materials designated in this specification shall be salvaged for reuse and or recycling. Waste disposal in landfills or incinerators shall be minimized.

1.6 Waste Management Plan

- .1 Waste Management Plan: Submit a Waste Management Plan within 10 calendar days after receipt of Notice of Award of Contract, or prior to any waste removal, whichever occurs sooner. The Plan shall contain the following:
 - .1 Analysis of the proposed job site waste to be generated, including the types of recyclable and waste materials generated (by volume or weight). In the case of demolition, a list of each item proposed to be salvaged during the course of the project should also be prepared
 - .2 Alternatives to Land Filling: Contractor shall designate responsibility for preparing a list of each material proposed to be salvaged, reused, or recycled during the course of the Project.
- .2 Post WMP or summary where workers at site are able to review its content.

1.7 Materials Source Separation Program

- .1 The Waste Management Plan shall include a Source Separation Program for recyclable waste and shall be in accordance with the established policies currently in place at the local Municipality, and the requirements of O. Reg. 102/94.
- .2 Prepare MSSP and have ready for use prior to project start-up.
- .3 Implement MSSP for waste generated on project in compliance with approved methods and as approved by Consultant.
- .4 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and/or recyclable materials.
- .5 Provide containers to deposit reusable and/or recyclable materials.
- .6 Locate containers to facilitate deposit of materials without hindering daily operations.
- .7 Locate separated materials in areas which minimize material damage.
- .8 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.

1.8 Disposal of Wastes

- .1 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .2 Provide appropriate on-site containers for collection of waste materials and debris. Containers for volatile wastes shall be closed containers and shall be removed from site daily.
- .3 Provide and use clearly marked separate bins for recycling.
- .4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site.
- .5 Remove waste material and debris from site and deposit in waste container at end of each working day.
- .6 Do not permit waste to accumulate onsite.

- .7 Burying of rubbish and waste materials is prohibited.
- .8 Disposal of waste into waterways, storm or sanitary sewers is prohibited.

1.9 Scheduling

- .1 Coordinate work with other activities at site to ensure timely and orderly progress of the Work.

1.10 Storage, Handling and Protection

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Owner.
- .2 Materials from building demolition to be salvaged or re-used are to be removed and salvaged.
- .3 Unless specified otherwise, materials for removal become Contractor's property.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Application

- .1 Do work in compliance with Waste Management Plan.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.
- .3 Source separate materials to be reused/recycled into specified sort areas.

3.2 Designated Substances

- .1 All designated substances abatement, removal and disposal shall be completed in accordance with O. Reg 278/05 and all other applicable legislation.

3.3 Diversion of Materials

- .1 Separate materials from general waste stream and stockpile in separate piles or containers, to approval of Owner, and consistent with applicable fire regulations. Mark containers or stockpile areas.
- .2 On-site sale of materials is not permitted.

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 Administrative procedures preceding preliminary and final inspections of Work.

1.2 References

- .1 Canadian Construction Documents Committee
 - .1 CCDC 2-2020 Stipulated Price Contract including Supplementary Conditions.
 - .2 OAA/OGCA Document 100 - Recommended Procedures Regarding Substantial Performance of Construction Contracts and Completion Takeover of Projects.
 - .3 The Construction Act.

1.3 Inspection and Declaration

- .1 Contractor's Inspection: The Contractor shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents. Submit duplicate copies of the deficiency list to the Owner and Consultant.
 - .1 Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
 - .2 Request Consultant's review.
- .2 Consultant's Review: Consultant and Contractor will perform review of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
- .3 Completion: submit written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
 - .4 Certificates required by Boiler Inspection Branch, Fire Commissioner, Utility companies, TSSA, ESA and other regulatory agencies have been submitted.
 - .5 Operation of systems have been demonstrated to Owner's personnel.
 - .6 Work is complete and ready for Final Review by the Consultant.
- .4 Final Inspection: when items noted above are completed, request final review of Work by Consultant, and Contractor. If Work is deemed incomplete by the Consultant, complete outstanding items and request re-review.
- .5 Declaration of Substantial Performance: when Consultant consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance. Refer to CCDC 2, General Conditions Article GC 5.4 - Substantial Performance of Work and Payment of Holdback for specifics to application.
- .6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .7 Final Payment: When Consultant considers final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. Refer to CCDC 2, General Conditions Article GC 5.5 – Final Payment for specifics to application.

- .8 Payment of Holdback: After issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with CCDC 2, General Conditions Article 5.4 - Substantial Performance of Work and Payment of Holdback.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

- .1 As built, samples, and specifications.
- .2 Equipment and systems.
- .3 Product data, materials and finishes, and related information.
- .4 Operation and maintenance data.
- .5 Spare parts, special tools and maintenance materials.
- .6 Warranties and bonds.
- .7 Final site survey.

1.2 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

1.3 Submission

- .1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .2 At least 2 weeks prior to commencement of scheduled commissioning activities, submit 2 copies of the draft Operating and Maintenance Manuals, for Consultants review and use during the commissioning activities. After the completion of the commissioning activities, the Consultant will return to the Contractor 1 draft copy, with review comments, for revision. Submit 1 copy of the revised Operating and Maintenance for approval prior to the production of final copies. Prior to the Issuance of the Final Certificate of Completion, and within 10 working days after Substantial Performance, submit 2 copies of the final Operating and Maintenance Manuals.
- .3 Building will not be deemed ready for use unless the draft copies of the Operating and Maintenance Manuals and the "As-built" Record Documents have been submitted and reviewed by the Consultant.
- .4 Building will not be deemed ready for use unless the completed and submitted Operating and Maintenance Manuals and "As-built" Record Documents have been accepted by the Consultant.
- .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.

1.4 Format

- .1 Organize data in the form as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings. Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

- .5 Arrange content by Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- .9 Provide 1:1 scaled CAD files in .dwg format. Provide duplicate copies on memory stick.

1.5 Contents Each Volume

- .1 Table of Contents: provide title of project;
 - .1 Date of submission; names.
 - .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.6 As-Builts and Samples

- .1 In addition to requirements in General Conditions, maintain at the site for Consultant one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for

construction purposes.

- .5 Keep record documents and samples available for inspection by Consultant.

1.7 Recording Actual Site Conditions

- .1 Record information on set of drawings, provided by Consultant.
- .2 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .3 Contract Drawings and shop drawings: 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.
- .4 Submit following drawings:
 - .1 Record changes in red. Mark on one set of prints and at completion of project prior to final inspection, produce electronic "as-built" records on disk using latest version of AutoCad. Annotate "AS-BUILT RECORD" in each drawing title block.
 - .2 All changes shall be shown on a separate drawing layer named "as-built".
 - .3 At least 2 weeks prior to commencement of scheduled commissioning activities, submit one copy of the draft "As-built" Project Record Documents for Consultants review and use during the commissioning activities. After the completion of the commissioning activities, the Consultant will return to the Contractor the draft copy, with review comments, for revision. Prior to the Issuance of the Final Certificate of Completion, and within 10 working days after Substantial Performance, submit 2 copies of the final "As-built" Project Record Documents and disk of "as-built" record drawings.
- .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 manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

1.8 Final Survey

- .1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.9 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 nomenclature and commercial number of

- replaceable parts.
- .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 troubleshooting; 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 Contractor's co-ordination 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 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 - Quality Control.
 - .15 Additional requirements: as specified in individual specification sections.
- 1.10 Materials and Finishes
- .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 Additional Requirements: as specified in individual specifications sections.
- 1.11 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 Spare parts as identified in individual sections are to be delivered to the Owner prior to the Contractor's application for Substantial Performance.
- .4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.12 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 Maintenance materials are to be delivered to the Owner prior to the Contractor's application for Substantial Performance.
- .4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.13 Special Tools

- .1 Provide special tools, in quantities specified in individual specification section.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Special tools are to be delivered to the Owner prior to the application for Substantial Performance.
- .4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

1.14 Storage, Handling and Protection

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and to satisfaction of Consultant.

1.15 Warranties and Guarantees

- .1 Separate each warranty or guarantee 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 Obtain warranties and guarantees, executed in duplicate by subcontractors, suppliers, and

manufacturers, within ten days after completion of the applicable item of work.

- .4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.
- .5 Verify that documents are in proper form, contain full information, and are notarized.
- .6 Co-execute submittals when required.
- .7 Retain warranties and guarantees until time specified for submittal.

1.16 Independent Specialty Engineers Sign-Off

- .1 Prior to Substantial Performance, provide copies of signed and stamped engineers review and sign-off letters stating that the work has been built in accordance with their drawings and designs. Conditional or vague letters of sign-off will not be accepted. All specialty design engineers for all sub-contractors and suppliers will be required to review the work in progress at appropriate intervals to ensure compliance with their designs and drawings and shall provide final sign-off letters. Provide copies of all field reports issued by specialty engineers. Carry all costs associated with full compliance with this requirement.

PART 2 PRODUCTS

2.1 Not Used

- .1 Not used

PART 3 EXECUTION

3.1 Not Used

- .1 Not used

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 31 23 10 Excavating, Trenching and Backfilling

1.3 References

- .1 The National Building Code of Canada 2020, Part 8-Safety Measures on Construction and Demolition Sites.
- .2 CSA Group (CSA)
 - .1 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures
- .3 ASTM International (ASTM)
 - .1 ASTM F710-22 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
- .4 Ontario Provincial Regulations
 - .1 Ontario Regulation 102/94 Waste Audits and Waste Reduction Work Plans.
 - .2 Ontario Regulation 103/94 Environmental Protection Act.
 - .3 Ontario Regulation 213/07 The Fire Code.
 - .4 Ontario Regulation 232/98 Landfilling Sites.
 - .5 Ontario Regulation 278/05 Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations.
 - .6 Ontario Regulation 347 Environmental Protection Act, General — Waste Management.
 - .7 Ontario Regulation 332/12 The Building Code.
- .5 The Workplace Health and Safety Act, and Regulations for Construction Projects.
- .6 The Contractors Health and Safety Policy.
- .7 Laws, rules and regulations of other authorities having jurisdiction.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit detailed written schedule, methodology and proposed procedures for demolition, including a Safe Work Plan for review prior to commencement of demolition.
- .3 Where required by authorities having jurisdiction, submit for approval drawings, diagrams or details clearly showing sequence of disassembly work or supporting structures and underpinning.
- .4 Drawings for structural elements of the demolition process including shoring, underpinning and installation of new lintels or beams in existing load bearing walls, shall bear signature and stamp of qualified professional engineer registered in the Province of Ontario.
- .5 Submit proposed dust-control measures.
- .6 Submit proposed noise-control measures.
- .7 Submit schedule of demolition activities indicating the following:
 - .1 Detailed sequence of demolition and removal work, including start and end dates for each activity.
 - .2 Dates for shutoff, capping, and continuation of utility services.

- .8 If hazardous materials are encountered and disposed of, landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
- .9 At Project Closeout: Submit record drawings in accordance with Section 01 78 00. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions

1.5 Permits

- .1 Obtain and pay for all permits and comply with all laws, rules, ordinances, and regulations relating to Demolition of Building and preservation of Public Health and Safety.
- .2 The Consultant will complete General Review during demolition in accordance with the Ontario Building Code. All other engineering required for shoring design and for other structural elements of the demolition work will be completed by the Contractor's own engineer and paid for by the Contractor.

1.6 Waste Management Plan

- .1 All work of this section shall be completed in accordance with the contractors approved Waste Management Plan specified in Section 01 74 19.

1.7 Definitions

- .1 Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals and inorganic wastes.
- .2 Demolition Waste: Building materials and solid waste resulting from construction, remodeling, repair, cleanup, or demolition operations that are not hazardous. This term includes, but is not limited to, asphalt concrete, Portland cement concrete, brick, lumber, gypsum wallboard, cardboard and other associated packaging, roofing material, ceramic tile, carpeting, plastic pipe, and steel. The materials may include rock, soil, tree stumps, and other vegetative matter resulting from land clearing and landscaping for construction or land development projects.
- .3 Environmental Pollution and Damage: The presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human or animal life; affect other species of importance to humanity; or degrade the utility of the environment for aesthetic, cultural or historical purposes.
- .4 Inert Fill: A permitted facility that accepts inert waste such as asphalt and concrete exclusively for the purpose of disposal.
- .5 Inert Solids/Inert Waste: Non-liquid solid waste including, but not limited to, soil and concrete that does not contain hazardous substances or soluble pollutants at concentrations in excess of water-quality standards established by a regional water board and does not contain significant quantities of decomposable solid waste.
- .6 Landfill: A landfill that accepts non-hazardous materials such as household, commercial, and industrial waste, resulting from construction, remodeling, repair, and demolition operations. A landfill must have a solid waste facilities permit from the Ministry of the Environment and be in conformance to O. Reg 232/98.

- .7 Recycling: The process of sorting, cleansing, treating and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.
- .8 Remove: Remove and legally dispose of items, except those identified for use in recycling, re-use, and salvage programs.
- .9 Reuse: The use, in the same or similar form as it was produced, of a material which might otherwise be discarded.
- .10 Solid Waste: All putrescible and non-putrescible solid, semisolid, and liquid wastes, including garbage, trash, refuse, paper, demolition and construction wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, dewatered, treated, or chemically fixed sewage sludge which is not hazardous waste, manure, vegetable or animal solid and semisolid wastes, and other discarded solid and semisolid wastes. "Solid waste" does not include hazardous waste, radioactive waste, or medical waste as defined or regulated by law.

1.8 Quality Assurance

- .1 Demolition Firm Qualifications: Demolition contractor shall be an experienced firm that has successfully completed demolition Work similar to that indicated for this Project.
- .2 Regulatory Requirements: Comply with governing regulations before starting demolition. Comply with hauling and disposal regulations of authorities having jurisdiction. Obtain and pay for all permits required.
- .3 Pre-demolition Conference: Conduct a conference at Project site.
 - .1 Review the environmental goals of this Project and make a proactive effort to increase awareness of these goals among all labor forces on site.
 - .2 Review schedule and scheduling procedures.
 - .3 Review health and safety procedures.
 - .4 Review of Project conditions including review of record photographs.

1.9 Project Conditions

- .1 Construct safety barriers, barricades, fencing and hoarding to separate public from work areas as described in Section 01 56 00.
- .2 The Owner assumes no responsibility for the actual condition of the structures to be demolished.
- .3 Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner insofar as practicable. Variations within the structures may occur by the Owner's salvage operations prior to start of demolition.

1.10 Designated Substances

- .1 Refer to Designated Substances Survey – Pre-Renovation, Ecole elementaire Jeanne-Lajoie, 150 Carnforth Road, Toronto, Ontario dated March 24, 2025.
- .2 Should any other material not identified in the above referenced reports resembling asbestos or other hazardous substances be encountered in course of demolition work, immediately stop work and notify the Owner's Representative. Refer to Section 01 41 00.

- .3 All work shall be completed in accordance with O. Reg 278/05 and all other applicable legislation. Refer to Specifications included in the Designated Substance Survey for abatement requirements.

PART 2 PRODUCTS

2.1 Materials

- .1 Provide all materials necessary for temporary shoring. On completion, remove temporary materials from site.
- .2 All building materials removed from the building shall become the property of the Contractor unless specified otherwise and shall be reused in new construction or removed from the Site.
- .3 All concrete, masonry, asphalt and similar materials shall be crushed prior to disposal.

2.2 Salvage

- .1 All items of salvageable value must be salvaged.
- .2 Provide a schedule of items to be salvaged and clearly indicate which items are to be retained by Owner. Clearly identify and tag each salvageable item.
- .3 Transport salvaged items from the site as they are removed.
- .4 Items of salvageable value to the Contractor may be removed from the structure as the work progresses, if such items are not claimed by the Owner.

2.3 Reuse

- .1 Salvage and reuse materials as indicated on the drawings.

2.4 Recycle

- .1 All materials from demolition and land clearing which can be recycled through local municipal programs and which is not scheduled for salvage shall be sorted and separated in accordance with Regional, Provincial and Municipal standards and regulations.
- .2 Provide recycling receptacles for the duration of construction activities at the building site.

PART 3 EXECUTION

3.1 Examination

- .1 Survey existing conditions and correlate with requirements indicated to determine extent of demolition, salvage and recycling required.
- .2 Verify that utilities have been disconnected and capped.
- .3 Survey condition of the building to determine whether removing any element might result in a structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during demolition.

- .4 Retain a licensed and qualified civil or structural engineer to provide analysis, including calculations, necessary to ensure the safe execution of the demolition work.
- .5 Perform surveys and tests as the Work progresses to detect hazards resulting from demolition activities.
- .6 Preliminary Survey:
 - .1 The Demolition Plans indicate the general extent of existing conditions based upon drawings provided by the Owner and existing site conditions. Review all areas of work to determine full extent of areas to be demolished, altered or renovated and become familiar with actual conditions and extent of work required.
 - .2 Before commencing demolition operations, examine Site and provide engineering survey to determine type of construction, condition of structure, and Site conditions. Assess strength and stability of damaged or deteriorated structures.
 - .3 Assess potential effect of removal of any part or parts on the remainder of structure before such part(s) are removed.
 - .4 Assess effects of demolition at adjacent structures and consider need for underpinning, shoring and/or bracing.
 - .5 Investigate for following conditions:
 - .1 load bearing walls and floors
 - .2 structure suspended from another
 - .3 effects of soils, water, lateral pressures on retaining or foundations walls
 - .4 presence of tanks and other piping systems
 - .5 presence of designated substances and hazardous materials.
- .7 After determining demolition methods, determine area of possible vibration. Carefully inspect beyond those adjacent areas. List potential damage areas and photograph each for record purposes before starting work.

3.2 Preparation

- .1 Erect and maintain dustproof and weatherproof partitions as required to prevent spread of dust, fumes and smoke to other parts of building. Maintain fire exits. On completion, remove partitions and make good surfaces to match adjacent surfaces of building.
- .2 Provide all shoring and bracing required for the execution of the work.
- .3 Ensure all sedimentation controls as required are in place prior to commencement of demolition activities.
- .4 Before commencing demolition, verify that existing water, gas, electrical and other services in areas being demolished are cut off, capped diverted or removed as required. Post warning signs on electrical lines and equipment which must remain energized to serve adjacent areas during period of demolition.
- .5 Conduct demolition operations and remove materials from demolition to ensure minimum interference with roads, streets, walks, and other adjacent occupied and utilized facilities.
- .6 Do not close or obstruct streets, walks, or other adjacent occupied or utilized facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

3.3 Utilities

- .1 Contact authorities or utility companies for assistance in locating and marking services passing under, through, overhead or adjacent to structure to be demolished. Such services include:
 - .1 Electrical power lines
 - .2 Gas mains
 - .3 Communication cables
 - .4 Fibre optic cables
 - .5 Water lines.
 - .6 Drainage piping (storm and sanitary).
- .2 Before disconnecting, removing, plugging or abandoning any existing utilities serving the building:
 - .1 Notify the Owner, applicable utility companies, and local authorities having jurisdiction.
 - .2 Cut off and cap utilities at the mains on the property or in the street as required by the Owner and responsible utility company. Maintain fire protection to the existing buildings at all times.
 - .3 Remove, cut off and plug, or cap all utilities within the existing building areas to be demolished, except those designated to remain

3.4 Protection

- .1 Erect and maintain temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction. Maintain such areas free of snow, ice, water and debris. Lighting levels shall be equal to that prior to erection.
- .2 Provide safe access and egress from working areas using entrances, hallways, stairways or ladder runs, protected to safeguard personnel using them from falling debris.
- .3 Do not interfere with use and activities of adjacent buildings and site. Maintain free and safe passage to and from buildings.
- .4 Where demolition operations prevent normal access to adjacent properties, provide and maintain suitable alternative access.
- .5 Provide flagmen where necessary or appropriate, to provide effective and safe access to site to vehicular traffic and protection to Owner's personnel. Refer to Division 1 for safety requirements.
- .6 Protect existing site improvements, appurtenances, and landscaping that are designated to remain in place.
- .7 Ensure that all necessary controls are in place at the beginning of each work period which will prevent the spread of contaminated material beyond the work area limits. Stop work immediately if there exists any possibility of the spread of contaminated materials.
- .8 Keep dust from entering existing facilities and areas of building not affected by the Work. Comply with Ministry of Health requirements regarding debris control.
- .9 Ensure scaffolds, ladders, equipment and other such equipment are not accessible to public. Protect with adequate fencing or remove and dismantle at end of each day or when no longer required.
- .10 Take precautions to guard against movement, settlement or collapse of adjacent structures, services or driveways. Be liable for such movement, settlement or collapse caused by failure to take necessary precautions. Repair promptly such damage when ordered.

- .11 If Owner considers additional bracing and shoring necessary to safeguard and prevent such movement or settlement, install bracing or shoring upon Owner's orders.
- .12 Particular attention shall be paid to prevention of fire and elimination of fire hazards which would endanger new work or existing premises.
- .13 Protect existing adjacent work against damages which might occur from falling debris or other causes due to work of this Section.
- .14 At all times protect the structure from overloading.
- .15 Provide protection around floor and/or roof openings.
- .16 Protect from weather, parts of adjoining structures not previously exposed.
- .17 Protect interiors of building parts not to be demolished from exterior elements at all times.
- .18 At end of each day's work, leave work in safe condition so that no part is in danger of toppling or falling.

3.5 Temporary Ventilation

- .1 Provide all required temporary ventilation for demolition work.

3.6 Environmental Controls

- .1 Comply with provincial and municipal regulations pertaining to water, air, solid waste, recycling, chemical waste, sanitary waste, sediment and noise pollution.
- .2 Protection of Natural Resources:
 - .1 Preserve the natural resources.
 - .2 Confine demolition activities to areas defined by public roads, easements, and work area limits indicated on the drawings.
 - .3 Water Resources: Comply with applicable regulations concerning the direct or indirect discharge of pollutants to underground and natural surface waters. Provide sedimentation control where necessary.
 - .4 Store and service construction equipment at areas designated for collection of oil wastes.
 - .5 Oily Substances: Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water in such quantities as to affect normal use, aesthetics, or produce a measurable ecological impact on the area.
- .3 Dust Control, Air Pollution, and Odour Control: Prevent creation of dust, air pollution and odors.
 - .1 Use temporary enclosures and other appropriate methods to limit dust and dirt rising and scattering in air to lowest practical level.
 - .2 Store volatile liquids, including fuels and solvents, in closed containers.
 - .3 Properly maintain equipment to reduce gaseous pollutant emissions.
- .4 Noise Control: Perform demolition operations to minimize noise.
 - .1 Provide equipment, sound deadening devices, and take noise abatement measures that are necessary to comply with municipal regulations.
- .5 Salvage, Re-Use, and Recycling Procedures:

- .1 Identify re-use, salvage, and recycling facilities.
- .2 Develop and implement procedures to re-use, salvage, and recycle demolition materials.
- .3 Identify materials that are feasible for salvage, determine requirements for site storage, and transportation of materials to a salvage facility.
- .4 Source-separate clean and uncontaminated demolition materials including, but not limited to the following types:
 - .1 Concrete, Concrete Block, Concrete Masonry Units (CMU), Brick.
 - .2 Metal (ferrous and non-ferrous).
 - .3 Wood.
 - .4 Glass.
 - .5 Plastics and Insulation.
 - .6 Gypsum Board.
 - .7 Porcelain Plumbing Fixtures.
 - .8 Fluorescent Light Tubes.
 - .9 Paper: Bond, Newsprint, Cardboard, Paper, Packaging Materials.
 - .10 Other materials as appropriate.

3.7 Performance

- .1 Ensure demolition work is supervised by competent foreman at all times.
- .2 Demolition shall proceed safely in systematic manner. Work on each floor level shall be complete before commencing work on supporting structure and safety of its supports are impaired. Parts of building which would otherwise collapse prematurely shall be securely shored. Walls and piers shall not be undermined.
- .3 Until acceptance, maintain and preserve active utilities traversing premises.
- .4 Provide enclosed chutes for disposal of debris from heights more than 1 storey in accordance with CSA S350.
- .5 Maintain safety of site by shoring below-grade-structures and excavations resulting from demolition against collapse.

3.8 Demolition

- .1 Review demolition procedures to ensure no personnel or equipment are located or working without additional safe working platforms or working surface adequate to support the operations.
- .2 Any damage caused to the adjacent buildings or properties by the neglect of the Contractor or any of his forces shall be made good at the expense of the Contractor including all costs and charges which may be claimed by the Owner for damages suffered.
- .3 Demolish in a manner to minimize dusting. Keep dusty materials wetted at all times.
- .4 Demolition: Use methods required to complete Work within limitations of governing regulations and as follows:
 - .1 Locate demolition equipment throughout the building and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - .2 Demolish concrete and masonry in sizes that will be suitable for acceptance at recycling or disposal facilities.
 - .3 Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

- .4 Break up and remove concrete slabs on grade in small sizes, suitable for acceptance at recycling or disposal facilities, unless otherwise shown to remain.
- .5 Remove all disconnected, abandoned utilities.
- .6 Remove all finishes, fixtures, fitments and services as indicated
- .7 Damages: Promptly repair damages to adjacent facilities caused by demolition operations.
- .8 Prevent access to excavations by means of fences or hoardings.

3.9 Selective Demolition

- .1 Carefully dismantle and remove all items in as shown and as necessary to complete the work.
- .2 Salvage items scheduled for reuse or to be handed over to the Owner.
- .3 Particular attention shall be paid to prevention of fire and elimination of fire hazards which would endanger the existing buildings.
- .4 Where existing flooring is to be removed from floor slabs to remain, including ceramic tile flooring, carefully remove flooring, grout, adhesives, waterproofing membranes and the like down to the base slab. Patch and repair slab where damaged with concrete or acceptable leveling compound in accordance with new flooring manufacturer's instructions and ASTM F710. Refer to original building drawings and remove and replace existing concrete floor toppings as necessary and where required.
- .5 Return areas to condition existing prior to the start of the work unless indicated otherwise.
- .6 At exterior and interior bearing walls to be removed, include breaking out and removal of existing concrete foundations to a minimum of 200 mm below new finished floor level.

3.10 Handling of Demolished Materials

- .1 Conform to the approved Waste Management Plan.
- .2 Do not allow demolished materials to accumulate or be stored on-site for more than 5 days.
- .3 Do not burn, bury or otherwise dispose of rubbish and waste materials on project site.
- .4 Pallet and shrink-wrap materials scheduled for re-use and stockpile where directed on site.
- .5 Disposal: Transport demolished materials off Owner's property and legally reuse, salvage, recycle, or dispose of materials. Legally transport and dispose of materials that cannot be delivered to a source separated or mixed recycling facility to a transfer station or disposal facility that can legally accept the materials for the purpose of disposal.
- .6 Deliver to facilities that can legally accept new construction, excavation and demolition materials for purpose of re-use, recycling, composting, or disposal.

3.11 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Clean adjacent streets and driveways of dust, dirt and materials caused by demolition operations.
- .3 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to

commencement of work.

- .4 Upon completion of demolition work, remove debris, trim surfaces and leave work site clean.
- .5 Video storm and sanitary sewers and jet clean where debris may have accumulated

End of Section

ASBESTOS ABATEMENT SPECIFICATIONS
École élémentaire Jeanne-Lajoie
150 Carnforth Road, Toronto, Ontario

ASBESTOS ABATEMENT SPECIFICATIONS

École élémentaire Jeanne-Lajoie

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At Rear:

Drawing No. 30248616-1 - Locations of Work Areas – First Floor Plan

Drawing No. 30248616-2 - Locations of Work Areas – First Floor Plan

Drawing No. 30248616-3 - Locations of Work Areas – Second Floor Plan

Pre-Contamination Inspection Checklist

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Daily Procedures Inspection Checklist

Final Visual Inspection Checklist

Final Air Clearance Test Checklist

Typical Decontamination Enclosures

Asbestos Abatement Electrician's Submittal Form

ASBESTOS ABATEMENT SPECIFICATIONS**École élémentaire Jeanne-Lajoie**

PART 1 – GENERAL**1.1 GENERAL**

- .1 The requirements as set out in these specifications may, at times, exceed the procedures detailed in the various applicable regulations. All work shall be done in compliance with the specifications AND the regulations. Should there be any discrepancy or conflict between the documents, the most stringent shall apply.

1.2 ASBESTOS ABATEMENT OUTLINE OF WORK

- .1 The intent of the work is to remove, and dispose select accessible asbestos-containing materials, to the extent practicable, prior to and during renovation work.
- .2 Replacement of the removed materials is not part of this contract unless otherwise noted.
- .3 Coordinate all work with the General Contractor and sub trades as required.
- .4 Refer to Architectural, Electrical, and Mechanical Drawings and project specifications for additional details and locations.
- .5 Where required, mechanical, electrical, communication and life systems isolations and disconnects will be performed by the General Contractor's sub trades prior to commencement of remedial work.
- .6 The following work will be performed by the General Contractor's sub trades prior to commencement of remedial work:
 - .1 Removal of florescent light tubes in light fixtures in ceiling assemblies slated for demolition by the Asbestos Contractor.
 - .2 Removal of plumbing fixtures, toilet partitions, millwork, school boards, and other attachments, to facilitate asbestos abatement operations.
 - .3 Removal of doors and associated hardware where door frames and associated glazing and framing is slated for demolition by the Asbestos Contractor.
- .7 Electrical hookups of GFI panels and temporary panels for power equipment will be performed by the General Contractor's licensed electrician in compliance to all regulatory requirements and codes.
- .8 Each negative pressure unit shall be integrity tested at the work site prior to commencement of asbestos removal operations.
- .9 Supply and install scaffolding and/or lift equipment in accordance with all applicable regulations, in order to provide sufficient and safe access to the work areas.
- .10 Work may be performed as several separate mobilizations.
- .11 Provide all supervision, labour, equipment, tools, materials, waste management, haulage and disposal, and other services, as required, for undertaking and completing all of the work, as detailed below.

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.12 Work Area 1 - Rooms 126, 129 and C106 (Partial)

- .1 Prepare the areas as indicated above and on the attached floor plans for Type 3 asbestos removal operations.
- .2 Remove and dispose as clean demolition waste, ceramic tile flooring except on raised floor section at urinals in Room 129.
- .3 Remove and dispose as asbestos waste, all ceramic baseboards and ceramic wall tiles on wall sections not slated for demolition. Mortar beds associated with ceramic tile applications are to be completely removed from concrete block walls.
- .4 Remove and dispose the following as asbestos waste:
 - .1 Select concrete block wall sections located behind toilets, urinals and sinks including, but not limited to, ceramic tile applications, concrete block and associated asbestos-containing mortar and underlying materials. The General Contractor will clearly identify all areas for wall removals.
 - .2 Urinals and raised masonry platform at urinals in Room 129 including, but not limited to, porcelain urinals, ceramic tiles applications, concrete, concrete block and associated asbestos-containing mortar and underlying materials.
 - .3 All loose and raised asbestos-containing mortar on remaining concrete block walls exposed by wall demolition operations.
 - .4 Two (2) metal door frames including asbestos-containing mortar that may be attached to and/or inside door frames.
 - .5 All loose and raised asbestos-containing mortar from wall sections in areas where door frames were removed.
- .5 Remove and dispose as asbestos waste, all asbestos-containing thermal insulation that may be present on piping exposed by wall demolition operations. For costing purposes, allow for the removal of asbestos-containing thermal insulation from a total of sixty (60) pipe fittings.

.13 Work Area 2 - Rooms 122, 123 and 123A and 123B

- .1 Prepare the areas as indicated above and on the attached floor plans for a Type 2 Enclosure and Glovebag asbestos removal operations.
- .2 Erect a three-chamber decontamination facility at the entrance to the work areas using wood or steel plates and studs covered with rip-proof polyethylene sheeting on both sides and sealed with duct tape.
- .3 Establish a measurable negative pressure differential in the enclosure work areas by using fan/filter units equipped with High Efficiency Particulate Air (HEPA) filters. Units must be integrity-tested on site and are to be exhausted directly outdoors.
- .4 Remove and dispose the following as clean demolition waste:
 - .1 All vinyl baseboards not attached to drywall walls.

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- .2 Entire ceiling assemblies in Rooms 123A and 123B including, but not limited to, light fixtures, 12" x 12" acoustic ceiling tiles and associated mastic, gypsum board ceiling substates, underlying materials and ceiling support systems.
- .3 All vinyl floor tiles in Rooms 122 and 123A.
- .5 Remove and dispose the following as asbestos waste:
 - .1 Entire ceiling assembly in Room 122 including, but not limited to, light fixtures, 12" x 12" asbestos-containing acoustic ceiling tiles, underlying materials and ceiling support system. Light fixtures and ceiling support system may be disposed as clean demolition waste provided, they are thoroughly cleaned of dust and debris prior to leaving the work areas and being disposed.
 - .2 Entire ceiling assembly in Room 123 including, but not limited to, light fixtures, drywall with asbestos-containing joint compounds, asbestos-containing cement ceiling panels, fiberglass batt insulation with asbestos-containing paper between layers of fiberglass, underlying materials and ceiling support systems. Light fixtures and ceiling support system may be disposed as clean demolition waste provided, they are thoroughly cleaned of dust and debris prior to leaving the work areas and being disposed.
 - .3 All asbestos-containing cement panels applied to walls in Rooms 123 and 123B, vertical pipe enclosure in Room 123, cement wall panel support systems and vertical pipe enclosure framing. Cement wall panel support systems and pipe enclosure framing may be disposed as clean demolition waste provided, they are thoroughly cleaned of dust and debris prior to leaving the work areas and being disposed.
 - .4 All vinyl baseboards on drywall walls.
 - .5 All vinyl floor tiles in Rooms 123 and 123B.
- .6 Remove and dispose as asbestos waste, a section of concrete block wall with asbestos-containing mortar located between Rooms 122 and 123B for a new door opening. If power tools are used to remove concrete block, power tools must be attached to dust collecting devices equipped with HEPA filters. Coordinate with the General Contractor to remove enough concrete block to allow for the new door opening and any masonry support systems that may be required. The General Contractor will clearly identify all areas for concrete block wall removals.
- .7 Inside the enclosure work areas, using glovebags, remove and dispose as asbestos waste, all asbestos-containing thermal insulation on pipe fittings. For costing purposes, allow for the removal of asbestos-containing thermal insulation from a total of one hundred (100) pipe fittings.
- .14 **Work Area 3 – Rooms 202, 205, 209 and 210**
 - .1 Prepare the areas as indicated above and on the attached floor plans for Type 2 Non-Enclosure asbestos removal operations.
 - .2 Remove and dispose the following as clean demolition waste:

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- .1 All vinyl baseboards not attached to drywall walls.
- .2 All non-asbestos-containing vinyl sheet flooring in Room 205.
- .3 Entire ceiling assemblies including, but not limited to, light fixtures, acoustic lay-in ceiling tiles, underlying materials and T-bar ceiling support systems.
- .3 Remove and dispose the following as asbestos waste:
 - .1 All vinyl baseboards attached to drywall walls with asbestos-containing joint compounds.
 - .2 All asbestos-containing vinyl floor tiles in Rooms 202, 209 and 210.
- .15 **Work Area 4 – Entrances S01, S02, S03, S04, S05, S06, S07, S08, S09, S10, S11, S12, and Rooms 124, 136, 137 and 138**
 - .1 Prepare the areas as indicated above and on the attached floor plans for Type 2 Non-Enclosure asbestos removal operations.
 - .2 Remove and dispose as asbestos waste, all metal door frames, thresholds and glazing and associated framing, including asbestos-containing mortar that may be attached to removed materials or present inside door frames. All removed materials may be disposed as clean demolition waste provided, they are thoroughly cleaned of all mortar, dust and debris prior to leaving the work areas and being disposed.
 - .3 Remove and dispose as asbestos waste, all loose and raised asbestos-containing mortar from concrete block walls in areas where door frames, glazing frames and thresholds were removed.
- .16 **Work Area 5– To Be Determined**
 - .1 Prepare locations pre-determined by the General Contractor for Type 2/glovebag asbestos removal operations.
 - .2 Supply and install scaffolding, in accordance with all applicable regulations, in order to provide sufficient and safe access to the work areas.
 - .3 Remove and dispose, as asbestos waste, accessible asbestos-containing thermal insulation applied to select pipe fittings to allow for removal of piping, modifications to mechanical systems and mechanical tie-ins. The General Contractor will clearly mark all locations for thermal insulation removals.
 - .4 For costing purposes, allow for twelve glovebag removal operations of less than one square metre of asbestos thermal insulation per glovebag location and tools, materials, disposal, expenses and labour costs (two workers over a 10-hour shift during regular business hours including travel time) per mobilization. Allow for two (2) separate mobilizations.
- .17 **Work Area 6 – To be Determined**
 - .1 Prepare locations pre-determined by the General Contractor for Type 2 Enclosure asbestos removal operations.

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- .2 Perform localized removal of drywall with asbestos-containing joint compounds and localized removal of concrete block with asbestos-containing mortar to facilitate renovation work.
- .3 Using hand tools and/or power tools attached to dust collecting devices equipped with HEPA filters, remove and dispose as asbestos waste, drywall with asbestos-containing joint compounds and/or concrete block with asbestos-containing mortar.
- .4 For costing purposes allow for allow for tools, materials, disposal, expenses and labour costs (two workers over a 10-hour shift during regular business hours including travel time) per mobilization. Allow for two (2) separate mobilizations
- .18 **Work Area 7 – To be Determined**
 - .1 Prepare locations pre-determined by the General Contractor for Type 2 Non-Enclosure asbestos removal operations.
 - .2 During the rebuild phase, assist the General Contractor’s sub trades in attaching items to concrete block walls with asbestos-containing mortar and/or drywall applications with asbestos-containing joint compounds.
 - .3 Using hand tools or power tools attached to dust collecting devices equipped with HEPA filters, mechanically fasten items supplied by the General Contractor to concrete block walls with asbestos-containing mortar and/or drywall applications with asbestos-containing joint compounds. The General Contractor will supply mechanical fasteners and items to be fastened and will clearly identify locations where attachments are required.
 - .4 For costing purposes allow for allow for tools, materials, disposal, expenses and labour costs (two workers over a 10-hour shift during regular business hours including travel time) per mobilization. Allow for one (1) separate mobilization.
- .19 Mortar in concrete block contains 2.6% chrysotile asbestos. Joint compounds on drywall applications contains 1% chrysotile asbestos. 12” x 12” acoustic ceiling tiles contain 1.3% amosite asbestos. Vinyl floor tiles contain 30.6% chrysotile asbestos. Cement wall and ceiling panels contain 35% chrysotile asbestos. Paper between layers of fiberglass insulation in fiberglass batt insulation contains 57.2% chrysotile. Thermal insulation on pipe fittings contains 40% chrysotile asbestos.
- .20 All waste is to be removed from the site and disposed. Asbestos waste disposal bins are not to be left on School property unless fully enclosed with an integral metal roof system and a lockable metal door system which must be kept locked at all times. Disposal bins must be removed immediately on completion of work.
- .21 **Schedule**
 - .1 Mobilization To be Coordinated with the General Contractor
 - .2 Complete Work and Demobilization To be Coordinated with the General Contractor

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1.3 GENERAL REQUIREMENTS

- .1 The location and availability of utilities including water, sewer and electrical power is to be determined on site. The Asbestos Contractor shall co-operate with all others on site. Should there be any disagreement, or should Contractors be unable to reach a satisfactory working arrangement, the Arcadis Professional Services (Canada) Inc. Consultant shall determine the manner for proceeding. The Asbestos Contractor shall not be entitled to any additional payment.
- .2 The General Contractor is responsible for all electrical connects and disconnects. All work must be performed by a licensed electrician in compliance to all regulatory requirements and codes.
- .3 The Asbestos Contractor is responsible for making all arrangements, and for paying for the disposal of all waste materials in accordance to all applicable government laws and regulations including local, provincial and federal.
- .4 The Asbestos Contractor is advised that extended hours of work may be required to meet the schedules as detailed in the Scope of Work and shall allow for the cost thereof including shift premiums and overtime. The Arcadis Professional Services (Canada) Inc. Consultant shall be advised in writing at least four days in advance of the proposed working hours.
- .5 The Asbestos Contractor shall furnish and post on site the name and current phone number of an authorized representative(s) who can be contacted on a 24-hour basis in case of an emergency.
- .6 All precautions will be taken to prevent the spread of contaminated material and to protect all parties including Asbestos Contractor's personnel, Owner's employees and the public from asbestos dust exposure during the course of the work. The documents outline the minimum levels of precaution to be taken.
- .7 All work in work areas that are confined spaces shall comply with all requirements respecting confined spaces specified in O. Reg. 632/05, as amended 346/15, November 26, 2015.
- .8 **All work shall be done in compliance with the specifications and the Ontario Regulation 278/05 – Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations – made under the Occupational Health and Safety Act.** Should there be any discrepancy or conflict between the documents, the most stringent shall apply.
- .9 Contract conditions include, but are not limited to, complying with all Regulations, taking all precautions necessary to control the release of asbestos fibres within the work areas, preventing the release of asbestos fibres outside the work areas, and providing appropriate protection from exposure to asbestos fibres for all parties. Failure to meet any of these conditions will be considered a fundamental breach of the Contract.

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- .10 The Arcadis Professional Services (Canada) Inc. Consultant will visit the site at his/her discretion to familiarize himself/herself with the progress and quality of the Work and to determine if the Work is proceeding in accordance with the Contract Documents.
- .11 The Arcadis Professional Services (Canada) Inc. Consultant shall have the authority to immediately stop the Work through a written instruction if, in his opinion, the Work does not conform to the requirements of the Contract Documents, or if continuance of the Work could subject the Owner, his employees or the public to a hazardous condition. The Work shall not recommence until such time as the deficiency or hazardous situation has been corrected and a written notice to proceed has been issued by the Arcadis Professional Services (Canada) Inc. Consultant.
- .12 If the Asbestos Contractor fails to comply with requirements dealing with the control of asbestos fibres and the health and safety of Asbestos Contractor employees, Arcadis Professional Services (Canada) Inc. Consultant and Owner personnel or the Public, the Owner, or the Owner's representative, may verbally instruct the Asbestos Contractor to cease work immediately with written confirmation to follow within two working days. If the Arcadis Professional Services (Canada) Inc. Consultant gives a written statement to the Owner and the Asbestos Contractor that sufficient cause exists, the Owner may notify the Asbestos Contractor in writing that he is in default of his contractual obligations.
- .13 Any employee shall be replaced, at the written request of the Arcadis Professional Services (Canada) Inc. Consultant, if working, or causing others to work, in violation of O.Reg. 278/05.
- .14 The Asbestos Contractor's insurance coverage limits, per occurrence, shall equal or exceed the following and shall name the Owner, the General Contractor and Arcadis Professional Services (Canada) Inc. as additional insureds:
- .1 General Liability \$5 million;
 - .2 Automotive Liability \$2 million;
 - .3 Pollution Liability \$5 million including asbestos operations.
- .15 The supervisor must have proven experience and proficiency in the type of Work being undertaken under this Contract.
- .16 The supervisor shall be replaced, at the written request of the Arcadis Professional Services (Canada) Inc. Consultant, if found to be incompetent or inattentive to the needs of the project.
- .17 Where standards of performance are specified or implied and the Work does not comply with the performance specified or implied, such deficiencies shall be corrected as directed by the Arcadis Professional Services (Canada) Inc. Consultant. Any subsequent testing shall be done at the Asbestos Contractor's expense.

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1.4 DEFINITIONS**.1 HEPA Vacuum:**

- .1 High Efficiency Particulate Aerosol (HEPA) filtered vacuum equipment acceptable to Health and Welfare Canada and meeting U.S. Military Standard 282. This vacuum equipment shall have a filtering system capable of collecting and retaining asbestos fibres to an efficiency of 99.97% for fibres of 0.3 micrometer or larger.

.2 Polyethylene sheeting sealed with tape:

- .1 Polyethylene sheeting of thickness specified sealed with tape along all edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from water damage or damage by sealants, and to prevent escape of asbestos fibres through the sheeting into a clean area.

.3 Inspector:

- .1 Representative of Arcadis Professional Services (Canada) Inc. designated by the owner to provide inspection and air monitoring of the Contractor's work.

.4 Authorized Visitor:

- .1 Representative of the building owner, Arcadis Professional Services (Canada) Inc., and/or persons representing regulatory agencies.

.5 Amended Water:

- .1 Water with a non-ionic surfactant added to reduce water tension to allow thorough wetting of asbestos fibres.

.6 Airlock:

- .1 A system for permitting ingress or egress without permitting air movement between a contaminated area and an uncontaminated area typically consisting of two curtained doorways at least 1.5 m apart.

.7 Curtained Doorways:

- .1 An arrangement of closures to allow ingress and egress from one room to another while permitting minimal air movement between rooms, typically constructed by placing two overlapping sheets of polyethylene over an existing or temporarily framed doorway, securing each along the top of the doorway, securing the vertical edge of one sheet along one vertical side of the doorway and securing the vertical edge of the other sheet along the opposite vertical side of the doorway.

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- .2 All free edges of polyethylene shall be reinforced with duct tape and the bottom edge shall be weighted to ensure proper closing. Each polyethylene sheet shall overlap openings an additional 1/3 of the doorway width.

- .8 *Operating Area:*
 - .1 Area where no removal or repair Work is underway.

- .9 *Clean Area:*
 - .1 Either an operating area or an area in which removal Work has already been completed.

- .10 *Work Area:*
 - .1 Where the actual removal of asbestos-containing materials take place.

- .11 *Negative Pressure:*
 - .1 A system which extracts air from the work area and discharges this air directly outside the building, sufficient to maintain a minimum pressure differential of 0.5 mm (0.02 inch) of water column relative to adjacent areas outside of work areas. This air extraction system is to be equipped with a High Efficiency Particulate Aerosol filtering system before discharge.

- .12 *Confined Space:*
 - .1 A fully or partially enclosed space,
 - .1 that is not both designed and constructed for continuous human occupancy, and
 - .2 in which atmospheric hazards may occur because of its construction, location or contents or because of work that is done in it.

1.5 REGULATORY AGENCIES

- .1 Comply with Federal, Provincial, and local requirements pertaining to asbestos, provided that in any case of conflict among those requirements or with these Specifications the more stringent requirement shall apply. These include, but are not limited to, the following:
 - .1 Ontario Ministry of Labour, Occupational Health and Safety Division, *Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations*, O. Reg. 278/05, as amended 62/18, March 2, 2018 – made under the *Occupational Health and Safety Act, R.S.O. 1990, c. E. 19, as amended*.

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- .2 Ontario Ministry of the Environment *Regulation 347* under the Environmental Protection Act, 19 as amended by O. Reg. 509/21, June 30, 2021.
 - .2 Government of Canada *Regulations Respecting the Handling, Offering for Transport and Transporting of Dangerous Goods*. (Extract from the Canada Gazette Part II, dated February 6, 1985.)
 - .3 Government of Ontario *Occupational Health and Safety Act, -R.S.O. 1990, c. E. 19, as amended, and Regulations for Construction Projects* O. Reg. 213/91, as amended.
 - .4 Office of the Fire Commissioner of Canada.
 - .5 Ontario Electrical Safety Code.
 - .6 Government of Ontario, Building Code O. Reg. 332/12, as amended 137/19, May 2, 2019.
- .2 *Patents:*
- .1 It shall be the Contractor's responsibility to ensure that all applicable patent laws are complied with.

1.6 FIRE SAFETY PLAN

- .1 Prior to initiating any work on the site, the Contractor shall prepare and submit in writing to the Arcadis Professional Services (Canada) Inc. Consultant a Fire Safety Plan. The Plan shall be in accordance to the requirements set forth in Section 2.14, Construction and Demolition Sites, of the National Fire Code and shall include:
 - .1 the designation and organization of site personnel to carry out fire safety duties, including fire water services if applicable;
 - .2 the emergency procedures to be used in the case of fire, including:
 - .1 sounding the fire alarm;
 - .2 notifying the fire department;
 - .3 instructing site personnel on procedures to be followed when the alarm sounds; and
 - .4 firefighting procedures;
 - .3 the control of fire hazards in and around the building;
 - .4 maintenance of firefighting facilities; and

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- .5 special requirements as may be identified by the building owner.
- .2 Implementation of the Fire Safety Plan shall be the sole responsibility of the Contractor, and the above shall, in no way, limit the Contractor's statutory and regulatory obligations. During the work, the Fire Safety Plan shall be prominently displayed at the site and its requirements included in site safety training and awareness programs.

1.7 SUBMITTALS**1.7.1 Submittals Before Commencing Work**

- .1 The following documentation shall be submitted to the Inspector with a dated covering letter listing attachments a minimum 48 hours prior to commencement of the Work:

- .1 *Permits and Notifications:*

- .1 All necessary permits for transporting and disposal of asbestos waste. Submit proof satisfactory to Inspector that suitable arrangements have been made to receive and properly dispose of asbestos waste. Copies of all Notifications required by Section 1.11.

- .2 *Safety Data Sheets:*

- .1 Safety Data Sheets, or equivalent, for any sealant, surfactant or other material proposed for use. Include a separate attachment for each sheet indicating the specific worker protective equipment proposed for use with the material indicated.

- .3 *Supervisory Personnel:*

- .1 Names of supervisory personnel who will be responsible for work area(s). **One of these supervisors must remain on site at all times asbestos removal or cleanup is occurring.** Submit proof that supervisory personnel have over 2000 hours experience on asbestos abatement projects, have performed supervisory functions on at least two other asbestos projects and have achieved the level of training as set out by the Regulation.

- .4 *Schedule:*

- .1 Provide a bar chart indicating planned progress for critical activities as required under **Scope of Work** as well as additional information listed below a minimum of 48 hours prior to commencement of any preparatory work indicating:

- .1 shifts to be worked;

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- .2 proposed workforce;
 - .3 starting date;
 - .4 estimated date of commencement of asbestos removal;
 - .5 estimated date of completion of asbestos removal;
 - .6 estimated completion date.
- .5 *Insurance:*
- .1 Provide a Certificate signed by the insurance agency naming the Owner, the General Contractor and Arcadis Professional Services (Canada) Inc. as co-insureds.
 - 2. The Asbestos Contractor's insurance coverage limits, per occurrence, shall equal or exceed the following:
 - .1 General Liability \$5 million;
 - .2 Automotive Liability \$2 million;
 - .3 Pollution Liability \$5 million including asbestos operations.
 - .3 The Asbestos Contractor must provide thirty (30) days' notice of cancellation or amendment of coverage.
- .6 *Fire Safety Plan:*
- .1 In accordance to Article 1.6 above.
- .7 *Confined Space:*
- .1 If a work area, or part thereof, is a confined space, the contractor shall submit:
 - .1 a co-ordination document (see Section 1.13.1.1);
 - .2 a written program (see Section 1.13.1.2);
 - .3 a written plan (see Section 1.13.1.4).

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.8 Asbestos Training:**.1 A letter certifying that:**

(a) every worker involved in a Type 3 operation has successfully completed the Asbestos Abatement Worker Training Program approved by the Ministry of Training, Colleges and Universities; and

(b) every supervisor of a worker involved in a Type 3 operation has successfully completed the Asbestos Abatement Supervisor Training Program approved by the Ministry of Training, Colleges and Universities. O.Reg. 278/05, s. 20(1).

1.7.2 Submittals Before Commencing Asbestos Removal

- .1 Results of negative pressure unit integrity tests.
- .2 Proposed Work Area emergency exit procedures.
- .3 Proposed locations of decontamination facilities and negative pressure units and exhaust routing.
- .4 Evidence (letter or other suitable documentation) of proper construction, inspection and installation of GFI panel by licensed electrician in compliance to all regulatory requirements and codes.

1.7.3 Submittals Upon Completion of Work

- .1 Asbestos waste haulage and disposal documentations including Bills of Lading, waste transfer documents and dump receipts.
- .2 All documentation as specified in the contract General Conditions including, but not limited to, Workplace Safety and Insurance Board Certificate, Statutory Declarations and Proof of Publication of Substantial Performance.

1.8 EXISTING CONDITIONS

- .1 Mortar in concrete block contains 2.6% chrysotile asbestos. Joint compounds on drywall applications contains 1% chrysotile asbestos. 12" x 12" acoustic ceiling tiles contain 1.3% amosite asbestos. Vinyl floor tiles contain 30.6% chrysotile asbestos. Cement wall and ceiling panels contain 35% chrysotile asbestos. Paper between layers of fiberglass insulation in fiberglass batt insulation contains 57.2% chrysotile. Thermal insulation on pipe fittings contains 40% chrysotile asbestos.
- .2 Existing conditions are documented in a report prepared by Arcadis Professional Services (Canada) Inc. for the Conseil scolaire Viamonde titled "*Designated Substances Survey - Pre-*

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Renovation, École élémentaire Jeanne-Lajoie, 150 Carnforth Road, Toronto, Ontario dated March 24, 2025, which is included with the request for quotation documents.

- .3 Masonry applications and other building materials may contain silica. Paint applications contain lead. Appropriate dust control procedures and respiratory protective equipment are to be used if disturbing these materials.

1.9 RESTRICTIONS

- .1 Do not allow smoking, eating or drinking in the work area.
- .2 Do not allow entry to work area by unauthorized persons.
- .3 Compressed air shall not be used in the work area.
- .4 Open flames will not be permitted in the work area (including but not limited to torches and propane-fired heaters).

1.10 WORKER PROTECTION**.1 Instructions:**

- .1 Before commencing Work, instruct workers in all aspects of work procedures and protective measures.

.2 Respiratory Protection:

- .1 Provide workers with personally issued and marked respiratory equipment acceptable to the Occupational Health and Safety Division of the Ontario Ministry of Labour, suitable for the asbestos exposure in the work area.
- .2 Ensure that suitable respiratory protective equipment is worn by every worker who enters the work area. A respirator provided by an employer and used by a worker:
 - .1 shall be in accordance to O.Reg. 278/05, Section 13, respirators;
 - .2 shall be fitted so that there is an effective seal between the respirator and the worker's face;
 - .3 shall be assigned to a worker for the worker's exclusive use;
 - .4 shall be used and maintained in accordance with the procedures specified by the equipment manufacturer;
 - .5 shall be cleaned, disinfected and inspected after use on each shift, or more often if necessary;

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- .6 shall have damaged or deteriorated parts replaced prior to being used by a worker; and
 - .7 when not in use, shall be stored in a convenient, clean and sanitary location.
- .3 *Protective Clothing:*
- .1 Provide workers with protective clothing which shall:
 - .1 be worn by every worker who enters the work area;
 - .2 be made of a material which does not readily retain nor permit penetration of asbestos fibres;
 - .3 consist of full body covering including head covering with snug fitting cuffs at the wrists, ankles and neck;
 - .4 include suitable footwear; and
 - .5 be repaired or replaced if torn.

1.11 NOTIFICATIONS

- .1 Notify, in writing, the local Fire Department of the extent of the work, including a copy of the Fire Safety Plan detailed in Article 1.6 above.
- .2 Notify, orally and in writing, an inspector at the office of the Ministry of Labour nearest the work place of the operation. O.Reg. 278/05, Section 11.
 - .1 The written notice required by subsection (1) shall set out:
 - .1 the name and address of the person giving the notice;
 - .2 the name and address of the owner of the place where the work will be carried out;
 - .3 the municipal address or other description of the place where the work will be carried out sufficient to permit the inspector to locate the place, including the location with respect to the nearest public highway;
 - .4 a description of the work that will be carried out;
 - .5 the starting date and expected duration of the work; and
 - .6 the name and address of the supervisor in charge of the work.

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- .3 Notify the Inspector a minimum of eight hours prior to initiation of the following phases of the project:
- .1 commencement of asbestos removal;
 - .2 commencement of sealant application;
 - .3 dismantling of the enclosure; and
 - .4 removing asbestos waste from the work area.

1.12 PROTECTION, REPAIR AND REPLACEMENT OF EQUIPMENT AND MATERIALS

- .1 All equipment within and surrounding the work area shall be suitably protected by the Contractor during the work periods.
- .2 All equipment damaged by the Contractor shall be replaced by the Contractor at no additional cost to the Owner.

1.13 CONFINED SPACES

Not Applicable.

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2.0 PART 2 – PRODUCTS**2.1 MATERIALS****.1 Polyethylene:**

- .1 In 0.15 mm (6 mil) minimum thickness unless otherwise specified; in sheet size to minimize joints.

.2 Tape:

- .1 Reinforced duct tape suitable for sealing polyethylene under both wet conditions using amended water, and dry conditions.

.3 Wetting Agent:

- .1 50% polyoxethylene ester and 50% polyglycol or polyxyethylene ether, or equivalent approved product, and shall be mixed with water to a concentration to provide adequate penetration and wetting of asbestos-containing material.

.4 Asbestos Waste Receptors:

- .1 0.15 mm (6 mil) minimum thickness appropriately labelled, sealable polyethylene bags and 0.15 mm (6 mil) minimum thickness sealable clear polyethylene bags.

.5 Rip-Proof Polyethylene:

- .1 0.20 mm (8 mil) fabric made up from 0.13 mm (5 mil) weave and 2 layers 0.04 mm (1.5 mil) poly laminate, in sheet size to minimize joints.

.6 Sealant:

- .1 Slow-drying sealant which remains tacky on surface for a minimum of 8 hours for purpose of trapping residual airborne fibre during settling period. Product must have flame spread and smoke development ratings both less than 50. **Product shall leave a clear finish when dry. Acceptable products “Childers Chil-Lock CP-240” or equivalent.**

2.2 EQUIPMENT

- .1 All equipment brought on site must be thoroughly clean and free of all fibre, asbestos or otherwise, to the satisfaction of the Field Inspector. The Contractor will be fully responsible for the replacement of equipment rejected by the Inspector and for all costs resulting from site contamination due to dirty or faulty equipment.

.2 Airless Sprayer:

- .1 Spray equipment for the application of amended water and sealant such as Graco Hydrospray or equivalent:

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- .1 Fine atomizing spray nozzle: Nozzle for airless sprayer capable of delivering not less than 4.5 L per minute of fine particle spray of amended water.

- .3 *Garden Sprayer:*
 - .1 Hand pump-type pressure-can garden sprayer fabricated out of either metal or plastic equipped with a wand at the end of a hose that can deliver a stream or spray of liquid under pressure. **Only to be used on small removal and repair projects with the approval of the site inspector.**

- .4 *HEPA Vacuum:*
 - .1 High Efficiency Particulate Aerosol filtered vacuum equipment. Must have a filtering system capable of collecting and retaining asbestos fibres to an efficiency of 99.97% for fibres of 0.3 um or larger. HEPA filters must have been individually tested and certified by the manufacturer.
 - .2 All HEPA vacuums brought onto the job site shall be visibly clean, shall be in a good state of repair and shall be maintained in such state through completion of the project.

- .5 *Glovebag:*
 - .1 Prefabricated, purposely made, 0.20 mm minimum thickness, polyvinyl chloride bag with integral 0.25 mm thick polyvinyl chloride gloves.
 - .2 Bag equipped with reversible double-pull, double-throw zipper on top to facilitate installation on pipe and progressive movement along pipe, with straps for sealing ends of bag around pipe, and with plastic flap under zipper for strength on pipe and to provide effective seal and with "ziploc" feature. Bags shall be secured using manufacturer's prescribed securing devices. Approval must be obtained from the Inspector for use of Glovebox. Bag must be acceptable to the Inspector for use.
 - .3 Bag must have valves to allow insertion of a vacuum hose and the nozzle of a water sprayer while maintaining the seal to the pipe, duct or similar structure.

- .6 *Negative Pressure Units:*
 - .1 Exhaust units fitted with High Efficiency Particulate Aerosol (HEPA) filters used to effect a negative pressure differential in the work area as compared to the immediate surrounding or clean area. The filtering system must be capable of collecting and retaining asbestos fibres to an efficiency of 99.97% for fibres of 0.3 um or larger. The HEPA filters must have been individually tested and certified by the manufacturer and bear a label certifying performance. The unit is to be fitted with instrumentation to indicate pressure differential across the HEPA filter with an audible alarm to sound at a preset low differential pressure.

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- .2 Construction of HEPA filter/fan cabinet units shall be airtight, and all joints shall be caulked. The gasket seal between the filter housing and the retaining frame inside the cabinet shall provide a zero-leakage seal to avoid filter bypassing.
- .3 **Each negative pressure unit shall be integrity tested at the work site prior to commencement of asbestos removal.** The procedure must include the testing of the integrity of the entire cabinet. Written confirmation of the test results are to be provided to the Inspector. Retesting may be requested by the Inspector and performed by the Contractor should the unit be damaged or modified during the work.
- .7 *Differential Pressure Recorder:*
- .1 Instrument to monitor and record the differential pressure between the Work Area and Clean Area.
- .1 sensitivity: 0.025 mm (0.001 inches) WC increments between +0.25 mm to -2.5 mm (+0.010 to -0.100 inches) WC
- .2 accuracy: +/- 1 %
- .3 pressure alarms: audible high and low level alarm programmable within operating range
- .4 printout: minimum 24 hr period at 15-minute intervals
- .8 *Ground Fault Panel:*
- .1 Electrical Panel equipped with ground fault circuit breakers of sufficient capacity to power all electrical equipment and lights in work area. All breakers shall have 5 mA ground fault protection. Panel should be complete with all necessary accessories including ground fault interrupter lights, test switch to ensure unit is working, and reset switch. Ground fault receptacles on extension cords shall not be used without written authorization by the Arcadis Professional Services (Canada) Inc. Consultant.
- .2 The GFI Panel must be constructed under the direction of a licensed Electrician and inspected by a licensed Electrician on a regular basis. Evidence of such construction and inspection shall be submitted to the Arcadis Professional Services (Canada) Inc. Consultant prior to installation of the Panel on site.

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3.0 PART 3 – EXECUTION**3.1 MAJOR ASBESTOS WORK (TYPE 3 OPERATIONS)****3.1.1 Plumbing and Drainage**

- .1 Provide a constant supply of water by means of copper or PVC pipe, fittings and valves to the worker area, equipment decontamination room and the shower facility. High pressure hose with appropriate connections may be used with the approval of the Inspector. A master shut-off valve shall be installed adjacent to, and on the clean side, of the decontamination facility. Any hose and hose connections must have a high-pressure rating and be limited to downstream of the master shut-off valve and are not to be left under pressure unattended.
- .2 The Contractor is responsible for the supply of a potable water source. There is no water in the building.
- .3 The effluent from the shower may be disposed of, through a filter, to the sanitary sewer, location to be determined during the pre-tender site visit. Only shower water may be disposed in this fashion, no asbestos-containing debris, cleaning solutions, encapsulants, sealants, body wastes, etc., may be disposed in the shower. The Contractor is responsible for all tie-ins to the existing systems and making good on completion. Free flowing shower effluent on to the floor or ground is not acceptable.
- .4 **All Work shall be carried out in accordance to the Ontario Plumbing Code.**

3.1.2 Electrical

- .1 The Contractor shall become completely familiar with the existing electrical installation during the site visit and pre-tender period.
- .2 The Contractor is responsible to provide and install all electrical requirements for the project including but not limited to:
 - .1 de-energize and lockout all electrical circuits in the work area wherever practicable;
 - .2 identify all systems that cannot be de-energized, and all low voltage systems such as controls and alarms;
 - .3 identify any electrical conditions which need special protection or consideration during the work;
 - .4 disconnect, if practicable, or provide suitable protection for, smoke and heat detectors, if any, and advise the authorities;
 - .5 protect existing electrical equipment including but not limited to: transformers, circuit breakers, switch gear, panels, buss ducts, fixtures, conduits, etc, within the work

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area, de-energized or not. Cover with a minimum of two independently sealed layers of poly, at least one of the layers to be of reinforced poly;

- .6 provide all additional transformers, circuit breakers, switch gear, panels, ground fault protection and temporary lighting required for the project. The ground fault panel is to have sufficient capacity to service the project needs and have two spare circuits to serve as backup. The work area lighting is to provide appropriate levels of illumination for the work, with a minimum of two separate circuits. Bulbs are to be fitted with cages or other suitable protection against breakage and/or direct contact with insulation materials (wood, plastic, etc.).
- .7 All electrical power within the work area must be ground fault protected. Refer to Section 2.2.8, *Ground Fault Panel*.
 - .1 The power cable to the Ground Fault Panel and the panel itself is not protected by interruptor and as such it must be located outside the work area or suitably protected from water and physical damage.
 - .2 All Work shall be performed by a licensed electrician and comply with the latest edition of the Ontario Electrical Safety Code and any other local codes and requirements which may govern the installation. The Contractor is responsible for, and shall arrange for, all inspections and approvals which may be required by government regulations, Electrical Safety Authority (ESA) or any other authorities having jurisdiction. The Client is to receive copies of all inspection reports.

3.1.3 Fire Prevention / Site Security

- .1 Contact and co-operate with Owner's fire/security monitoring agency to identify impact of project on existing system with the intent of maintaining existing protection. The Owner will assume service costs for the monitoring agency.
- .2 Advise local fire department of the nature and extent of the work.
- .3 Heat Detectors:
 - .1 Protect and seal heat detectors with 0.04 mm (1.5 mil) polyethylene, sealed with tape. Tape is not to interfere with function of the unit.
 - .2 System is to be activated and deactivated as arranged with monitoring agency and Owner's Representative with the intent of leaving the entire system active when the Contractor is not on site.
 - .3 Provide an emergency name and contact number to the monitoring agency.

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3.1.4 Decontamination Facilities

- .1 Proposed locations of Decontamination Enclosure Systems are to be determined during the prestart site review. The facility must be of adequate size and construction to suit the requirements of the project. The owner may have restrictions on the location of the facilities. The worker decontamination enclosure system shall be kept separate from the waste and equipment transfer system.
- .2 Workers' Decontamination Enclosure System:
 - .1 The Worker Decontamination Enclosure System shall comprise of a serial arrangement of three separate compartments including a Clean Change Room, a Shower Room and a Contaminated Change Room with an air lock separating each area. The purpose of this system is to provide a means of entry into the work area and allow decontamination of personnel and small tools on exit.
 - .1 *Clean Change Room:* Build a clean room between the shower room and clean areas outside of enclosures, with one airlock to the shower room. Provide lockers for workers' street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install a mirror to permit workers to fit respiratory equipment properly; provide sufficient hangers and hooks; provide a bench or chairs. Install a lockable door and lock at the entrance to the clean room and provide a key to the Inspector.
 - .2 *Shower Room:* Build a shower room between the Equipment and Access Room, with two airlocks, one to the clean room and one to the Equipment and Access Room. Provide one shower for every five workers. **Only 'walk through' shower units are acceptable.**
 - .3 Provide a constant supply of hot and cold water. The shower room shall have individual controls inside the room to regulate water flow and temperature.
 - .4 Provide piping and connect to water sources and drains. Provide soap and appropriate containers for disposal of used respirator filters. Note that workers may provide their own towels as these are not contaminated and may be removed from the site for cleaning.
 - .5 *Contaminated Change Room:* Build an Equipment and Access Room between the shower room and the work areas, with one airlock to the shower room. Install storage facilities for workers' shoes and any protective clothing to be reworn in work areas. Provide for disposal of used coveralls.
 - .6 The Contaminated Change Room shall be large enough to accommodate specified facilities, any other equipment needed, and at least one worker allowing him sufficient space to undress comfortably.

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- .3 Waste and Equipment Decontamination Enclosure System (Waste Load-Out).
 - .1 The drum and equipment decontamination enclosure system shall comprise of a serial arrangement of three separate compartments including a Clean Room, a Central Handling Area and a Washing area with an air lock between each area. The purpose of this system is to provide a means to decontaminate and remove waste from the work area. Large equipment is to remain in the work area for the duration.
 - .1 *Clean Room:* Build a clean room between the Central Handling Area and the clean area with a plastic double airlock separating the two areas. The clean room shall be of sufficient size to accommodate at least ten waste receptors and the largest item of equipment used. Install a lockable door and lock at the entrance to the clean room and provide a key to the Inspector.
 - .2 *Central Handling Area:* Build a handling room between the Clean Room and the Washing Area with a plastic double airlock separating the two areas. The handling room shall be of sufficient size to accommodate at least ten waste receptors and the largest item of equipment used.
 - .3 *Washing Area:* Build a washroom between the Central Handling Area and the work area with one airlock to the Central Handling Area. Provide water for cleaning which is to be disposed as asbestos waste.
- .4 Construction of Decontamination Enclosures:
 - .1 Build suitable framing for enclosures or use existing rooms, where convenient and permitted, and line with polyethylene sheeting sealed with tape. Use minimum of one layer of clear, rip-proof polyethylene on floors and two layers (one on each side of the framing) of dark 0.15 mm (6 mil) polyethylene on walls and ceiling.

Temporary framing shall be constructed of 50 mm x 100 mm studs at 600 mm centres.
 - .2 Construct airlocks between rooms.
 - .3 Clearly mark the exits from the work area.
 - .4 Post warning signs at all entrances to the work area and on the outside of all walls enclosing each work area. Submit proposed emergency exit procedures for review and approval by the Inspector prior to contamination of the work area.
- .5 Separation of Work Areas with **Temporary Partitions:**
 - .1 Separate parts of the building not included in the asbestos abatement program from parts of the building used for asbestos abatement by means of an airtight and tamper resistant barrier constructed from floor to ceiling as follows:

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- .1 Build suitable temporary lumber stud framing constructed of 50 mm x 100 mm Spruce studs at 600 mm centres.
- .2 Caulk edges of partition both sides at floor, ceiling, walls and fixtures to form an air tight and watertight seal. Duct tape is a suitable alternative.
- .3 Cover framing with two layers of 0.15 mm (6 mil) polyethylene, one on each side of studs. Apply new 12 mm (1/2 inch) gypsum board or 6 mm (1/4 inch) plywood from top to bottom of the barrier on the occupied (clean) side secured with screws and nails.

3.1.5 Work Area Preparation

- .1 Remove moveable objects to a designated temporary location in the building unless the Scope of Work specifies this work to be done by others.
- .2 Isolate air handling and ventilation systems to prevent contamination and fibre dispersal to other areas of the building during the work phase.
 - .1 There may be ventilation ducts above the ceiling assembly which must be accessed, visually inspected for openings and sealed prior to contaminating the work area. If, in the opinion of the Inspector, there is a significant amount of asbestos material on the ceiling assembly, access is to be restricted until all other preparations are complete.
 - .2 The mechanical ventilation system serving the work area shall be disabled and locked out and all openings, diffusers, grills or voids in the work area shall be sealed with rip proof polyethylene and tape independent of wall polyethylene.
- .3 Protect all existing electrical equipment to be left in place during the work including fixtures, panels, transformers, switch gear, motors and boxes located within the work area: Cover with a minimum of 2 independently sealed layers of polyethylene sealed with duct tape. At least one of the layers shall be rip proof polyethylene.
- .4 Protect all wall hangings, fixtures, equipment, and other items which could not be relocated from the work area with 0.15 mm (6 mil) polyethylene sealed with tape independent of wall or floor polyethylene.
- .5 Secure from the inside and seal independently, prior to applying the wall polyethylene, all openings including doors, windows, hatches, etc., leading into the work area from an occupied area or from outside. Polyethylene used to seal windows to public or occupied areas is to be opaque.
- .6 Seal all penetrations including pipe, conduit and duct openings, drains, etc., with polyethylene and duct tape independent of floor or wall polyethylene.

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- .1 There may be penetrations or equipment requiring protection above the ceiling assembly which must be accessed, visually inspected and sealed prior to contaminating the work area. If, in the opinion of the Inspector, there is a significant amount of asbestos material on the ceiling assembly, access is to be restricted until all other preparations are complete.
- .7 Protect floors with rip proof polyethylene sheeting sealed with tape except areas requiring floor tile removal. Extend polyethylene at least 300 mm (12 inches) up the walls. Overlap adjoining sheets of polyethylene by at least one foot.
 - .1 Protect any floor rugs which are to remain in place from damage by using a minimum second layer of rip-proof poly taped and sealed independently.
 - .2 Water leakage during the removal operation may not be confirmed until the work is complete and can result in contamination of the rug with asbestos fibres carried in the water as well as permanent staining or damage of the material. Should a rug be left in place during the work it must be thoroughly vacuumed with HEPA equipment and steam cleaned at the completion of the project. The Contractor is responsible for cleaning, repair or replacement of floor covering to the satisfaction of the Inspector. The Contractor may elect to provide additional protection.
- .8 Protect walls and all other internal surfaces not specifically mentioned earlier with one layer of 0.15 mm (6 mil) clear polyethylene. The polyethylene shall extend to within six inches of ceiling height and shall be attached carefully to avoid disturbing asbestos-containing material. Overlap adjoining sheets of polyethylene by at least 300 mm.
- .9 Polyethylene sheeting shall be suitably braced and/or restrained so that subsequent application of a negative pressure differential in the work area does not cause excessive billowing or failure of the polyethylene or taped joints. Walls with masonry finish (brick or block) may require 25 mm x 50 mm (1" x 2") straps as bracing for the wall protection.
- .10 Ensure that polyethylene near a heat source is a flame-resistant type.
- .11 Spray adhesive is not to be applied directly on to floor or wall finishes.
- .12 Install the negative air pressure system, which includes a minimum of 1 backup unit for every 4 units installed. Exhaust air to the outside of the building. Submit proposed locations of negative pressure units and exhaust routing to the Inspector for review and approval.
 - .1 The exhaust from the unit to the outside of the building is to be airtight and constructed of wire-reinforced flexible or rigid duct. Each end, at the unit and at the outlet, and the penetration through the isolation barrier or enclosure, is to be mechanically secured (duct tape is not considered adequate). The outlet is to be shielded from the weather and have a mesh to prevent introduction of foreign objects. The Contractor is to ensure that the building remains secure from intrusion by others.

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- .2 Each unit is to be DOP tested at the work site prior to commencing asbestos removal. The procedure is to include the testing of the integrity of the entire cabinet. Retesting is required if the unit is damaged or modified during the work.
- .3 Switch the negative air pressure system to the "ON" mode and operate continuously until completion of the work, including final cleanup. Provide continuous monitoring of pressure difference using an automatic instrument. The monitor gauge shall be located outside the work area enclosure. A minimum air pressure of 0.5 mm (0.02 inches) water gauge is to be achieved and maintained within the work enclosure relative to the adjacent uncontaminated areas at all times.

3.1.6 Worker Protection

- .1 Instructions:
 - .1 Before commencing Work, instruct workers in all aspects of work procedures and protective measures.
- .2 Respiratory Protection: (refer to Section 1.10.2).
- .3 Protective Clothing: (refer to Section 1.10.3).
- .4 Entering the Work Area:
 - .1 Remove all street clothing in the Clean Room.
 - .2 Put on clean disposable coveralls.
 - .3 Inspect and put on respiratory protection. Note that respirator head straps are to be under the head covering as the respirator is removed last.
 - .4 Enter work area through Shower Room and Equipment and Access Room. Put on work boots and other items left in contamination.
- .5 Leaving the Work Area:
 - .1 Before exiting the work area, remove visible debris from clothing, footwear, hard hats and the outside of respirators by using a HEPA vacuum or wet wiping.
 - .2 Proceed to the Equipment and Access Room and remove boots and other items to be left in contamination, remove disposable coverall and place in container for disposal. Respirator is not to be disturbed during this operation.
 - .3 Wearing only the respirator, enter the Shower Room, wet the respirator in the shower before removing by facing the shower nozzle and remove. If applicable, remove the filters and dispose in container. If filters are to be reused, seal openings with provided plugs or duct tape to prevent release of fibre and hand out respirator

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to the Clean Room. Proceed to wash thoroughly with soap and shampoo prior to entering the Clean Room.

- .4 Items left in the Equipment and Access Area may be removed by cleaning at completion of the project, disposed as waste, or sealed in plastic and taken to another contaminated area.
 - .1 At no time is more than one airlock in the three room serial arrangement to be opened during the passage of workers.
 - .2 Once in the contaminated work area, leaving the area must include full procedures as listed above.

3.1.7 Pre-contamination Inspection

- .1 Asbestos Abatement Work shall not commence until:
 - .1 The Ministry of Labour, Construction Health and Safety Branch has been notified through a Notice of Project and a copy of the Notice of Project is posted on the site.
 - .2 Arrangements have been made for disposal of waste.
 - .3 All documentation is in place.
 - .4 Work areas and decontamination enclosures and parts of the building required to remain in use are effectively segregated.
 - .5 Tools, equipment, materials, and waste receptors are on hand.
 - .6 Warning signs have been posted as specified.
 - .7 Negative air pressure differential [minimum 0.5 mm (0.02 inches) water gauge] has been established in the work area with monometer in place and operational.
 - .8 All workers have been made familiar with the use of respirators, procedures for entering and leaving the contaminated area and emergency evacuation routes.
 - .9 Written **authorization to proceed** has been obtained from the Inspector based on a visual inspection of the site.
 - .10 A Pre-contamination Inspection Checklist is provided at the end of this document for the Contractor's reference.

3.1.8 Asbestos Remedial Work

- .1 Maintenance of Enclosures:

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- .1 Maintain enclosures in tidy condition.
 - .2 Ensure that barriers and polyethylene linings are effectively sealed and taped.
 - .3 Repair damaged barriers and remedy defects immediately upon discovery.
 - .4 Visually inspect enclosures at the beginning and end of each working period **and at least once each day on days when there are no shifts. This includes weekends and holidays.**
 - .5 Ensure that a **minimum** air pressure differential of **0.5 mm (0.02 inches)** water gauge is maintained within the work enclosure relative to the adjacent uncontaminated areas at all times.
 - .6 Ensure that the work area is secure during periods of no activity.
- .2 Upper Seals: (where applicable)
- .1 There may be ventilation ducts, penetrations and equipment requiring protection above the ceiling assembly which must be accessed, visually inspected and sealed.
 - .2 Open Plenum and/or upper wall penetrations: while operating under contaminated procedures and ensuring adequate negative pressure within the work area, systematically access the ceiling along the perimeter of the project site and seal all openings with framing, polyethylene and duct tape. Adjacent areas are not to be occupied during this operation.
 - .3 Ventilation ducts, openings, etc.: while operating under contaminated procedures and ensuring adequate negative pressure within the work area, systematically access the ceiling as required to access the openings and seal with framing, polyethylene and duct tape. The ventilation systems serving the work area are to be turned off or locked-out during this procedure and remain off until completion of the work.
 - .4 Equipment requiring protection: while operating under contaminated procedures and ensuring adequate negative pressure within the work area, systematically access the ceiling as required to access the equipment and seal with polyethylene and duct tape.
- .3 Asbestos Encapsulation
- .1 *Bridging*: applied as a continuous flexible membrane or coating over friable material to seal the surface and act as a barrier against physical damage or deterioration. Material is to be water based, without solvents nor utilize hydrocarbons and have a Class A Fire Hazard Classification. Must comply with CGSB 1-GP-205M Type 11. Refer to Scope of Work for finish colour. Standard of acceptance: Ocean No. 666

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- Latex Fire Resistive Asbestos Encapsulant as distributed by Ocean Coatings Consultants Ltd.
- .2 *Penetrating*: applied to be absorbed into friable material and solidify thus binding fibres together and prevent release. Material is to be water based, without solvents nor utilize hydrocarbons and have a Class A Fire Hazard Classification. Standard of acceptance: Childers CHIL-CASE CP-215 Bridging Encasement/Encapsulant Coating;
 - .3 *Equipment*: airless paint sprayer with adequate pressure and nozzle size to suit the material being used. Refer to the encapsulant manufacturer's recommendations for minimum sizes. Equipment must be able to maintain a consistent fan pattern with the nozzle at 300 mm from the surface when spraying.
 - .4 The nature of the encapsulant may effect the requirements for respiratory protection in addition to protection provided for asbestos dust. Vapours may be released during application and must be taken into account when selecting appropriate protection. Refer to MSDS sheets.
 - .5 *Application*: clean all surfaces of debris and dust, repair damaged areas with compatible materials, apply a light first coat to moisten the surface and immediately follow with a second application ensuring complete and consistent coverage by spraying a minimum of four passes in different directions. Refer to Scope of Work for minimum dry film thickness.
 - .6 Encapsulated asbestos-containing materials are to be identified in a manner acceptable to the Inspector.
- .4 Asbestos Removal (Wet Method)
- .1 *Thermal insulation*: (piping and equipment) Ensure that heat sources to all piping systems, tanks, etc., have been shut off before work commences. Carefully cut open the outer cover of thermal insulation while spraying a mist of amended water on the section being worked on; thoroughly soak the underlying asbestos-containing material with amended water, using airless spray equipment. Spray the asbestos material repeatedly during the work process to maintain saturation and to minimize asbestos fibre dispersion.
 - .2 *Sprayed-on Materials (Texture Coat and Fireproofing)*: Apply amended water to the surface of the material using an airless sprayer. Allow the water to soak through to the surface. Application of a fine mist at low volumes will avoid excessive water dripping to the floor. The thickness and the nature of the asbestos containing material will dictate the time required to soak and number of passes necessary.
 - .3 *Troweled-on Materials (Plaster)*: Apply amended water to the surface of the material using an airless sprayer. Application of a fine mist at low volumes will avoid excessive water dripping to the floor. Remove plaster material by hand and place

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directly into waste receptor. Do not throw or allow waste to fall to the floor from the work area. Ensure that all asbestos debris is removed from the ceiling/wall assembly. Ensure that all asbestos debris is removed including that on fasteners. Spray the asbestos material repeatedly during the work process to maintain saturation and to minimize asbestos fibre dispersion.

- .4 *Vinyl Sheet Flooring (with asbestos-containing paper backing)*: Apply amended water to the surface of the material using an airless sprayer. Allow the water to soak through to the surface. Application of a fine mist at low volumes will avoid excessive water dripping to the floor. The thickness and the nature of the asbestos containing material will dictate the time required to soak and number of passes necessary.
- .5 Remove the saturated asbestos material in small sections. Do not allow saturated asbestos to dry out. As it is being removed, pack the material into a waste receptor (polyethylene bag).
 - .1 Spray the asbestos material repeatedly during the work process to maintain saturation and to minimize asbestos fibre dispersion.
 - .2 Mist the air periodically with water.
 - .3 Excess water is to be treated as asbestos waste and is to be placed into a waste receptor (polyethylene bag). Refer to Waste Handling for cleaning and removal of bagged asbestos waste.
- .6 After completion of asbestos removal, all surfaces from which asbestos has been removed shall be brushed and wet-sponged to remove all visible material and residues. During this work the surfaces shall be kept wet.
- .5 Asbestos Removal (Dry Method)
 - .1 Dry removal of asbestos-containing material is to be limited to applications which cannot be wetted due to electrical hazards and may only be undertaken with written instruction for the Inspector.
 - .2 Ensure that the site is fully isolated from the remaining parts of the building and that adequate negative air pressure is being maintained within the work area prior to initiating any dry removal work.
 - .3 A person knowledgeable in supplied air systems and responsible for its operation is to inspect the air source and supply network to ensure that it complies with all regulatory requirements. The person is to sign a statement as to his inspection and have the statement posted on the work site.
 - .4 Provide supplied-air, positive-pressure, full-face respirators to all persons required to enter the dry removal area. All persons required to use supplied air respirators are

ASBESTOS ABATEMENT SPECIFICATIONS**École élémentaire Jeanne-Lajoie**

to be trained and be able to demonstrate their competence to use and maintain the equipment.

- .5 Remove the asbestos by hand in small quantities and place directly into a waste receptor (poly bag). Do not allow a build-up of asbestos debris. The bagged asbestos waste is to be wetted with amended water inside the material transfer facility prior to double bagging.
- .6 After completion of asbestos removal, all surfaces from which asbestos has been removed shall be brushed (dry) and HEPA vacuumed to remove all visible material and residues. The entire work area including decontamination facilities, equipment and work area surfaces shall then be cleaned by HEPA vacuuming.
- .6 Initial Cleaning
 - .1 Wet clean (other than dry removal areas) and HEPA vacuum the entire work area, including all Decontamination Enclosure Systems and equipment used in the process. Prefilters on HEPA fan/filter units shall be replaced and disposed of as contaminated waste.
 - .1 For floors covered by rugs, remove the top layer of polyethylene at this stage.
 - .2 HEPA vacuum cleaners shall be emptied of their contents which shall be disposed of as contaminated waste.
 - .3 All equipment shall also be thoroughly clean including but not limited to HEPA vacuum cleaners, vacuum hoses, sprayers, scaffolding and other equipment. Dismantle scaffolding and clean components.

3.1.9 Waste Handling

- .1 Three workers with personal protection equipment for a Type 3 operation, respirators and disposable coveralls, enter the Waste Load-out facility from the clean side, one (A) stays in the Clean Area, the second (B) proceeds to the Central Handling Area, and the third (C) proceeds to the Washing Area. A fourth worker (D) may enter the work area in the usual fashion.
- .2 Worker D cleans all bulk debris from the waste receptors (polyethylene bag) containing asbestos waste by wet wiping. The bag is then passed in to worker C in the Washing Area of the Waste Load-out facility. Worker C washes the bag (water must be made available) and passes it to worker B in the Central Handling Area where it is placed into a second waste receptor (clear bag) and wet wiped. Worker B passes the bag to worker A in the Clean Area where it is stored for future disposal or passed outside the facility to another worker for placement into the disposal bin.

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- .1 At no time is more than one air lock in the three room serial arrangement to be opened for transfer of material. The workers are not to pass from one room to another during the waste handling operation.

- .3 On completion, all surfaces in the three material handling areas are to be wet washed and cleaned of all debris. The three workers are then to proceed into the contaminated work area each sealing or closing the airlock behind him.

- .4 Contaminated equipment being removed from the work area may be handled similarly to waste but instead of bagging it may be completely washed or vacuumed.

3.1.10 Final Seal and Cleaning

- .1 After completion of the asbestos removal and initial cleaning a visual inspection will be performed by the Inspector to confirm that all visible debris has been removed from the work surfaces.

- .2 Surfaces shall be accepted as clean when there is no visible residue, dirt, dust, film, stain or discolouration on all surfaces within the work area including but not limited to piping, tanks, ducts, conduits, mechanical and electrical items, wiring, cracks, crevices, joints, etc., resulting either from prior contamination, asbestos removal procedures or from cleaning procedures.

- .3 Cleaning and inspection shall be repeated at the Contractor's cost if the area does not meet the above criteria and is declared unclean.

- .4 The application of sealant is not to commence until all visible asbestos fibre has been removed from all surfaces and a written *authorization to proceed* has been obtained based on a visual inspection of the work area.

- .5 Architectural finishes, including ceiling components, various fixtures and other surfaces which may be damaged or stained by the sealant are to be suitably protected with polyethylene and duct tape. **Any damage resulting from the Contractor's work shall be made good to the satisfaction of the Inspector.**

- .6 Sealant shall be sprayed to all surfaces in the work area. The spray is to be directed from the top down to ensure that the higher horizontal surfaces are covered. Spraying from the floor only is not acceptable. Apply sealant using an airless high pressure paint sprayer.

- .7 The nature of the sealant may effect the requirement for respiratory protection. Vapours that may be released during sealant application must be taken into account when selecting respirators.

- .8 In dry removal areas, it may be possible to apply the sealant with a rag or sponge. If this is not practicable, the surfaces are to remain unsealed.

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- .9 After the sealant has dried, allow a 12-hour period for dust settling. During this settling period, no entry or activity will be permitted in the work area.
- .10 After the work area is dry and a visual inspection by the Inspector confirms the area is satisfactorily clean, clearance air samples shall be taken in the work area by the Inspector. The work area is declared clean by the Inspector when the air monitoring results conform to the pre-established levels.
- .11 Cleaning, inspection and air sampling shall be repeated at the Contractor's expense if the area does not meet visual inspection and air monitoring criteria and is declared unclean.

3.1.11 Final Tear Down and Demobilization

- .1 The final tear down is not to commence until a written *authorization to proceed* has been obtained based on a visual inspection of the work area and the results of the air monitoring.
- .2 Dismantle the remainder of the enclosure and dispose of all polyethylene sheeting as asbestos waste.
- .3 Vacuum and/or wet wipe all surfaces previously inaccessible due to temporary construction.
- .4 Seal the outside of the negative pressure exhaust units with polyethylene and tape before removing from work area.

3.1.12 Re-establishment of Objects and Systems

- .1 Re-establish thermal insulation, fireproofing, acoustic applications, ceiling systems, etc., removed during the course of the project in accordance with the standard specification when specified in the Scope of Work.
- .2 Reinstall objects, moved to temporary locations in the course of the Work, in their proper positions.
- .3 Resecure mounted objects removed in the course of the Work in their former positions.
- .4 Re-establish mechanical and electrical systems in proper working order.
- .5 Repair or replace objects damaged in the course of the Work.

3.2 ASBESTOS REMOVAL (GLOVEBAG METHOD)

- .1 Before performing work:
 - .1 Prepare site by placing new 0.15 mm (6 mil) polyethylene plastic drop sheets on all surfaces immediately below and within 3.0 m of the work area.
 - .2 Remove all obstructions from around pipes to allow access for repair work.

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- .3 Inspect all glovebags for defects before using. A defective bag shall not be used.
- .4 Ensure that any knife to be used inside the glovebag has a retractable blade and that any saw used inside the glovebag is of the flexible wire type; and brush used inside a glovebag shall not have metal bristles.
- .2 Perform removal operations using the following procedures (in accordance to the manufacturer's instructions):
 - .1 Place any tools necessary to remove insulation in bottom of the containment bag.
 - .2 Install the bag on the pipe or fitting using shoulder straps and zipper provided. **Duct tape is not to be substituted for shoulder straps.** Support bag as necessary to avoid damage to the piping system or the bag itself.
 - .3 Insert nozzle of spray pump prefilled and primed with water and surfactant mixture (amended water) into the bag through the valve provided. Place hands in gloves and relocate the tools to the tool pouch.
 - .4 Cut or remove exterior insulation jacket, where applicable, to expose asbestos pipe covering. Wet exposed pipe covering with sufficient amended water to suppress any dust. Remove insulation and arrange in bottom of bag to obtain maximum capacity for the bag. Wash down exposed portion of pipe and top section of bag ensuring that insulation in lower portion of bag as well as any exposed end of insulation is thoroughly saturated. Use one hand and a cloth or sponge to aid in washing process.
 - .5 Ensure that pipe and other surfaces are clean of visual residue, dirt or dust prior to removal of the containment bag and seal all surfaces with encapsulant. Seal exposed ends of remaining asbestos insulation with encapsulant.
 - .6 If the glovebag is ripped, cut or opened in any way, work that may disturb friable material shall cease immediately. If the rip, cut or opening is small and easy to repair then the glovebag shall be repaired immediately with tape. Work may continue once the repairs are complete. If the rip, cut or opening is not small and cannot be easily repaired, place the glovebag immediately within a suitable asbestos waste container. Any spilled material containing asbestos shall be cleaned up and removed by using a vacuum equipped with a HEPA filter.
 - .7 To remove bag after completion of stripping, wash top section and tools thoroughly. Put all tools in one hand (glove), pull hand out inverted, twist to create a separate pouch, double tape to seal ends, cut and place in the next glovebag or into a water bucket, open pouch under water and clean and then allow to dry. Tools may also be cleaned and handed out during the dismantling of the bag while taking all precautions to prevent release of asbestos.

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- .8 Remove all air inside the glovebag by means of a vacuum equipped with a HEPA filter. Seal lower portion of bag and place bag into appropriate waste container.
- .9 After removal of bag, ensure pipe is clean of all residue. If necessary after removal of each section of asbestos, vacuum all surfaces of pipe, using HEPA Filtered Vacuum equipment.
- .10 Welds and folds of glovebags are to remain intact without modification to manufacturer's design.
- .11 Glovebags, disposal bags, cloth rags and any porous materials are to be handled and disposed as hazardous waste.
- .12 Frequently, and at regular intervals during the work and immediately upon completion of the work, glovebags containing asbestos-contaminated dust and waste shall be placed in a suitable waste container and shall be removed from the workplace.
- .13 Immediately after removal of asbestos, clean all surfaces and equipment within the work area using a HEPA vacuum and damp wiping.
- .14 Remove polyethylene floor covering, fold inward, and place in 6-mil polyethylene waste bags. Seal bags tightly.
- .15 Place sponges, brushes, etc., in double polyethylene bags and seal tightly.
- .16 Make arrangements for disposal of all asbestos-containing waste material.

3.3 TYPE 2 ENCLOSURE METHOD

- .1 Preparation
 - .1 Separate the work area from the rest of the building using rope barriers, signage and other appropriate means. The extent of the work area will depend on the amount of work to be done, potential for fibre release and the height of the work above floor level.
 - .2 Identify the work area with clearly visible warning signs.
 - .3 Construct a frame for the enclosure from 50 mm x 100 mm (2" x 4") studs or other suitable material (scaffolding, for example); if the potential exists for the disturbance of asbestos-containing material during the construction of the enclosure, wear a respirator and suitable protective clothing; ensure that the enclosure is of adequate size to permit the storage of equipment and waste.
 - .4 If the room where the work is to take place is small, the room itself may serve as an enclosure, provided that all openings are sealed, the mechanical ventilation system

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École élémentaire Jeanne-Lajoie

- servicing the room is disabled and the ventilation ducts to and from the work area are sealed.
- .5 Shut off the source of heat for piping systems (i.e., boiler or steam line header), where possible.
 - .6 Cover the walls, floor and ceiling of the enclosure with clear 0.15 mm polyethylene sheeting sealed with duct tape. Curtains of polyethylene sheeting must be fitted on each side of the entrance to the enclosure (curtain flaps may require weights at the bottoms to ensure proper closing).
 - .7 Disable the ventilation system servicing the enclosure, seal ventilation ducts to and from the work area.
 - .8 Shut off and lock out electrical power within the enclosure.
 - .9 Wear an appropriate respirator approved for use with asbestos and suitable protective equipment. Only persons wearing protective clothing and equipment shall be allowed to enter the work area. If the type of asbestos is other than chrysotile, a powered air purifying respirator shall be used.
 - .10 Do not use compressed air.
 - .11 Do not eat, drink, smoke or chew in the work area.
 - .12 Vacuum surfaces of insulated material in the work area using a HEPA vacuum.
- .2 Asbestos Removal and Cleanup
- .1 Only non-powered hand-tools, or power tools **FITTED WITH A DUST COLLECTION DEVICE AND HEPA FILTER** are permitted to be used.
 - .2 Do not eat, drink, chew or smoke within the work area.
 - .3 *Thermal insulation:* (piping and equipment) Ensure that heat sources to all piping systems, tanks, etc., have been shut off before work commences. Carefully cut open the outer cover of thermal insulation while spraying a mist of amended water on the section being worked on; thoroughly soak the underlying asbestos-containing material with amended water, using airless spray equipment. Spray the asbestos material repeatedly during the work process to maintain saturation and to minimize asbestos fibre dispersion.
 - .4 *Mortar and Cement Board:* Apply amended water to the surface of the material using an airless sprayer. Application of a fine mist at low volumes will avoid excessive water dripping to the floor. Remove material by hand and place directly into waste receptor. Do not throw or allow waste to fall to the floor from the work area. Ensure that all asbestos debris is removed from the ceiling/wall assembly.

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Ensure that all asbestos debris is removed including that on fasteners. Spray the asbestos material repeatedly during the work process to maintain saturation and to minimize asbestos fibre dispersion.

- .6 *Vinyl Flooring:* Apply amended water to the surface of the material using an airless sprayer. Allow the water to soak through to the surface. Application of a fine mist at low volumes will avoid excessive water dripping to the floor. The thickness and the nature of the asbestos containing material will dictate the time required to soak and number of passes necessary.
- .7 *Drywall with Asbestos-Containing Joint Compound:* Remove gypsum board by hand and place directly into waste receptor. Do not throw or allow waste to fall to the floor from the work area. Ensure that all asbestos debris is removed from the ceiling/wall assembly. Ensure that all asbestos debris is removed including that on fasteners.
- .8 *Ceiling Tiles:* Remove tiles by hand and place directly into waste receptor. Do not throw or allow waste to fall to the floor from the work area. Ensure that all asbestos debris is removed from the T-bar and J-moulding.
- .9 Remove the saturated asbestos material in small sections. Do not allow saturated asbestos to dry out. As it is being removed, pack the material into a waste receptor (polyethylene bag).
 - .1 Spray the asbestos material repeatedly during the work process to maintain saturation and to minimize asbestos fibre dispersion.
 - .2 Mist the air periodically with water.
 - .3 Excess water is to be treated as asbestos waste and is to be placed into a waste receptor (polyethylene bag). Refer to Waste Handling for cleaning and removal of bagged asbestos waste.
- .10 After completion of asbestos removal, all surfaces from which asbestos has been removed shall be brushed and wet-sponged to remove all visible material and residues. During this Work the surfaces shall be kept wet.
- .11 Clean all surfaces and equipment within the work area, including polyethylene sheeting, using a HEPA vacuum or by damp wiping.
- .12 Seal all surfaces of pipe or other equipment, enclosure, and ends of exposed insulation with a suitable encapsulant.
- .13 After satisfactory completion of cleaning and before leaving the work area, decontaminate protective clothing (including boots) and equipment, etc., using a HEPA vacuum or by damp wiping.

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- .14 Dismantle the enclosure and wet and dispose of all polyethylene sheeting, brushes and sponges as asbestos waste.
- .15 Dispose of protective clothing as asbestos waste.
- .16 Wash hands and face at the completion of the work (before leaving the work area); damp wipe the respirator and store in a proper place.
- .17 Make arrangements for disposal of all asbestos-containing waste material.

3.4 TYPE 2 NON-ENCLOSURE METHOD

- .1 Preparation
 - .1 Control the spread of dust from the work being performed by use of drop sheets, keeping doors closed, providing signage, etc. Ensure that appropriate equipment and materials are at hand.
 - .2 Restrict access to the work area using rope barriers, barricades, and other appropriate measures.
 - .3 Disable ventilation systems servicing the work area.
 - .4 Provide and wear a non-powered air purifying respirator with high efficiency cartridges approved for use with asbestos and disposable coveralls including hood, elasticized cuffs and zipper over work clothes.
- .2 Asbestos Removal and Cleanup
 - .1 Only non-powered hand-tools, or power tools **FITTED WITH A DUST COLLECTION DEVICE AND HEPA FILTER** are permitted to be used.
 - .2 Do not eat, drink, chew or smoke within the work area.
 - .3 *Vinyl Floor Tile*: Disconnect all floor-mounted electrical fixtures and outlets and seal with duct tape. Seal other floor penetrations as required. Spray amended water on tiles to be removed to reduce dust. Remove tiles and immediately place into waste receptor. Double bag when removing debris from work area.
 - .4 *Mortar and Cement Board*: Place polyethylene sheet over ground to prevent soil contamination. Apply amended water as required to reduce dust. Remove material by hand with minimal breakage and place immediately into waste receptor. Do not throw or allow the asbestos waste to fall to the ground from the work area. Ensure that all asbestos debris is removed including that on fasteners, embedded in caulking, etc.

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- .5 *Drywall with Asbestos-Containing Joint Compound:* Apply amended water to the surface of the material using an airless sprayer. Application of a fine mist at low volumes will avoid excessive water dripping. Remove gypsum board by hand and place directly into waste receptor. Do not throw or allow waste to fall to the floor from the work area. Ensure that all asbestos debris is removed from the ceiling/wall assembly. Ensure that all asbestos debris is removed including that on fasteners. Double bag when removing debris from work area.
- .6 *Ceiling Tiles:* Apply amended water to the surface of the material using an airless sprayer. Application of a fine mist at low volumes will avoid excessive water dripping to the floor. Remove tiles by hand and place directly into waste receptor. Do not throw or allow waste to fall to the floor from the work area. Ensure that all asbestos debris is removed from the T-bar and J-moulding. Double bag when removing debris from work area.
- .7 Do not allow waste to accumulate.
- .8 Clean dust and debris at regular intervals and at the end of each shift with a damp cloth or HEPA vacuum.
- .9 Ensure that there is no visible airborne dust in the work area during the removal and cleanup operation.
- .10 All duct tape, polyethylene sheets, disposable clothing and other consumables used for, and during the removal of asbestos shall be contained and disposed as asbestos waste.
- .11 After satisfactory completion of cleaning and before leaving the work area, decontaminate protective clothing (including boots) and equipment, etc., using a HEPA vacuum or by damp wiping.
- .12 Dispose of protective clothing as asbestos waste.
- .13 Wash hands and face prior to taking breaks and at completion of the work before leaving the work area. Damp-wipe the respirator after use and store in an appropriate place.
- .14 Make arrangements for disposal of all asbestos-containing waste material.

3.5 TYPE 1 OPERATION

Not Applicable.

3.6 WASTE DISPOSAL

- .1 Asbestos-containing wastes shall be disposed of in accordance with procedures established by the Ontario Ministry of the Environment *Regulation 347 (as amended) under the*

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Environmental Protection Act and the Government of Canada Transportation of Dangerous Goods Regulations.

- .2 All waste is to be removed from the site and disposed. Disposal containers are not to be left on the property unattended unless fully enclosed and locked. Bins must be removed immediately on completion of work.
- .3 Both sides of every vehicle used for the transportation of asbestos and every waste container must display in large easily legible letters that contrast in colour with the background the word "CAUTION" in letters not less than 10 cm in height and the words:

CONTAINS ASBESTOS FIBRES

Avoid Creating Dust and Spillage

Asbestos May Be Harmful To Your Health

Wear Approved Protective Equipment

- .4 Both sides of every waste container must display in large easily legible letters the words '**ASBESTOS, WHITE, PRODUCT IDENTIFICATION NUMBER 2590**' or '**ASBESTOS, BLUE, PRODUCT IDENTIFICATION NUMBER 2212**' in accordance with the type of asbestos being transported.
- .5 Every vehicle used for the transportation of asbestos waste shall display a Class 9 placard on the front, back and two sides of the vehicle.
- .6 The waste must be transported in a fully-enclosed truck, or alternatively, in a waste disposal skip. The driver must be familiar with cleanup and handling procedures and be trained to deal with spills or container breakage.
- .7 The truck must be equipped with a shovel and broom, wetting agent, protective clothing, respiratory protective equipment, polyethylene bags of at least 0.15 mm (6 mil) thickness, and bag closures and duct tape.
- .8 All waste must be transported with a **Bill of Lading** directly from the work area to the waste disposal site. The Bill of Lading is to indicate the source and type of asbestos, the Carrier, the amount, the destination (disposal site) and date all in accordance to applicable regulations. A copy of the Bill of Lading and disposal site receipt is to be provided to the Inspector.

3.7 AIR MONITORING

- .1 Air tests will be taken at the discretion of the Asbestos Consultant using the Phase Contrast Microscopy (PCM) method from the time asbestos-containing materials may be disturbed until the final visual inspection of the work area(s).

.1 *Outside Asbestos Removal Work Areas:*

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- .1 The maximum allowable fibre concentration outside the Work Areas during asbestos removal or cleanup shall be 0.05 f/cc. Should readings exceed this value, the work shall stop at the discretion of the inspector and proceed only after the cause of the high fibre counts has been remedied.
- .2 All costs associated with the cleaning, monitoring, and disruption caused by excessive fibre levels outside the Work Area and related to the work, are to be borne by the Asbestos Contractor including but not limited to:
 - .1 thorough cleaning with wet wiping and HEPA vacuuming by the Asbestos Contractor to the extent and satisfaction of the Inspector,
 - .2 all activities deemed necessary by the Inspector including area isolation, personnel relocation, additional visual inspections and air monitoring to confirm that the area has been adequately cleaned,
 - .3 disruption of plant production, office routine, and delays.
- .2 *Final Clearance Test:*
 - .1 Air samples will be taken in each Type 3 asbestos removal work area using the PCM (NIOSH 7400) method.
 - .1 Air sampling will not be performed in crawl space work areas.
 - .2 Final clearance tests will be performed following aggressive sampling procedures:
 - .1 Before starting the sampling pumps and during sampling, the exhaust from forced air equipment (1 horsepower) leaf blower is directed against walls, ceilings, floors, ledges, and other surfaces in the area. The Contractor shall supply the leaf blower.
 - .2 Prior to commencement of final air clearance testing, the contractor shall install 20 inch fans in the centre of the work area (minimum of one fan per 10,000 cubic foot of work area space). The fans shall be operated on slow speed and pointed toward the ceiling. The fans will run for the duration of the air sampling period and will be shut off when sampling is complete.
 - .3 Asbestos work areas shall be declared clean only if the laboratory results show concentrations of 0.01 f/cc or less for all samples.
 - .4 All costs associated with additional cleaning, monitoring, and disruption as the result of failure to pass final clearance due to visual inspection and/or air monitoring are to be borne by the Contractor including but not limited to:

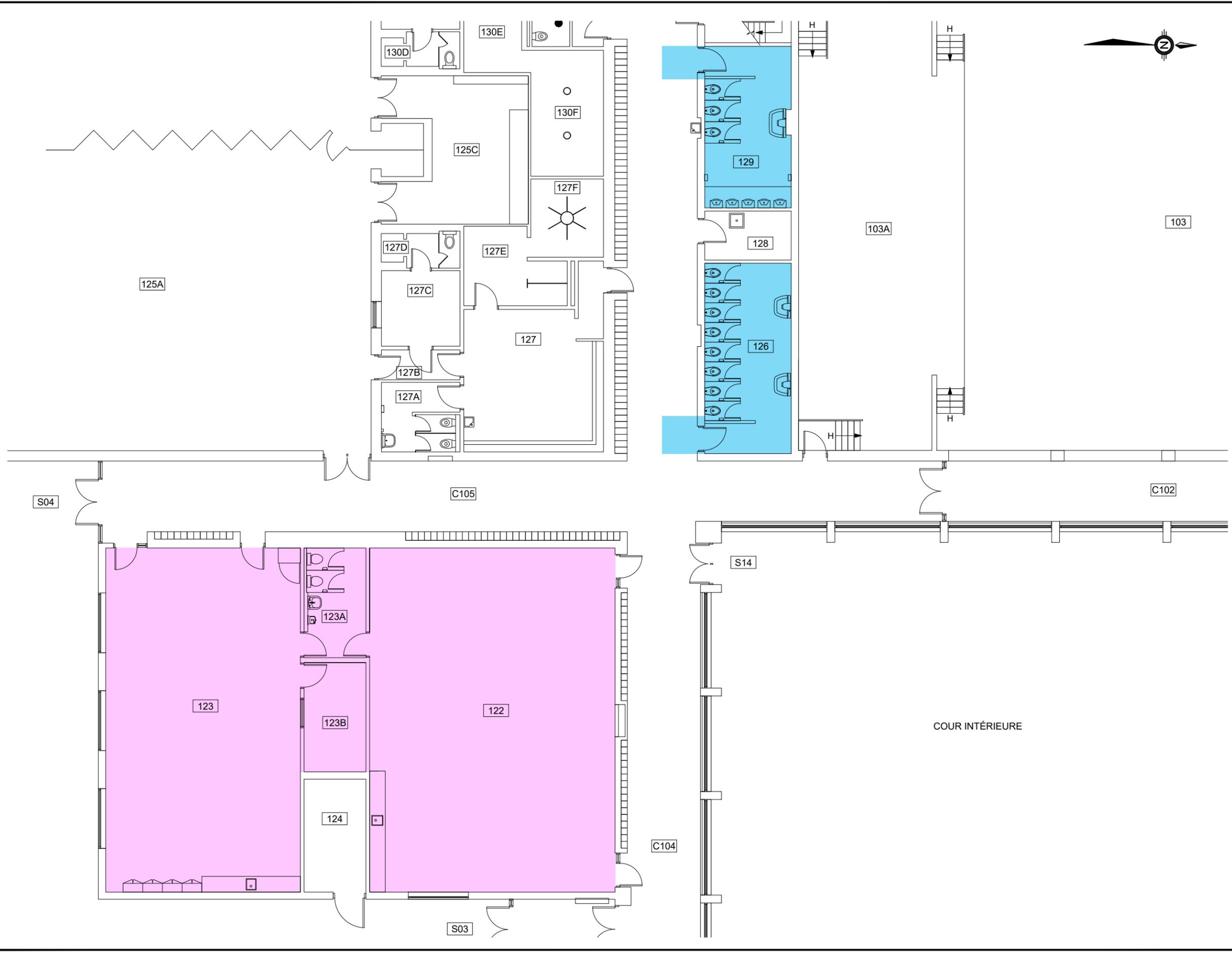
ASBESTOS ABATEMENT SPECIFICATIONS

École élémentaire Jeanne-Lajoie

- .1 thorough cleaning with wet wiping and HEPA vacuuming by the Asbestos Contractor to the extent and satisfaction of the Inspector,
- .2 further visual inspections and air monitoring to confirm that the area has been adequately cleaned,
- .3 disruption of plant production, office routine, and delays.

END OF SECTION

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LEGEND:

- 127 FUNCTIONAL SPACE
- WORK AREA 1
- WORK AREA 2

NOTES:

- 1.

REVISIONS:

No.	Date:	By:	Revisions

REFERENCE:

- 1.



Conseil Scolaire Viamonde

ASBESTOS ABATEMENT SPECIFICATIONS

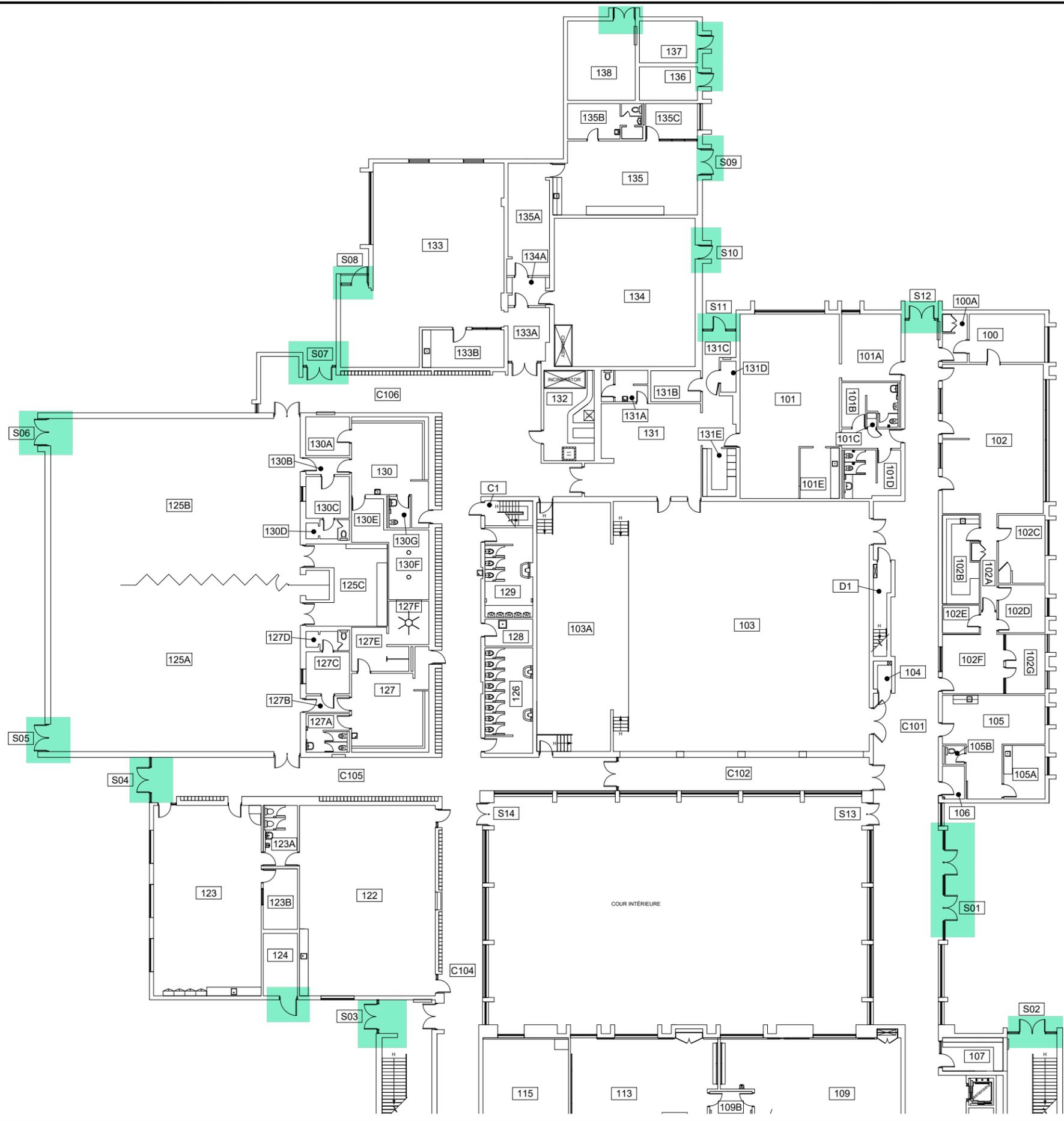
LOCATIONS OF WORK AREAS

ÉCOLE ÉLÉMENTAIRE JEANNE-LAJOIE
 150 CARNFORTH ROAD
 TORONTO, ONTARIO

FIRST FLOOR PLAN

Drawn By: M.K.R	Approved By: J.D	Project No: 30248616
Date: MARCH 2025	Scale: N.T.S	Drawing No: 30248616-1

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LEGEND:

- 100 FUNCTIONAL SPACE
- WORK AREA 4

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REVISIONS:

No.	Date:	By:	Revisions

REFERENCE:

- 1.



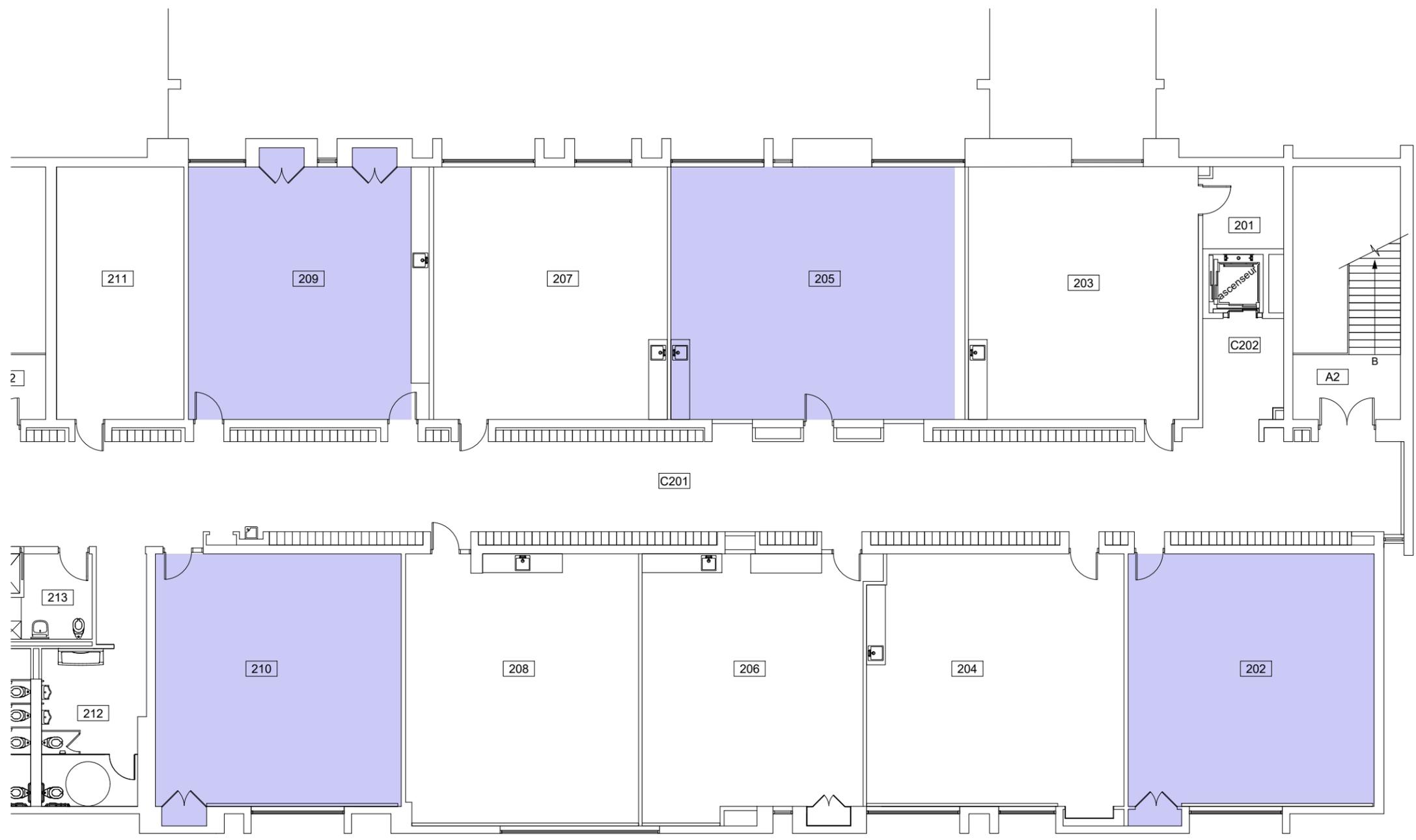
Conseil Scolaire Viamonde

ASBESTOS ABATEMENT SPECIFICATIONS

LOCATIONS OF WORK AREAS
 ÉCOLE ÉLÉMENTAIRE JEANNE-LAJOIE
 150 CARNFORTH ROAD
 TORONTO, ONTARIO

FIRST FLOOR PLAN

Drawn By: M.K.R	Approved By: J.D	Project No: 30248616
Date: MARCH 2025	Scale: N.T.S	Drawing No: 30248616-2



LEGEND:

- 205 FUNCTIONAL SPACE
- WORK AREA 3

NOTES:

- 1.

REVISIONS:

No.	Date:	By:	Revisions

REFERENCE:

- 1.



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ASBESTOS ABATEMENT SPECIFICATIONS

LOCATIONS OF WORK AREAS

ÉCOLE ÉLÉMENTAIRE JEANNE-LAJOIE
150 CARNFORTH ROAD
TORONTO, ONTARIO

SECOND FLOOR PLAN

Drawn By: M.K.R	Approved By: J.D	Project No: 30248616
Date: MARCH 2025	Scale: N.T.S	Drawing No: 30248616-3

ARCADIS CANADA INC.

Client: _____ Project No.: _____
Project Site: _____ Foreman: _____
Contractor: _____ Work Area: _____

TYPE 3 (FULL ENCLOSURE) ASBESTOS ABATEMENT PRE-CONTAMINATION INSPECTION CHECKLIST

Type 3 Asbestos Abatement Classifications:

- Removing/disturbing of more than 1 m² of friable asbestos-containing materials
- Spray application of sealant to friable asbestos-containing materials
- Removing/cleaning air handling equipment in a building with sprayed fireproofing
- Removing/disturbing kiln, metallurgical furnace or similar structure with refractory materials
- Removing non-friable asbestos materials using power tools not equipped with HEPA filters
- Repair/alter/demolish a building which asbestos was used in the manufacture of products

Before Beginning Asbestos Abatement Work:

- All documentation and pre-work submittals in place
 - Bonding (if applicable)
 - Insurance documentation (naming ARCADIS and Owner as co-insured)
 - Names/Phone numbers of Contractor Representatives for emergencies
 - Permits for transport and disposal of asbestos waste
 - Material Safety Data Sheets
 - Names and statement of experience for supervisory personnel
 - Contractor schedule
 - Notice of Project (NOP)
 - Confirmation of electrical lock-out in work area and of any electrical inspections
 - Evidence of proper construction and inspection of GFI panel by a licensed electrician.
 - Written *Fire Safety Plan*.
 - Documentation of pre-construction site condition (if required)
 - Proof of asbestos abatement training
- Notice of Project (NOP) posted
- Warning signs posted
- Work area and decontamination enclosures segregated from rest of building
- Points of entry secure including neg-air exhaust location(s)
- Independent isolation of all electrical equipment and openings including windows, doors, temporary partitions, etc.
- Adequate protection applied to all equipment and other components within work area
- Mechanical ventilation systems locked out and isolated
- Adequate neg-air units, including back-ups installed, and Integrity-tested on site
- Negative air units exhausting outside of building
- Negative air pressure differential in place (minimum 0.02 inch water gauge)
- Manometer in place, alarm and recorder functioning
- Emergency lighting in place and plugged into electrical outlets
- Work area lighting adequate
- All electrical equipment, including shower sump pump inside work area ground fault protected
- Tools, equipment, materials and waste receptors on hand
- All workers familiar with PPE, decontamination procedures, equipment and evacuation routes
- Airless sprayer functioning, and tested with approved amended water in-line
- Shower functioning and tested for pressure, filtered drainage, separate hot/cold water, or mixed water (40°C to 50°C)
- All shower accessories (soap, shampoo, mirrors etc.) in place
- Upper seals complete (if required)
- HEPA vacuums - Integrity-tested within last 3 months

Note: All above items must be checked off or marked n/a (not applicable)

COMMENTS / AUTHORIZATION

This authorization does not in any way replace the contract requirements as detailed in the Specifications, Scope of Work, Regulations, or on-site direction given by the Arcadis Inspector.

DATE: _____ ARCADIS INSPECTOR SIGNATURE: _____

ARCADIS CANADA INC.

Client: _____ Project No.: _____
Project Site: _____ Foreman: _____
Contractor: _____ Work Area: _____

TYPE 3 (FULL ENCLOSURE) ASBESTOS ABATEMENT DAILY PROCEDURES CHECKLIST

- All warning signs posted
- Decontamination and work area enclosures kept in tidy condition
- Shower unit properly drained and clean
- Adequate hot water for shower
- Adequate shower accessories
- All polyethylene barriers and linings sealed and taped
- Minimum negative pressure maintained
- Neg-air primary filters replaced regularly
- Neg-air exhausts to each side secure
- Manometer alarm and tape read-out functioning
- ACM applications wet and promptly bagged into labelled containers
- Personal Protective Equipment being used properly
- Decontamination of personnel and equipment executed properly
- Perimeter inspections being carried out
- Adequate labour, supervisors, materials and equipment available on site
- Access to work area secure
- Adequate lighting maintained
- Emergency lighting operational

Waste Disposal

- Proper signage applied to truck/waste skip
- Waste bin secured/locked

Note: All above items must be checked off or marked n/a (not applicable)

COMMENTS / AUTHORIZATION

This authorization does not in any way replace the contract requirements as detailed in the Specifications, Scope of Work, Regulations, or on-site direction given by the Arcadis Inspector.

DATE: _____ ARCADIS INSPECTOR SIGNATURE: _____

ARCADIS CANADA INC.

Client: _____ Project No.: _____
Project Site: _____ Foreman: _____
Contractor: _____ Work Area: _____

TYPE 3 (FULL ENCLOSURE) ASBESTOS ABATEMENT FINAL VISUAL INSPECTION CHECKLIST

Final Visual Inspection Checklist

Surfaces shall be accepted as clean when there is no visible residue, dirt, dust, film, stain or discolouration on all surfaces within the work area including but not limited to piping, tanks, ducts, conduits, mechanical and electrical items, wiring, cracks, crevices, joints, etc., resulting either from asbestos removal procedures or from cleaning procedures.

Cleaning and inspection shall be repeated at the Contractor's expense if the area does not meet the above criteria and is declared unclean.

- All waste bags removed from area
- All surfaces and equipment clean including neg-air units, scaffolding, ladders, vacuum attachments, etc.
- All tools bagged or decontaminated and removed from area
- Glue and application equipment available and operational
- Remaining non-acm thermal insulation applications protected and clean (if present)

Note: All above items must be checked off or marked n/a (not applicable)

COMMENTS / AUTHORIZATION

This authorization does not in any way replace the contract requirements as detailed in the Specifications, Scope of Work, Regulations, or on-site direction given by the Arcadis Inspector.

DATE: _____ **ARCADIS INSPECTOR SIGNATURE:** _____

ARCADIS CANADA INC.

Client: _____ Project No.: _____
Project Site: _____ Foreman: _____
Contractor: _____ Work Area: _____

TYPE 3 (FULL ENCLOSURE) ASBESTOS ABATEMENT FINAL CLEARANCE TEST CHECKLIST

Post-Sealant Application Inspection Checklist

- Sealant application visually confirmed (surfaces tacky)
 - Polyethylene from walls and floors (not forming part of seal) removed and disposed
 - All surfaces and equipment clean
 - Minimum sealant settling time elapsed
-

PCM Final Clearance Test

- Two air samples taken inside the enclosure of an area of 10 m² (108 ft²) or less
- Three air samples taken inside the enclosure of an area of 10 m² (108 ft²) to 500 m² (5382 ft²)
- Five air samples taken inside the enclosure of an area of 500 m² (5382 ft²) or more
- Forced air used inside enclosure before and during air sampling
- Fan (20") in the centre of the enclosure pointed upwards towards the ceiling on low (1 fan for every 20,000 ft³ of room space required.)
- Each air sample collected for a volume of at least 2400 L
- Final air sample analysis pass pre-determined criteria
- Final air sample analysis failed pre-determined criteria
- Air sampling results posted following receipt of the results.

TEM Final Clearance Test

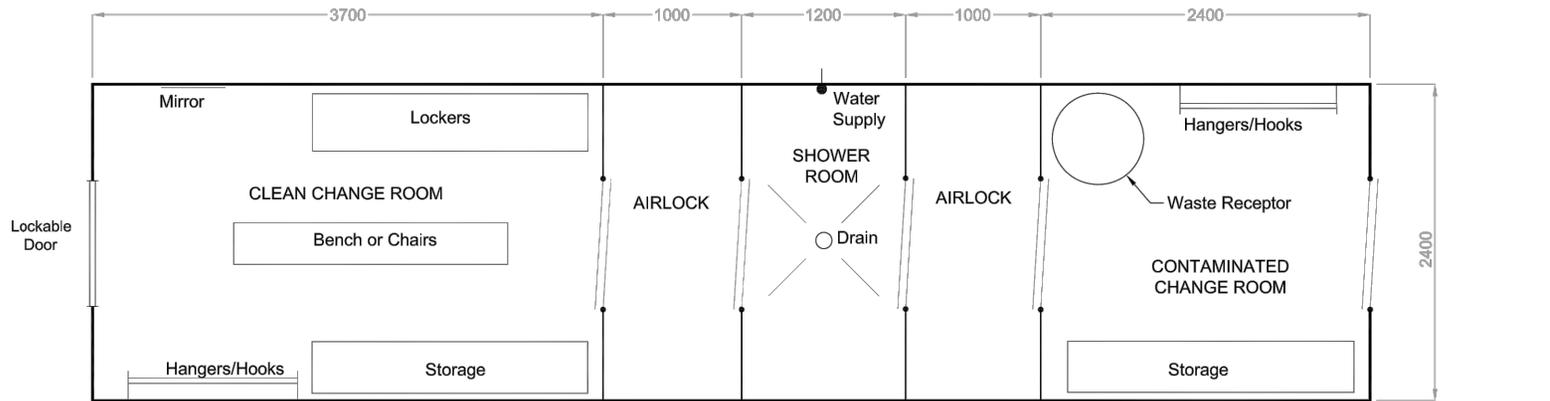
- Five air samples taken inside of the enclosure
- Five air samples taken outside of the enclosure
- Forced air used inside enclosure before and during air sampling
- Fan (20") in the centre of the enclosure pointed upwards towards the ceiling on low (1 fan for every 20,000 ft³ of room space required.)
- Each air sample collected for a volume of at least 2400 L
- Final air sample analysis pass pre-determined criteria
- Final air sample analysis failed pre-determined criteria
- Air sampling results posted following receipt of the results.

Note: All above items must be checked off or marked n/a (not applicable)

COMMENTS / AUTHORIZATION

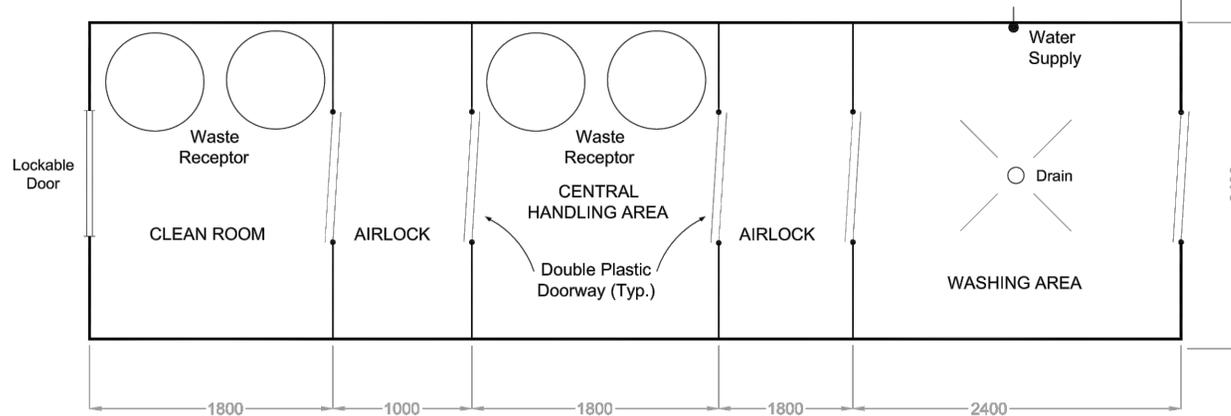
This authorization does not in any way replace the contract requirements as detailed in the Specifications, Scope of Work, Regulations, or on-site direction given by the Arcadis Inspector.

DATE: _____ ARCADIS INSPECTOR SIGNATURE: _____



WORKERS DECONTAMINATION ENCLOSURE SYSTEM

CONTAMINATED AREA



WASTE AND EQUIPMENT DECONTAMINATION ENCLOSURE SYSTEM



TYPICAL DECONTAMINATION ENCLOSURES

DIMENSIONS PROVIDED ARE FOR TYPICAL INSTALLATIONS AND MAY VARY SUBJECT TO THE PROPERTY SIZE AND AVAILABLE SPACE WITH THE APPROVAL OF THE INSPECTOR

**ASBESTOS ABATEMENT
ELECTRICIAN'S SUBMITTAL FORM**

Abatement Contractor _____

Project Site _____

I hereby certify the following:

1. All electrical work has been performed by a licensed electrician and complies with the latest edition of the Ontario Electrical Safety Code and any other local codes and requirements.
2. Arrangements have been made for all inspections and approvals which may be required by government regulations, Electrical Safety Authority and any other authorities having jurisdiction.
3. The GFI panel has been properly constructed, inspected and installed by a licensed electrician in compliance to all regulatory requirements and codes.
4. All electrical circuits in the work area have been de-energized and locked out wherever practicable.
5. All systems that cannot be de-energized have been clearly identified.
6. Any electrical conditions which need special protection or consideration have been clearly identified.

Electrical Contractor _____

Electrician's Name (print) _____

Electrician's Signature _____

Electrician's License No. _____

Date _____

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 03 10 00 Concrete Forming and Accessories
- .2 Section 03 30 00 Cast-in-Place Concrete
- .3 Section 04 05 19 Masonry Anchorage and Reinforcing
- .4 Section 04 22 00 Concrete Unit Masonry
- .5 Section 05 50 00 Metal Fabrications

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A143/A143M-07(2020) Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
 - .2 ASTM A1064/A1064M-22 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
- .2 American Concrete Institute (ACI)
 - .1 ACI SP-66 (04) ACI Detailing Manual
- .3 CSA Group (CSA)
 - .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete
 - .2 CSA A23.3:19 Design of Concrete Structures
 - .3 CSA G30.18:21 Carbon Steel Bars for Concrete Reinforcement
 - .4 CSA G40.20-13/G40.21-13 (R2018) General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
 - .5 CSA W186:21 Welding of Reinforcing Bars in Reinforced Concrete Construction
- .4 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC Reinforcing Steel Manual of Standard Practice

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit shop drawings, including placing drawings and bar lists.
 - .2 Prepare placing drawings and bar lists in accordance with the American Concrete Institute (ACI) Detailing Manual, and the Reinforcing Steel Institute of Canada (RSIC) Reinforcing Steel Manual of Standard Practice and the typical details included with Contract Documents.
 - .3 Prepare placing drawings to minimum scale of 1:50.
 - .4 Submit placing drawings and bar lists sufficiently detailed and dimensioned to permit correct placement of reinforcement and accessories without reference to architectural or structural Drawings.
 - .5 Show reinforcement, including dowels, in elevation on placing drawings for wall reinforcement.
 - .6 Show concrete cover to reinforcement.
 - .7 Show location of construction joints.
- .3 Inspection Reports: Inspection and Testing Company shall:
 - .1 Submit written reports of inspection and tests.
 - .2 Distribute reports as follows:

- .1 Consultant.
- .2 Contractor.

4 Quality Assurance Submittals:

- .1 Mill Test Report: provide Consultant with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.
- .2 Submit in writing proposed source of reinforcement material to be supplied.

1.5 Quality Assurance

- .1 Obtain a copy of CSA A23.1/A23.2 and maintain on site.
- .2 Qualifications: Welding: Undertake welding of reinforcement only by a fabricator or Subcontractor approved by Canadian Welding Bureau to requirements of CSA W186.
- .3 Source Quality Control: Source Quality Control may be performed by an Inspection and Testing Company appointed by Consultant.
- .4 Review provided by Inspection and Testing Company does not relieve Contractor of his sole responsibility for quality control over Work. Performance or non-performance of Inspection and Testing Company shall not limit, reduce, or relieve Contractor of his responsibilities in complying with the requirements of the Specification.
- .5 Identify and correlate reinforcing steel from Canadian mills with test reports for compliance with requirements specified.
- .6 Test unidentified reinforcing steel at expense of Contractor. Perform testing for each 1 tonne or part thereof supplied for incorporation in Work.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.7 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 In accordance with reference standards.
- .2 Substitute different size bars only if permitted in writing by Consultant.
- .3 Bar Reinforcing Steel:
 - .1 Bars which are to be welded by arc-welding process: to CSA G30.18, Grade 400W.
 - .2 Other bars: to CSA G30.18, Grade 400R.
- .4 Plain round bars: to CSA G40.20-04/G40.21.
- .5 Welded Wire Fabric: to ASTM A1064/A1064M and in flat sheets, not rolls.

- .6 Cold-drawn annealed steel wire ties: to ASTM A497.
- .7 Chairs, bolsters, bar supports, spacers: to CSA A23.1.
- .8 Mechanical splices: subject to approval of Consultant.

2.2 Fabrication

- .1 Fabricate reinforcing steel only in permanent fabricating shop.
- .2 Fabricate reinforcing steel in accordance with shop drawings.
- .3 Tag reinforcing bars to indicate placement as designated on shop drawings.
- .4 Splices:
 - .1 Provide splices only where specifically indicated on Drawings.
 - .2 Stagger alternate mechanical splices 750 mm apart.
 - .3 Stagger alternate end bearing splices 750 mm apart.
 - .4 Install on threaded splices, plastic internal coupler thread protector and plastic bar end thread protector.

PART 3 EXECUTION

3.1 Examination

- .1 Before starting this work, examine work done by others which affects this work.
- .2 Examine formwork to verify that it has been completed, and adequately braced in place.
- .3 Notify the Consultant of any conditions which would prejudice proper completion of this work.
- .4 Commencement of work implies acceptance of existing conditions.

3.2 Installation

- .1 Place reinforcing steel in accordance with reviewed placing drawings, typical details, and CSA A23.3.
- .2 Adequately support reinforcing and secure against displacement within tolerances permitted.
- .3 Place reinforcing steel to provide minimum spacing and proper concrete cover as noted on drawings.
- .4 Do not cut reinforcement to incorporate other Work.
- .5 Relocate or rebend bars only on written instructions of Consultant.
- .6 Tie reinforcement in place. Do not weld.

3.3 Adjusting

- .1 Adjust and secure reinforcement in correct position immediately before concrete is placed.
- .2 Remove contaminants which lessen bond between concrete and reinforcement.

3.4 Field Quality Control

- .1 Provide competent supervisor, with at least three years of experience in reinforcement placement, to direct placement of reinforcement.
- .2 Inspect placement of reinforcement for conformance with Drawings and Specifications, before each concrete placement, and correct as necessary.
- .3 Consultant's periodic review of selected areas of reinforcement are for verification of conformity to design concept and general arrangement only and shall not relieve Contractor of responsibility for quality control, errors, or omissions, or conformance with requirements of Contract Documents.

3.5 Defective Work

- .1 Incorrectly fabricated, misplaced or omitted reinforcement will be considered defective Work.
- .2 Replace or adjust defective reinforcement before concrete is placed as directed by Consultant.
- .3 Replace or strengthen concrete work which is deficient as a result of incorrectly fabricated, misplaced, or omitted reinforcement, which was not corrected before concrete was placed.
- .4 Pay for additional inspection and testing, redesign, corrective measures, and related expenses, if Work has proven to be deficient.

3.6 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- | | | |
|----|------------------|-----------------------------------|
| .1 | Section 03 10 00 | Concrete Forming and Accessories |
| .2 | Section 03 20 00 | Concrete Reinforcing |
| .3 | Section 04 05 19 | Masonry Anchorage and Reinforcing |
| .4 | Section 04 22 00 | Concrete Unit Masonry |
| .5 | Section 05 50 00 | Metal Fabrications |
| .6 | Section 07 92 00 | Joint Sealants |

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM C260/C260M-10a (2016) Standard Specification for Air Entraining Admixtures for Concrete
 - .2 ASTM C295/C295M-19 Standard Guide for Petrographic Examination of Aggregates for Concrete
 - .3 ASTM C309-19 Standard Specification for Liquid Membrane Forming Compounds for Curing Concrete
 - .4 ASTM C330/C330M-17a Standard Specification for Lightweight Aggregates for Structural Concrete
 - .5 ASTM C494/C494M-19 Standard Specification for Chemical Admixtures for Concrete
 - .6 ASTM C881/C881M-20a Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
 - .7 ASTM C1017/C1017M-13e1 Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
 - .8 ASTM C1107/C1107M-20 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
 - .9 ASTM D412-16 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
 - .10 ASTM D570-98(2018) Standard Test Method for Water Absorption of Plastics
 - .11 ASTM D624-00(2020) Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
 - .12 ASTM D638-14 Standard Test Method for Tensile Properties of Plastics
 - .13 ASTM D1259-06(2018) Standard Test Methods for Nonvolatile Content of Resin Solutions
 - .14 ASTM D1751-18 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
 - .15 ASTM D2240-15e1 Standard Test Method for Rubber Property—Durometer Hardness
 - .16 ASTM D5329-20 Standard Test Methods for Sealants and Fillers, Hot-Applied, for Joints and Cracks in Asphalt Pavements and Portland Cement Concrete Pavements
- .2 American Concrete Institute (ACI)
 - .1 ACI 117-10 Specifications for Tolerances for Concrete Construction and Materials.
 - .2 ACI 232.1R-12 Report on the Use of Raw or Processed Natural Pozzolans in Concrete
- .3 CSA Group (CSA)
 - .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete.
 - .2 CSA A283:19 Qualification Code for Concrete Testing Laboratories.
 - .3 CSA A3000-18 Cementitious Materials Compendium
- .4 Ontario Provincial Standard Specifications (OPSS)

- .1 OPSS 1010 Material Specification for Aggregates - Granular A, B, M and Select Subgrade Material.
- .2 OPSS 1212 Material Specification for Hot-Poured Rubberized Asphalt Joint Sealing Compound.
- .5 Government of Canada Treasury Board Secretariat (TBS)
 - .1 Standard on Embodied Carbon in Construction

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Samples: Submit for inspection, material samples of specified mix designs.
- .3 Concrete Mix Designs:
 - .1 Submit concrete mix designs for review. Specify intended use for each mix design.
 - .2 Review of mix design does not relieve Contractor from responsibility for compliance with Contract Documents.
 - .3 Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA A23.1. Mix design shall be adjusted to prevent alkali aggregate reactivity problems.
 - .4 Provide certification that plant, equipment, and all materials to be used in concrete comply with the requirements of CSA A23.1.
 - .5 Submit written requests for use of admixtures not specified, for site mixing of concrete, and for use of bonding agents.
 - .6 Submit in writing, proposed method of in-situ strength testing.
- .4 Inspection Reports: Inspection and Testing Company shall:
 - .1 Submit written reports of inspection and tests.
 - .2 Distribute reports as follows:
 - .1 Consultant;
 - .2 Contractor.
 - .3 On concrete cylinder test reports, include:
 - .1 Specific location of concrete represented by sample
 - .2 Design strength.
 - .3 Unit weight of sample
 - .4 Class of exposure
 - .5 Aggregate size and mixtures incorporated
 - .6 Date, hour and temperature at time sample taken
 - .7 Percentage air content
 - .8 Test strength of cylinder
 - .9 Type of failure if test fails to meet specification.

1.5 Quality Assurance

- .1 Obtain a copy of CSA A23.1/A23.2 and maintain on site.
- .2 Source Quality Control:
 - .1 Both source quality control, and field quality control specified in Article 1.5.4, may be performed by an Inspection and Testing Company appointed by Consultant.
 - .2 Review provided by Inspection and Testing Company does not relieve the Contractor of his sole responsibility for quality control over Work. Performance or non- performance of Inspection and Testing Company shall not limit, reduce, or relieve Contractor of his responsibilities in complying with the requirements of the Specification.

- .3 Inspection and Testing Company shall be certified under CSA A283, Qualification Code for Concrete Testing Laboratories, for Category 1 Certification.
- .4 Payment for specified Work performed by Inspection and Testing Company will be made from Cash Allowance.
- .5 Payment for additional tests (including testing of structure and its performance and load testing) required by changes of materials or mix design requested by Contractor, and failure of completed Work to meet specified requirements, shall be made at Contractor's expense.
- .6 Perform Work of source quality control in accordance with CSA A23.2 and to include:
 - .1 Verification that ready-mix supplier is qualified to supply concrete in accordance with Specification.
 - .2 Review of proposed concrete mix designs.
 - .3 Sampling, inspection, and testing of materials as may be required.
- .3 Field Quality Control:
 - .1 Inspection and Testing Company, when appointed as specified for Source Quality Control, shall perform sampling, inspection and testing of concrete work at site.
 - .2 Perform sampling, inspection and testing in accordance with CSA A23.2, and to include:
 - .1 Making of standard slump tests.
 - .2 Obtaining of three standard specimens for strength tests from each 100 m of concrete, or fraction thereof, of each mix design of concrete placed in any one day. In addition, for slabs-on-grade, obtain beam specimens for determination of modulus of rupture.
 - .3 Verification that test specimens are stored within an enclosure, maintained at specified temperatures.
 - .4 Making compression tests of each set of three specimens, one at 7 days and two at 28 days; modulus of rupture tests at 90 days.
 - .5 Verification of air content of air-entrained concrete.
 - .1 For Class of exposure F-1, and C-2, test at frequency in accordance with CSA A23.1.
 - .2 Make first test before placing any concrete.
 - .3 After stable air content has been established, frequency of tests will be determined by Consultant.
 - .4 For other Classes of exposure, test at time of obtaining strength test specimens.
 - .3 Inspection for Tolerances:
 - .1 Confirm that concrete work meets specified tolerance requirements.
 - .2 Use the elevation survey records of elevations of finished concrete surfaces specified in Section 03 10 00 and this section as basis for judging compliance.
 - .3 Use approved aluminum straightedge to judge compliance with specified slab tolerances, except use dipstick equipment where F-number tolerance is specified.
 - .4 Slabs-on-Grade:
 - .1 Observe application of curing compound to sample slab, recording rate of application.
 - .2 Monitor on a random basis acceptable to the Consultant, that slab is being saw cut before slab temperature starts to fall.
 - .3 Qualifications: Floor finishing shall be undertaken only by contractors with at least 10 years of experience.
 - .4 Sample of Finish Flooring:
 - .1 Finish an area of floor slab where directed by Consultant to provide sample of finish for approval.
 - .2 Protect new sample area until finish is approved.
 - .3 If liquid membrane curing compound is to be used on Project, determine and apply correct quantity required to meet rate of coverage recommended by manufacturer for measured test area.
 - .4 Approved sample will provide standard by which subsequent finishing will be judged and will be incorporated into Work.

1.6 Tolerances

- .1 In accordance with ACI 117 and CSA A23.1.
- .2 Difference between elevation of high point and low point in specified area not to exceed:
 - .1 In any bay up to 100 m²: 12 mm.
 - .2 In any bay up to 400 m²: 25 mm.
- .3 Straightedge method: Finish floor slabs to meet following tolerances when measured at 72 +/- 12 hours after completion of floor finishing, before shores are removed from formed slabs, by placing a freestanding unlevelled straight edge anywhere on slab and allowing it to rest on two high points. Gap between straightedge placed on two high points and slab not to exceed:
 - .1 3 metre straightedge: 8 mm (Class A).
 - .2 2 metre straightedge: 4 mm.

1.7 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.

1.8 Job Conditions

- .1 Protect floor slabs, and concrete surfaces exposed to view or on which finishes are to be applied, from grease, oil, and other soil which will affect the appearance of the concrete, or impair the bond of finish material.
- .2 Environmental Conditions: In addition to Cold Weather and Hot Weather Requirements of CSA A23.1, the following shall apply to Work of this Section:
 - .1 Provide protection or heat, or both, so that temperature of concrete at surfaces is maintained at not less than 21 ° C for three days after placing, not less than 10 ° C for the next two days and above freezing for the next two days.
 - .2 Do not permit alternate freezing and thawing for fourteen days after placing.
 - .3 Vent exhaust gases from combustion type heaters to atmosphere outside protection enclosures.
 - .4 Provide protection to maintain concrete continuously moist during curing period.
 - .5 For field cured cylinders representing strength development of in-situ concrete, provide same specified hot and cold weather protection for storage of each concrete compression specimen as for concrete from which it was taken, until it is sent to testing laboratory.
 - .6 Do not place concrete during rain. Should rain commence during placing, cover freshly placed concrete.
 - .7 Do not place bonded toppings on rough slabs that are less than 15 °C.
 - .8 Do not grout at ambient air temperatures or concrete surface temperatures less than 5 ° C, or when temperature is forecast to fall to less than 5 ° C within 24 hours of grouting.
 - .9 Do not apply sealants at ambient air temperatures or concrete surface temperatures less than 5 ° C.

1.9 Project Records

- .1 Maintain record of all concrete pour related to time, date, delivery slip serial number and location of each concrete pour and identify related test cylinders. Keep records on site until project is completed.
- .2 Delivery Records: File duplicate copies of concrete delivery slips on which shall be recorded: supplier, serial number of slip, date, truck number, contractor, Project, Class of exposure,

cementing materials content, air content, volume in load, and time of first mixing of aggregate, cementing materials and water.

- .3 Record Drawings:
 - .1 Record on a set of Drawings:
 - .1 founding elevations of all footings
 - .2 variations of foundation Work from that indicated on Drawings.
 - .2 Make record drawings available for Consultant's inspection at all times.

1.10 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 To meet specified requirements of referenced Standards.
- .2 Cement:
 - .1 Portland Cement: to CSA A3000.
 - .2 Cementitious Hydraulic Slag: to ACI 232.1R
- .3 Fine Aggregate: For slabs-on-grade, fineness modulus of fine aggregate to be between 2.7 and 3.1.
- .4 Coarse Aggregates:
 - .1 20 mm to 5 mm (No. 4 sieve) except as specified below.
 - .2 For slabs-on-grade 125 mm and thicker: 40 mm to 5 mm (No. 4 sieve); combine at least two of the single sizes specified in Table 5 Group II of CSA A23.1, one of which is to be 40 mm, to obtain maximum bulk density (unit weight) and optimum grading, in accordance with an approved procedure.
 - .3 For slabs-on-grade: Abrasion loss not to exceed 35%. Petrographic number of aggregate not to exceed 125 when tested in accordance with ASTM C295.
 - .4 For toppings 50 mm thick and less and for slabs over open web steel joists: 12 mm to 5 mm (No. 4 sieve).
- .5 Admixtures:
 - .1 Conform to Reference Standards for chemical and air-entraining admixtures.
 - .2 Provide only admixtures that are free of chlorides.
 - .3 When requested, provide evidence acceptable to Consultant that superplasticizer does no increase shrinkage of concrete.
- .6 Curing-Sealing Compound: Membrane curing-sealing compound formulated from chlorinated rubber resins, or acrylic emulsion, solvent free for use in occupied buildings, to ASTM C309, type 1.
 - .1 Basis-of-Design Product: Euclid Chemical Company; Diamond Clear 350 or a comparable product by one of the following:
 - .1 BASF Corporation - Construction Systems.
 - .2 Sika Corporation
 - .3 W.R. Meadows
- .7 Bonding Agent: To ASTM C881, 100% reactive, 2 component, low viscosity, high modulus bonding adhesive.

- .8 Saw Cut Filler: Semi-rigid epoxy or polyurea in accordance with ACI 302.1R for joint fillers used in control and construction joints.
 - .1 Basis of Design Euco 700 or Euco QWIKjoint UVR by Euclid Chemical.
- .9 Premoulded Joint Fillers: Bituminous impregnated fiber board: to ASTM D1751.
- .10 Sealant: Refer to Section 07 92 00 – Joint Sealants
- .11 Mechanical Anchors: 'Kwik' Bolts, 'Cinch' Anchors or Parabolts.
- .12 Weep hole tubes: plastic.

2.2 Concrete Mixes

- .1 Ready Mix, with 28 day compressive strength as indicated on Drawings.
- .2 Design concrete mix in conformance with CSA A23.1, Tables 1, 2, 5 (Alternative 1) and 17, and as follows. Provide concrete meeting water/cementing materials ratio and air content of Table 14 in accordance with Class of exposure specified in following sub-paragraphs, and minimum strength specified on Drawings. Note that concrete designed in accordance with water/cementing materials ratio of Table 14 may yield strength exceeding minimum strength specified on Drawings.
 - .1 Class of exposure C-2 with 25 percent Portland cement replaced with cementitious hydraulic slag: for pavements, sidewalks, curbs and gutters.
 - .2 Class of exposure F-2 with 25 percent Portland cement replaced with cementitious hydraulic slag: for grade beams, and for exposed exterior beams, columns, walls and slabs.
 - .3 Slabs-on-Grade:
 - .1 Use type 20 Portland cement, or replace 35 percent Portland cement with cementitious hydraulic slag.
 - .2 When mean daily temperature exceeds 25 ° C at time of placement, replace 25 percent of type 20 cement, or 50 percent of type 10 cement, with cementitious hydraulic slag.
 - .3 Use water/cementing materials ratio 0.45 maximum.
 - .4 Use aggregates specified in paragraphs 2.1.3.
 - .5 Cementing materials content 325 kg/m.
 - .6 Modulus of rupture 3.5 MPa average, 3.0 MPa minimum.
 - .7 Slump at delivery, before addition of superplasticizer, 50 mm; add superplasticizer, not water, to bring slump to level acceptable to floor finisher for placement.
 - .4 Interior Concrete, other than specified above, and not exposed to freezing and thawing or the application of deicing chemicals: select water/cementing materials ratio and cementing materials content on basis of strength, workability, and finishing requirements.
- .3 Submit evidence, and material samples, if requested, acceptable to the Inspection and Testing Company, to verify that the proposed concrete mix design will produce specified quality of concrete.
- .4 List all proposed admixtures in mix design submission. Do not change or add admixtures to approved design mixes without Consultants approval.
- .5 Concrete Weight: Air dry unit weight: minimum 2,300 kg/m; adjusted proportionally for maximum air content listed in CSA A23.1, Clause 15, Table 10.
- .6 Concrete supplier to provide documentation indicating the requirements of TBS Standard on Embodied Carbon in Construction have been met.

2.3 Admixtures

- .1 Chemical Admixture: To ASTM C494. Incorporate water-reducing admixture, type WN, in all concrete.
- .2 Air Entraining Agent: To ASTM C260. Incorporate air-entraining agent in addition to chemical admixture in concrete of relevant Class of exposure, in accordance with CSA A23.1, Clause 15, Table 10.
- .3 Chloride: Do not use calcium chloride or admixtures containing chloride in concrete.

2.4 Concrete Toppings

- .1 Provide topping with minimum 28 day compressive strength of 32 MPa.

2.5 Premixed Grout

- .1 Non-Shrink Metallic: Non-catalyzed metallic grout to ASTM C1107, Compressive strength at 28 days: 48 MPa.
- .2 Non-Shrink, Non Stain, Non-Metallic: to ASTM C1107. Compressive strength at 28 days: 59 MPa.
- .3 Flowable Grout: High-tolerance Non-shrink, Non-metallic shrinkage compensating grout to ASTM C1107. Compressive strength at 28 days: 59 MPa.

PART 3 EXECUTION

3.1 Examination

- .1 Before starting this work, examine work done by others which effects this work.
- .2 Notify Consultant of any condition which would prejudice proper completion of this work.
- .3 Confirm that surfaces on which concrete is to be placed are free of frost and water before placing.
- .4 Confirm that reinforcement, dowels, control joints, inserts and all other built in work are in place and secured.
- .5 Commencement of work implies acceptance of existing conditions.

3.2 Treatment of Formed Surfaces

- .1 Conform to the requirements of CSA A23.1, and as additionally specified herein.
- .2 Treat concrete surfaces which will be exposed or painted in the completed building to provide a "Smooth Rubbed Finish" in accordance with CSA A23.1, uniform in colour and texture.
- .3 Plugs at Recessed Ties:
 - .1 Clean tie holes to remove all foreign matter.
 - .2 Coat plugs by dipping in adhesive and insert in hole.
 - .3 Remove excess adhesive immediately with thinner which will not stain concrete, as recommended by manufacturer.

- .4 Obtain Consultant's approval of finished exposed concrete and grind or otherwise correct to the satisfaction of the Consultant.

3.3 Placing Concrete

- .1 Place concrete in accordance with requirements CSA A23.1/A23.2.
- .2 Notify Consultant and inspection and testing firm at least 24 hours prior to commencement of concrete placing operation and 24 hours before wall forms are closed in.
- .3 Obtain Geotechnical Engineer's confirmation that thickness, elevation and compaction of sub-grade meets specifications before placing concrete.
- .4 Do not place concrete in water or open frozen surfaces.
- .5 Remove contaminants which lessen concrete bond to reinforcement before concrete is placed.
- .6 Maintain accurate records of cast in place concrete items. Record date, location of pour, quantity, air temperature and test samples taken.
- .7 Ensure that reinforcement, inserts, embedded items, formed expansion joints and the like, are not disturbed during concrete placement.
- .8 Joint fillers:
 - .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Consultant.
 - .2 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
 - .3 Locate and form isolation, construction and expansion joints as indicated.
 - .4 Install joint filler.
 - .5 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.
- .9 Provide construction joint as indicated on the drawings. Ensure dowels are adequately anchored and placed at right angles to the joint before placing concrete.
- .10 Place floor slabs to depth indicated on the drawings with 25 MPa minimum concrete unless otherwise noted on drawings but consistent with minimum cement content specified for exposed floors in this specification.
- .11 Sloping Surfaces and Slabs: commence concrete placement at bottom of sloping surfaces.

3.4 Finishing Concrete

- .1 Perform finishing operations on plastic concrete surfaces in accordance with CSA A23.1, and as specified herein.
- .2 Refer to the drawings for floor finishes and coverings.
- .3 Screed the top of rough floor slabs to an even level or sloping surface at the proper elevation to receive the finish or topping specified on the drawings and in finish schedule.
- .4 Provide a smooth steel trowel finish on all areas scheduled to receive a covering, or painted finish.

- .5 Exposed Floor Surfaces: Provide hard, smooth, dense, steel troweled surface, free from blemishes, and of uniform appearance.

3.5 Curing

- .1 Cure concrete in accordance with CSA A23.1 and as specified herein.
- .2 Curing Compound Method:
 - .1 Use curing and sealing compound specified except:
 - .1 On surfaces to receive epoxy or similar paint finish.
 - .2 On surfaces to which architectural finishes will be adhered, the adhesives for which are incompatible with the curing compound.
 - .3 Air-entrained concrete for exterior slabs and sidewalks placed between October 1st and March 31st.
 - .3 Select acrylic water compound except that if ambient conditions extend drying time unduly and if area is well ventilated and unoccupied by other workers, solvent based compound may be used.
 - .4 Apply curing compound in accordance with manufacturer's instructions, increasing application rate as necessary to cover surface completely.
 - .5 Curing Blanket or Wet Burlap Method: For exterior sidewalks and other finished concrete surfaces that will be exposed to freezing and thawing or deicing chemicals:
 - .1 Cover with curing blanket or wet burlap overlaid with 0.102 mm thick polyethylene and maintain in place for the additional curing for durability period in accordance with CSA A23.1 but in no case for less than 7 days.
 - .2 Wet blanket or burlap regularly to maintain in moist condition. Do not allow to dry out.
 - .6 Cure finished concrete surface with an approved curing and sealing compound which will leave the surface with a uniform appearance and with a minimum of discolouration after drying. Ensure that the curing compound will be compatible with the architectural finishes or adhesives for finishes to be applied later. Apply the compound in strict accordance with the manufacturer's instructions.
 - .7 Protect surface which will be exposed to direct sunlight during the curing period, with a light coloured, laminated waterproof paper immediately after the curing and sealing compound has hardened sufficiently for the paper to be placed without damage to the sealed surface. Lap the paper a minimum of 100 mm and seal the laps. Leave the paper in place for at least seven days.

3.6 Grouting

- .1 Mix prepackaged grout with water in accordance with manufacturer's printed instructions.
- .2 Dampen concrete surfaces immediately before installing grout.
- .3 Use non-shrink and shrinkage-compensating grouts only when grout will be contained against expansion and self-disintegration.
- .4 Slope grout beyond edge of plate at 45 degrees.
- .5 Provide same environmental protection and curing as specified for concrete.

3.7 Joint Sealant

- .1 Apply sealant specified in Section 07 92 00 to thoroughly dry surfaces only, at ambient air temperatures above 5 ° C.
- .2 Provide sealant on top of joint filler with a polyethylene bond breaker between joint filler and joint sealant applied in accordance with manufacturer's direction.
- .3 Confirm that preformed joint filler and backer rod are compatible with sealant.
- .4 Caulk joints in accordance with the following:
 - .1 Do not commence joint preparation until concrete is at least 28 days old.
 - .2 Thoroughly clean sides of joints with mason's router, or power saw, equipped with double blade where necessary to suit joint width.
 - .3 Blow clean with compressed air with oil trap on line, or vacuum clean.
 - .4 Install backer rod of diameter 25 percent greater than joint width, and type recommended by sealant manufacturer to be compatible with sealant. Locate backer rod to provide for sealant depth of one-half joint width, but not less than 12 mm.
 - .5 Prime joint if required, as recommended by sealant manufacturer.

3.8 Defective Work

- .1 Variations in excess of specified tolerances and marked and disfigured surfaces that cannot be repaired by approved methods will be considered defective work.
- .2 Replace or modify concrete that is out of place or does not conform to lines, detail or grade as directed by the Consultant.
- .3 Replace or repair defectively placed or finished concrete as directed by the Consultant.
- .4 Testing and Replacement of Deficient Concrete in Place:
 - .1 Pay for additional testing and related expenses if concrete has proven to be deficient.
 - .2 Replace or strengthen deficient concrete work as directed by the Consultant, and pay for all testing and related expenses for replaced work until approved by the Consultant.

3.9 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Clear away from the building site excess and waste materials and debris resulting from Work of this Section.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 04 01 00.91 Cleaning and Restoration of Masonry in Historic Structures

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM C207-18 Standard Specification for Hydrated Lime for Masonry Purposes
 - .2 ASTM C270-19ae1 Standard Specification for Mortar for Unit Masonry
 - .3 ASTM C1713-23 Standard Specification for Mortars for the Repair of Historic Masonry
- .2 CSA Group (CSA)
 - .1 CSA A179-14 (R2019) Mortar and Grout for Unit Masonry
 - .2 CSA A371-14 (R2019) Masonry for Buildings
 - .3 CSA A3000-18 Cementitious Materials Compendium

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit 3 samples of each mortar selected by the Consultant. The samples must be correctly identified and presented in U-shaped plastic extrusions measuring 10 mm x 10 mm x 100 mm in length.
- .3 Product data: Submit Technical Data Sheet of each mortar or grout used. The Technical Data Sheet must include the product's characteristics, performance criteria and limits.

1.5 Preexisting Conditions

- .1 Identify any structural weaknesses that might affect the completed work and report them before commencing work.
- .2 Examine mortar joint profiles and the methods to reproduce them before repointing.
- .3 Examine the vertical and horizontal joints in order to determine which were done first and if they all have the same profile; also keep in mind the other execution details that define the authenticity of the original work.

1.6 Quality Assurance

- .1 Construct masonry wall mock ups with specified mortar as described in Section 04 01 00.91.

1.7 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

- .3 The mortar and grout bags must be stored on wooden pallets and protected against inclement weather.

1.8 Project Conditions

- .1 Cold Weather Placement:
 - .1 When the temperature during the day ranges from:
 - .1 0 ° C to 4 ° C: The sand or mixing water must be heated to a temperature between 20°C and 70°C.
 - .2 0 ° C to -4 ° C: The sand and the mixing water must be heated to a temperature between 20 and 70 ° C.
 - .3 -4 ° C to -7 ° C:
 - .1 The sand and mixing water must be heated to a temperature between 20 ° C and 70 ° C.
 - .2 Both sides of the walls under construction must be heated.
 - .3 Windbreakers must be used when wind speed exceeds 25 km/h.
 - .4 -7 ° C and lower:
 - .1 The sand and the mixing water must be heated to a temperature between 20 ° C and 70°C.
 - .2 Enclosures and supplementary heating must be planned for in order to maintain air temperature above 0 ° C.
 - .3 The temperature of the masonry unit at the time of placement cannot be less than 7 ° C.
 - .2 Hot Weather Placement: Cover the opening with a waterproof non-staining tarpaulin to prevent it from drying too quickly.
- .2 Mortar shall never be directly exposed to the sun or to high wind for a long period.

1.9 Protective Measures

- .1 Keep masonry dry using secure waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from snow, rain and dirt, until masonry work is completed and protected by flashings or other permanent construction.
- .2 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.
- .3 Provide temporary bracing of masonry work during and after erection until mortar has cured and permanent lateral support is in place.
- .4 Provide protection boards over exposed corners, vulnerable decorative work and all openings such as doors and windows which may be damaged by construction activities.
- .5 Maintain protection for the duration of the work. Remove and dispose of protective material as directed by the Consultant.
- .6 Protect rainwater leaders, eavestroughs and gutters against blockage and damage by wastes and residues before commencement of work. Install suitable protection on all drains while maintaining normal water flow at all times.
- .7 Prevent the entry of dust, debris and water into the building by sealing all openings.

.8 Provide protection against the spread of dust debris and water at or beyond the work area by suitable enclosures.

.9 Protect all existing flashings and appurtenances at all times.

1.10 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.11 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Materials

.1 Mortar and grout materials must be provided by the same supplier.

.2 All mortar and grout must be manufactured in a plant where processes are certified ISO 9001:2008.

.3 Portland Type GU Cement, conforming to standard CSA A3000.

.4 Hydraulic lime Type S, conforming to standard ASTM C207.

.5 Mortar should contain an air admixture agent.

.6 Sand: Fine-grain sand granulometry conforming to Table 1 of standard CSA A179.

.7 Water: Only use clean potable water free of harmful substances such as oils, acids, salts and organic matter

.8 Pigments: Use iron oxide pigments. The percentage of pigments should not exceed 10% of the binder density.

.9 It is strictly prohibited to use any type of additive to alter the setting time, workability or any other property of the plastic or cured mortar.

2.2 Types of Mortar

.1 All mortars described hereafter are low-compressive strength mortars and are manufactured by King Packaged Materials Company.

.2 Each type of mortar must be factory pre-blended with the raw materials, and then mixed with water at the construction site according to the manufacturer's instructions.

.3 For structures built after 1925:

.1 Repointing: Use a Type O Mortar such as KING MasonCare 300, or a hydraulic-lime-based mortar such as KING HLM-350, or a Pozzolan-lime-based such as the KING PHL-350.

- .2 Replacing masonry Unit: Use a hydraulic-lime-based mortar such as the KING HLM-500 or a Pozzolanic-lime-based mortar such as the KING PHL-500.

2.3 Types of Grout

- .1 All grouts mentioned hereafter are low-compressive-strength grouts and are manufactured by KING PACKAGED MATERIALS COMPANY.
- .2 It is strictly prohibited to use mortar as grout.
- .3 Each type of grout must be factory pre-blended with the raw materials, and then mixed with water at the construction site according to the manufacturer's instructions.
- .4 For structures built between 1925 and 1975, use a Portland-cement-based grout with a low compressive strength such as KING HL-5 or KING LS.
- .5 For structures built after 1975, use a Portland-cement-based grout with a low compressive strength such as KING LS or KING E-15.

PART 3 EXECUTION

3.1 Preparation

- .1 The cutting depth of the joints to be redone must be around 25 mm (from 2 to 2½ times the thickness of a 10 mm joint), or until you reach the mortar that is sound looking. During the work described hereafter, the contractor-mason must be very diligent to prevent any damage to the stone, the biscuit or the edge of the brick.
- .2 Verify the state of the joints and remove deteriorated mortar using one of the following methods:
 - .1 Using a cold chisel, either by hand or attached to a compressed air cannon, apply a light pressure so as not to damage the masonry unit.
 - .2 Using a radial saw (with a 100 mm diameter diamond blade) for the horizontal joints. However, this can only be done by experienced workers who are recognized for their ability to do this kind of work. If this is the case, then only drill at the centre of the joint and finish the job using a chisel.
 - .3 Remove the waterproofing product around the edge of the openings (doors, windows, etc.) in order to be able to re-point as much of the surface as possible.
 - .4 Determine whether or not the voids need to be refilled.
 - .5 Before repointing, the contractor must inform the Consultant if he/she finds any voids that are not specified on the plans and are structurally abnormal.

3.2 Mixing Mortar

- .1 Mix the mortar using a clean mortar mixer or an electric drill fitted with an appropriate end piece free of dried mortar, traces of rust and other contaminants; do not thaw equipment with salt or other anti-freeze agents.
- .2 Conformity: Comply with the requirements, recommendations and specifications indicated on the manufacturer's Technical Data Sheet.
- .3 Mix the repointing mortar until you get a consistency that's firm enough to form a ball with your hands. If using KING MasonCare 300, let it rest for about 30 minutes before applying.

- .4 The total mixing time should not take less than 3 minutes or longer than 5 minutes. Coloured mortar should be mixed between 8-10 minutes.
- .5 If using 30-kg bags of coloured or non-coloured mortar, the contractor must not mix less than one bag at a time.

3.3 Mixing Grout

- .1 Mix the grout using a clean electric drill free of dried mortar or traces of rust and other contaminants, or using a conventional grout mixer. If using KING HL-5 grout, use a high-shear mixer. Do not thaw equipment with salt or other anti-freeze agents.
- .2 Conformity: Comply with the requirements, recommendations and specifications indicated on the manufacturer's Technical Data Sheet.
- .3 If using 30 KG bags of grout, the contract must not mix less than one bag at a time.

3.4 Placement Timeframe for Mortar and Grout

- .1 Mortar
 - .1 If room temperature is equal to or greater than 25 ° C, mortar must be placed in under 1.5 hours after mixing. If room temperature is less than 25 ° C, mortar must be placed in under 2.5 hours after mixing.
- .2 Grout
 - .1 Grout must be placed in under 1.5 hours after mixing.

3.5 Remixing

- .1 With the exception of hydraulic-lime-based mortars, remixing is done to ensure the necessary workability of the mortar

3.6 Repointing

- .1 Use potable water to wash off all dust and residue from the exposed joints, but leave a bit of moisture in the existing joints to prevent water from absorbing too quickly into the old and pre-existing mortar.
- .2 Apply a first layer of mortar in the joints in a manner to obtain a uniform depth (+ 25 mm) using a pointing trowel to fill in the joints; once this layer has cured (24 hours), apply successive layers of 6 mm. Make sure each layer is well compacted to prevent air pockets, and allow each layer to lightly cure before applying the next one, until you are level with the wall surface. Finish the new joints in the same way as the original ones.

3.7 Colour Uniformity

- .1 In order to ensure colour uniformity of the mortar, the contractor must:
 - .1 Use the same supplier for all mortar and grout.
 - .2 Ensure that the quantity of water in the mortar joints remains the same while smoothing them.

- .3 Always use a clean mixer.

3.8 Curing

- .1 Curing is essential to optimize the physical properties of mortar.
- .2 Curing must be done using a moist cure starting with the initial setting of the mortar.
 - .1 During working hours, spray the mortar lightly with water using a sprayer.
 - .2 pAfter working hours and on weekends, create a system whereby the mortar is enclosed with a jute, which is in turn enclosed by polyethylene, and constantly wet it so that it remains humid creating a greenhouse effect.
 - .3 The jute and polyethylene should never come in direct contact with the mortar. Leave a minimum space of 102 mm between the jute and the wall surface to allow air to circulate.
 - .4 Minimum cure times:
 - .1 For KING MasonCare 300: 3 days
 - .2 For KING HLM-350: 7 days
 - .3 For KING HLM-500: 7 days
 - .4 For KING PHL-350: no cure is needed
 - .5 For KING PHL-500: no cure is needed

3.9 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Protect the masonry works and the adjacent work from soiling and other damaging elements.
- .3 Cover the finished work with tarpaulin to protect them against mortar spatter.
- .4 After finishing the work, remove the excess mortar using a wooden blade. Once the mortar has sufficiently cured:
 - .1 Moisten the wall surface with clean water, starting from the bottom.
 - .2 Scour the wall surface with soapy water and a non-metallic brush with hard bristles, starting from the top.
 - .3 Rinse with clean water as needed

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 04 22 00 Concrete Unit Masonry
- .2 Section 05 12 23 Structural Steel

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A153/A153M-23 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- .2 CSA Group (CSA)
 - .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete.
 - .2 CSA S304-14 (R2019) Design of Masonry Structures.
 - .3 CSA A370-14 (R2018) Connectors for Masonry.
 - .4 CAN/CSA A371-14 (R2019) Masonry Construction for Buildings.
 - .5 CSA G30.3-M1983 (R1998) Cold-Drawn Steel Wire for Concrete Reinforcement.
 - .6 CSA G30.18-09 (R2014) Carbon Steel Bars for Concrete Reinforcement
 - .7 CSA W186-M1990 (R2016) Welding of Reinforcing Bars in Reinforced Concrete Construction
- .3 American Concrete Institute (ACI)
 - .1 Detailing Manual
- .4 Reinforcing Steel Institute of Canada (RSIC)
 - .1 Reinforcing Steel Manual of Standard Practice

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit the following samples:
 - .1 Two of each type of masonry reinforcing and connector specified.
- .3 Product Data: Submit manufacturer's printed product literature, specifications and data sheets.
- .4 Shop Drawings:
 - .1 Submit shop drawings for all masonry reinforcing. Include placing drawings, bar lists and details. Indicate clearly reinforcing bar sizes, spacing, bending details, lap details, dowels to adjacent construction location and quantities of reinforcement and connectors.
 - .2 Prepare placing drawings and bar lists in accordance with the American Concrete Institute (ACI) Detailing Manual, and the Reinforcing Steel Institute of Canada (RSIC) Reinforcing Steel Manual of Standard Practice, the typical details included with Contract Documents.
 - .3 Prepare placing drawings to minimum scale of 1:50.
 - .4 Submit placing drawings and bar lists sufficiently detailed and dimensioned to permit correct placement of reinforcement and accessories without reference to architectural or structural Drawings.
 - .5 Show reinforcement, including dowels, in elevation on placing drawings for wall reinforcement.
 - .6 Show cover to reinforcement

.7 Show location of construction joints.

1.5 Design Criteria

- .1 Non-conventional Masonry Connectors
 - .1 Deflection: maximum 2.0 mm, including free play when acted upon by 0.45 kN lateral load, in all possible positions of adjustment.
 - .2 Positive restraint at position of maximum adjustment.
- .2 Multi-component Ties - Free Play: Maximum 1.2 mm, when assembled in any possible configuration.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.7 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 All metal components: hot dipped zinc galvanized to CSA S304 unless otherwise indicated.
- .2 Bar Reinforcement: To CSA A371 and CSA G30.18, grade 400R, deformed billet steel bars.
- .3 Column Ties: Fero CAT Tie (Column Adjustable Tie), spot weld to columns at 400 mm c/c.
- .4 Connectors: to CSA A370 and CSA S304.
 - .1 Finish: Steel components, hot dip galvanized to CAN/CSA A370.
 - .2 Side Mounting Rap Ties:
 - .1 Flat-Plate: Length to suit steel stud width and thickness of gypsum sheathing, membrane and insulation.
 - .2 V-Tie: Length to provide placement of legs at centerline of solid unit veneer.
 - .3 Insulation support.
 - .4 Basis of Design: Side Mounting Rap Ties by Fero Corporation
 - .3 Strip Ties: Prescriptive corrugated strip tie. 100 mm x 22 mm x 0.91 mm thick corrugated tie conforming to CSA A370.
- .5 Wire Reinforcement: To CSA A371 and CSA G30.3.
 - .1 Masonry Veneer Walls: To CSA A370, hot dipped galvanized to ASTM A153, Class B2, 4.76 mm wire diameter, to suit overall wall thickness. BL-42 Ladder Reinforcement and System 2000 Seismic Adjustable Tie by Blok-Lok Ltd.
 - .2 Interior walls: hot dipped galvanized to CSA S304
 - .1 4.76 mm wire diameter hot dipped galvanized to CSA S304 for interior bearing walls.
 - .2 3.66 mm wire diameter bright wire finish, standard duty for interior non-bearing walls and partitions

- .3 Truss Type: Blok-Trus BL-30 by Blok-Lok Ltd. for non-vertically reinforced walls
- .4 Ladder Type: Blok-Trus BL-10 by Blok-Lok Ltd. for vertically reinforced walls

- .6 Equivalent products as manufactured by the following manufacturer's may be used subject to submission and acceptance by the Consultant of technical data:
 - .1 Hohmann and Barnard Inc. or approved equivalent.

- .7 Epoxy Adhesive: Hilti HIT-HY 2270 Adhesive anchor or approved equivalent.

2.2 Fabrication

- .1 Fabricate reinforcing in accordance with CSA A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Ontario.
- .2 Obtain Consultant's approval for locations of reinforcement splices other than shown on placing drawings.
- .3 Upon approval of Consultant, weld reinforcement in accordance with CSA W186.
- .4 Ship reinforcement clearly identified in accordance with drawings.

PART 3 EXECUTION

3.1 Installation

- .1 Install masonry reinforcement, connectors and anchors in accordance with CSA A370, CSA A371, CSA A23.1 and CSA S304 unless indicated otherwise.

3.2 Reinforcement

- .1 Unless otherwise noted, all masonry walls shall be reinforced with joint reinforcement.
- .2 Reinforcement shall be installed in the first and second bed joints, 200 mm apart immediately above lintels and below sill at openings, and in bed joints at 400 mm vertical intervals elsewhere. Reinforcement in the second bed joint above or below openings shall extend 600 mm beyond the jambs. All other reinforcement shall be continuous except that it shall not pass through vertical masonry control joints. Side rods shall be lapped at least 150 mm at splices.
- .3 Use prefabricated corner and tee sections for continuous reinforcement at corners and intersecting walls.
- .4 Vertical reinforcement shall have a minimum clearance of 13 mm from the masonry and not less than one bar diameter between bars.
- .5 All block cores containing vertical reinforcing and/or anchor bolts shall be solidly filled with non-shrink grout.
- .6 Place reinforcement and ties in grout spaces prior to grouting.
- .7 Cleanouts: Provide cleanouts in the bottom course of masonry for each grout pour when the grout pour height exceeds 1.5 m.

- .8 Construct cleanouts so that the space to be grouted can be cleaned and inspected. In solid grouted masonry, space cleanouts horizontally a maximum of 800 mm on center.
- .9 Construct cleanouts with an opening of sufficient size to permit removal of debris. The minimum opening dimension shall be 76 mm.
- .10 After cleaning, close cleanouts with closures braced to resist grout pressure.

3.3 Bonding and Tying

- .1 Bond walls of two or more wythes using seismic connectors and ladder type reinforcement in accordance with CSA S304, CSA A371 and as indicated.
- .2 Tie masonry veneer to backing in accordance with CSA S304, CSA A371 and as indicated.
- .3 Masonry ties shall be installed as per the requirements of CSA A371 with maximum spacing of 400 mm vertically and 400 mm horizontally.

3.4 Reinforced Lintels and Bond Beams

- .1 Reinforce masonry lintels and bond beams as indicated.
- .2 Place and grout reinforcement in accordance with CSA S304.

3.5 Metal Anchors

- .1 Do metal anchors as indicated.

3.6 Lateral Support and Anchorage

- .1 Do lateral support and anchorage in accordance with CSA S304 and as indicated.
- .2 Anchor new masonry to existing with steel dowels as indicated. Drill into existing masonry and set reinforcing bars in epoxy adhesive in accordance with manufacturer's instructions.

3.7 Control Joints

- .1 Terminate reinforcement 25 mm short of each side of control joints unless otherwise indicated.
- .2 Control joints shall be stepped to avoid cutting lintel beams. Under no circumstance shall the control joints be placed to compromise the bearing for the lintel.

3.8 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.

3.9 Field Touch Up

- .1 Touch up damaged and cut ends of galvanized reinforcement steel and connectors with compatible finish to provide continuous coating.

3.10 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 04 05 12 Mortar and Grout for Masonry Restoration
- .2 Section 04 05 19 Masonry Anchorage and Reinforcing
- .3 Section 04 27 00 Multiple Wythe Unit Masonry
- .4 Section 06 10 00 Rough Carpentry
- .5 Section 07 27 13 Modified Bituminous Sheet Air Barriers
- .6 Section 07 92 00 Joint Sealants

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM C216-22 Standard Specification for, Facing Brick (Solid Masonry Units Made of Clay or Shale)
- .2 CSA Group (CSA)
 - .1 CSA A82-14 (R2018) Fired Masonry Brick Made from Clay or Shale.
 - .2 CSA A165 Series-14 (R2019) CSA Standards on Concrete Masonry Units
 - .3 CSA A179-14 (R2019) Mortar and Grout for Unit Masonry
 - .4 CSA A371-14 (R2019) Masonry Construction for Buildings.
 - .5 CSA A3000-18 Cementitious Materials Compendium
 - .6 CSA S304-14 (R2019) Design of Masonry Structures
- .3 Brick Industry Association (BIA)
 - .1 Technical Note No. 20-2006 Cleaning Brick Work.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for brick masonry and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Samples: submit duplicate samples of brick in colour and texture specified.

1.5 Quality Assurance

- .1 Test Reports: submit certified test reports including sand gradation tests in accordance with CSA A179 showing compliance with specified performance characteristics and physical properties, and in accordance with Section 04 05 00.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00.
 - .2 Construct mock-up panel of exterior brick construction 1200 x 1800 mm.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect brick masonry from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new

1.7 Project Conditions

- .1 Ambient Conditions: assemble and erect components only when temperature is above 4 ° C.

1.8 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 Face brick:
 - .1 Fired clay brick to CSA A82.
 - .1 Size: To match existing brick.
 - .2 Colour and texture: To match existing brick.
 - .3 Solid/hollow.
 - .2 Reinforcement:
 - .1 Reinforcement in accordance with Section 04 05 19.
 - .3 Connectors:
 - .1 Connectors in accordance with Section 04 05 19.
- .4 Mortar Mixes in accordance with 04 05 12 for repointing & repairs.
- .5 Grout Mixes in accordance with Section 04 05 12 for repairs.
- .6 Control Joint Filler: to ASTM D5249, Type 1, Round, flexible, continuous-length, nonabsorbent, non-gassing, non-staining, and non-shrinking. Extruded from a cross-linked polyethylene. Flexible foam, heat-Resistant Backer Rod. 9.5 mm thick by width of wall.
- .7 Damp Course and Flashings
 - .1 Fully compatible with air barrier membrane specified in Section 07 27 13. Self-adhesive modified SBS bitumen membrane reinforced with proprietary glass screen, minimum thickness of 1.0 mm:
 - .1 Vedagard Non-slip by Bakor Inc.
 - .2 Perm-A-Barrier Wall Flashing by W.R. Grace & Co.
 - .3 Mel-Dek by W.R. Meadows
 - .4 Enverge Flashguard by Firestone.
 - .2 Lap Sealant: recommended by flashing manufacturer.
 - .3 Surface primers and conditioners as recommended by membrane manufacturer.

- .8 Cavity Vents and Weepholes: purpose made PVC vents, with pest resisting design, size to suit masonry units. Cell-Vent with mortar net, or Mor-Control by Dur-O-Wal Inc. Colour to match mortar colour.
- .9 Mortar diverters: shaped and sized to suit cavity spaces.
 - .1 Manufactured from recycled material.
- .10 Mechanical Fasteners: As recommended by manufacturer of material to be fastened, and in accordance with the reference standards, corrosion resistant.
- .11 Packing Insulation: loose glass fibre insulation or mineral wool with minimum density of 17.6 kg/m³.
- .12 Cleaning Compounds:
 - .1 Use low VOC products in compliance with SCAQMD Rule 1168.
 - .2 Compatible with substrate and acceptable to masonry manufacturer for use on products.
 - .3 Cleaning compounds compatible with brick masonry units and in accordance with manufacturer's written recommendations and instructions.

PART 3 EXECUTION

3.1 Examination

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for brick masonry 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.

3.2 Preparation

- .1 Protect adjacent finished materials from damage due to masonry work.

3.3 Installation

- .1 Construction to conform to CSA A371.
- .2 Bond: Match existing.
- .3 Coursing height: Match existing.
- .4 Jointing: concave.
- .5 Mixing and blending: mix units within each pallet and with other pallets to ensure uniform blend of colour and texture.
- .6 Reinforcement: Install reinforcing in accordance with Section 04 05 19.
- .7 Connectors: Install connectors in accordance with Section 04 05 19.
- .8 Mortar Placement: conform to CSA A371.

- .9 Grout Placement: Grout masonry in accordance with CSA S304 and as indicated.
- .10 Repair/Restoration: Upon completion of masonry, fill holes and cracks, remove loose mortar and repair defective work.
- .11 Tolerances: To CSA A371.

3.4 Moisture Control

- .1 Place continuous dampcourse and flashing membrane at the bottom of all exterior walls, including at bottom of walls and over all openings. Extend flashing from exterior face of exterior wythe, turned up backing face minimum 150 mm and bonded to sheathing with adhesive, unless otherwise indicated. Lap all joints 150 mm and seal with adhesive.
- .2 Install weep hole vents in vertical joints immediately over flashings, in exterior wythes of cavity wall and masonry veneer wall construction, at maximum horizontal spacing of 600 mm on centre.
- .3 Mortar diverters: install purpose made diverters in cavities where indicated and as directed, size and shape to suit purpose and function.
- .4 Grout screens: install purpose made diverters in cavities where indicated and as directed, size and shape to suit purpose and function.

3.5 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
- .3 Clean unglazed clay masonry: 10 m² area of wall designated by Consultant as directed below and leave for one week. If no harmful effects appear and after mortar has set and cured, protect windows, sills, doors, trim and other work, and clean brick masonry as follows.
 - .1 Remove large particles with wood paddles without damaging surface. Saturate masonry with clean water and flush off loose mortar and dirt.
 - .2 Scrub with solution of 25 ml trisodium phosphate and 25 ml household detergent dissolved in 1 L of clean water using stiff fibre brushes, then clean off immediately with clean water using hose. Alternatively, use proprietary compound recommended by brick masonry manufacturer in accordance with manufacturer's directions.
 - .3 Repeat cleaning process as often as necessary to remove mortar and other stains.
 - .4 Use acid solution treatment for difficult to clean masonry as described in Technical Note No.20 by the Brick Industry Association.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- | | | |
|----|------------------|------------------------|
| .1 | Section 03 30 00 | Cast-In-Place Concrete |
| .2 | Section 04 22 00 | Concrete Unit Masonry |
| .3 | Section 05 50 00 | Metal Fabrications |
| .4 | Section 06 20 00 | Finish Carpentry |
| .5 | Section 07 21 13 | Building Insulation |
| .6 | Section 07 26 00 | Vapour Retarders |
| .7 | Section 08 11 00 | Metal Doors and Frames |

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A123/A123M-17 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - .2 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
 - .3 ASTM D2559 - 12a(2018) Standard Specification for Adhesives for Bonded Structural Wood Products for Use Under Exterior Exposure Conditions
 - .4 ASTM F1667-21a Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
- .2 CSA Group (CSA)
 - .1 CSA A247- M86 (R1996) Insulating Fiberboard.
 - .2 CSA B111-1974(R2003) Wire Nails, Spikes and Staples.
 - .3 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .4 CSA O80 SERIES-15 Wood Preservation
 - .5 CSA O86-14 Engineering Design in Wood
 - .6 CSA O121-17 Douglas Fir Plywood.
 - .7 CSA O141:23 Canadian Standard Lumber.
 - .8 CSA O151-17 Canadian Softwood Plywood
 - .9 CSA O437 Series-93 (R2011) Standards on OSB and Waferboard
 - .10 CSA Z809-08 Sustainable Forest Management
- .3 Underwriters Laboratories Canada (ULC)
 - .1 ULC 102-2018 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .4 National Lumber Grading Authority (NGLA)
 - .1 Standard Grading Rules for Canadian Lumber, Latest Edition.
- .5 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-2004 FSC Principle and Criteria for Forest Stewardship.
 - .2 FSC-STD-20-002-2004 Structure and Content of Forest Stewardship Standards V2-1
 - .3 FSC Accredited Certified Bodies.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 When required by authorities having jurisdiction, submit sequential erection drawings indicating all necessary false work, temporary construction bracing and hoisting.

- .3 Submit shop drawings for wood trusses stamped and signed by a Professional Engineer registered in the Province of Ontario. Include statement that manufactured wood trusses and beams are designed in accordance with the referenced standards.
- .4 Certified Wood: Submit listing of wood products and materials used, produced from wood obtained from forests certified by FSC Accredited Certification Body in accordance with FSC-STD-01-001.

1.5 Quality Assurance

- .1 Sawn lumber shall be identified by the grade stamp of an association or independent grading agency certified by the Canadian Lumber Standards Accreditation Board.

1.6 Shipping, Handling and Storage

- .1 Protect materials, under cover, both in transit and on the site.
- .2 Store materials to prevent deterioration or the loss or impairment of their structural and other essential properties. Do not store materials in areas subject to high humidity and areas where masonry and concrete work are not completely dried out.
- .3 Store sheathing materials level and flat, in a dry location. Protect panel edges from moisture at all times.

1.7 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 Timber Material shall be 'Grade Stamped'.
- .2 CSA Z809 or FSC Certified.
- .3 Construction Lumber: To CSA O141 Softwood Lumber graded to NLGA Standard Grading Rules for Canadian Lumber, published by the National Lumber Grades Authority. All lumber shall bear grade stamps. Moisture content of softwood lumber not to exceed 19% at time of installation.
 - .1 Framing lumber, plates, furring, blocking, No. 1 SPF.
 - .2 Nailing strips, furring and strapping: No. 4 S-P-F.
 - .3 Fitment framing: No. 1 S-P-F.
- .4 Canadian Softwood Plywood: to CSA O151-M, standard construction, good one or both sides as required, thickness as shown or specified.
 - .1 Douglas Fir Plywood: To CSA O121-M, standard construction, good one side, thickness as shown on the drawings.
 - .2 Plywood used for exposed interior work shall have select grade veneer, one or both faces where exposed, with fire retardant finish. Fire retardant shall be in accordance with CAN/CSA-080.1, and all treated materials shall bear a ULC approval stamp.
 - .3 Poplar Plywood: to CSA 0153, standard construction.
 - .4 Mat formed structural panel board (oriented strand board): to CSA O437, square edge, 12.7 mm thickness.

- .5 Nails, Spikes and Staples: To ASTM F1667.
- .6 Bolts: 12.5 mm diameter, galvanized, complete with nuts and washers.
- .7 Proprietary Fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.
- .8 Wood Preservative to CSA O80 SERIES.
- .9 Adhesive: Contractors gun grade cartridge loaded wood adhesive, general purpose, to ASTM D2559.
- .10 Building Paper: to CAN2-51.32-M, 15# asphalt impregnated paper.
- .11 Vapour Retardant: 0.152 mm polyethylene film to CGSB 51.34 Type 1.
- .12 Fibreglass Insulation: to CSA A101, loose batt type, minimum density of 24 kg/m³.
- .13 Galvanizing: to CSA-G164. Use galvanized fasteners, and hardware for exterior work, preservative treated lumber, and materials in contact with concrete or masonry.
- .14 Fire Retardant Treatment
 - .1 Arch Wood Protection, Inc., "Dricon FRT" or equal by Chemical Specialties, Inc., D-Blaze", Hoover Treated Wood Products "Pyro-Guard" or Osmose Wood Preserving Co., Inc. "FirePRO" interior Type A fire-retardant wood treatment.
 - .2 Pressure impregnate lumber and plywood with fire-retardant chemicals to comply with AWWA C20 (lumber) and C27 (Plywood), respectively, for treatment type indicated; identify "fire-retardant-treated wood" with appropriate classification marking of Underwriters Laboratories, Inc., or other testing and inspecting agency acceptable to authorities having jurisdiction.
 - .1 Treated materials shall meet FR-S ratings of not more than 25 for flame spread, smoke developed and fuel contributed when tested in accordance with UL 723 or ASTM E84, with no increase in flame spread and evidence of significant progressive combustion upon continuation of test for additional 30 minutes.
 - .2 No increase in above ratings when subjected to standard ASTM D2898 rain test.
 - .3 For interior locations use fire-retardant chemical formulation that produces "Interior Type A" treated lumber and plywood with the following properties under conditions present after installation:
 - .1 No reduction takes place in bending strength, stiffness and fastener holding capacities below values published by manufacturer of chemical formulation that are based on tests by a qualified independent testing laboratory of treated wood products identical to those indicated for this Project under elevated temperature and humidity conditions simulating installed conditions.
 - .2 No other form of degradation occurs due to acid hydrolysis or other causes related to manufacture and treatment.
 - .3 No corrosion of metal fasteners results from their contact with treated wood.
 - .4 Inspect each piece of treated lumber or plywood after drying and discard damaged or defective pieces.
 - .5 Kiln-dry all lumber and plywood materials after treatment to maximum 15% moisture content.

PART 3 EXECUTION

3.1 Installation

.1 Workmanship

- .1 Execute work using skilled mechanics according to best practice, as specified here.
- .2 Lay out work carefully and to accommodate work of other trades. Accurately cut and fit; erect in proper position true to dimensions; align, level, square, plumb, adequately brace, and secure permanently in place. Join work only over solid backing.

.2 Rough Hardware: Include rough hardware such as nails, bolts, nuts, washers, screws, clips, hangers, connectors, strap iron, and operating hardware for temporary enclosures.

.3 Erection of Framing Members

- .1 Install members true to line, levels and elevations. Space framing members and frame all openings as detailed on the drawings.
- .2 Construct continuous members from pieces of longest practical length.
- .3 Install spanning members with crown edge up.
- .4 Anchor wood framing to supporting walls with galvanized metal strap ties.

.4 Provide treated wood nailers, blocking, cants, grounds, furring and similar members where shown and where required for screeding or attachment of other work and surface applied items. Attach to substrate as required to support applied loading.

.5 Electrical Equipment Backboard: provide backboards for mounting electrical equipment as indicated. Use 19 mm thick fir face veneer fire retardant softwood plywood on 19 x 38 mm furring around perimeter and at maximum of 305 mm intermediate spacing.

- .1 Install plywood backboards with countersunk screws.

.6 Blocking: Provide solid wood backing to support millwork, cabinetwork, equipment, fixtures, railings and accessories and the like, as required. Coordinate with work of other Sections and install all required backing. Any such equipment mounted on gypsum wallboard assemblies or similar assemblies shall be adequately supported.

- .1 Provide solid wood blocking in all partitions where wall stops are specified in the hardware schedule.

.7 Roof Blocking, Curbs and Copings:

- .1 Provide and install framing, blocking, curbs and copings as indicated on the drawings. Anchor blocking securely in permanent manner.
- .2 Provide minimum 10 mm Douglas Fir plywood copings on all built-up wood copings and curbs as detailed.
- .3 All wood curbs shall be filled with fibrous insulation specified in Section 07 21 13.
- .4 Provide shims and blocking necessary for levelling of roof hatches and equipment curbs.

3.1 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- | | | |
|-----|------------------|-----------------------------|
| .1 | Section 05 50 00 | Metal Fabrications |
| .2 | Section 06 10 00 | Rough Carpentry |
| .3 | Section 06 40 00 | Architectural Woodwork |
| .4 | Section 07 92 00 | Joint Sealants |
| .5 | Section 08 11 00 | Metal Doors and Frames |
| .6 | Section 08 14 16 | Flush Wood Doors |
| .7 | Section 08 71 10 | Door Hardware |
| .8 | Section 09 21 16 | Gypsum Board |
| .9 | Section 09 91 23 | Interior Painting |
| .10 | Section 10 28 10 | Toilet and Bath Accessories |

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM E1333-22 Standard Test Method for Determining Formaldehyde Concentrations in Air and Emissions Rates from Wood Products Using a Large Chamber.
 - .2 ASTM F1667-21a Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
- .2 CSA Group (CSA)
 - .1 CSA B111-1974 (R2003) Wire Nails, Spikes and Staples.
 - .2 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA O112 SERIES-M1977 (R2006) Standards for Wood Adhesives
 - .4 CSA O121-17 Douglas Fir Plywood.
 - .5 CSA O141:23 Canadian Standard Lumber.
 - .6 CSA O151-17 (R2022) Canadian Softwood Plywood
 - .7 CSA O153-13 (R2017) Poplar Plywood.
 - .8 CSA Z760-94 (R2001) Life Cycle Assessment
- .3 American National Standards Institute (ANSI)
 - .1 ANSI A208.1-2009 Particleboard.
 - .2 ANSI A208.2-2016 Medium Density Fibreboard (MDF) for Interior Applications.
 - .3 ANSI/HPVA HP-1-2016 Standard for Hardwood and Decorative Plywood.
 - .4 ANSI/NEMA LD 3-2005 High Pressure Decorative Laminates
- .4 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
 - .1 Architectural Woodwork Quality Standards Illustrated.
- .5 Canadian Plywood Association (CanPly)
 - .1 The Plywood Handbook 2005.
- .6 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-V4-0 FSC Principle and Criteria for Forest Stewardship.
 - .2 FSC-STD-20-002-2004, Structure and Content of Forest Stewardship Standards V2-1
 - .3 FSC Accredited Certified Bodies.
- .7 National Hardwood Lumber Association (NHLA)
 - .1 Rules for the Measurement and Inspection of Hardwood and Cypress 1998.
- .8 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2005.
- .9 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)
 - .1 SCAQMD Rule 1168-03 Adhesives and Sealants Applications

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit shop drawings.
 - .1 Indicate details of construction, profiles, jointing, fastening and other related details.
 - .2 Indicate materials, thicknesses, finishes and hardware.
- .3 Submit duplicate 300 mm long samples of each type of solid wood or 300 x 300 mm square type of plywood to receive stain or natural finish.
- .4 Submit samples of plastic laminate materials.

1.5 Quality Assurance

- .1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.
- .3 Wood materials certified by Forestry Stewardship Council.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Protect materials against dampness during and after delivery.
- .3 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.

1.7 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Lumber Materials

- .1 Softwood lumber: unless specified otherwise, S4S, moisture content 19% or less in accordance with following standards:
 - .1 CSA O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
 - .3 AWMA custom premium grade, moisture content as specified.
 - .4 Machine stress-rated lumber is acceptable.
- .2 Hardwood Lumber: To NHLA requirements, moisture content of 6% maximum, maple species, AWMA Custom Grade.
 - .1 Bench Slats: Select Grade Maple.

2.2 Panel Materials

- .1 Douglas Fir Plywood (DFP): to CSA O121, standard construction.
 - .1 Forestry Stewardship Council (FSC) certified.
 - .2 Urea-formaldehyde free.
- .2 Canadian Softwood Plywood (CSP): to CSA O151, standard construction.
 - .1 Forestry Stewardship Council (FSC) certified.
 - .2 Urea-formaldehyde free.
- .3 Hardwood Veneered Plywood: To CSA O115, of thickness indicated, Type II Select Grade Maple, where transparent finish is required and Solid Grade where paint finish is required. Good two sides for work with two sides exposed to view; good one side for work with one side exposed to view. Use particle board core with Type I bond.
- .4 Particleboard: to ANSI A208.1.
 - .1 Forestry Stewardship Council (FSC) certified.
 - .2 Urea-formaldehyde free.
- .5 Medium density fibreboard (MDF): to ANSI A208.2, density 640-800 kg/m³.
 - .1 Forestry Stewardship Council (FSC) certified.
 - .2 Urea-formaldehyde free.

2.3 Plastic Laminate

- .1 Plastic Laminate Facing Sheet: ANSI/NEMA LD 3-2005 High-Pressure Decorative Laminates (HPDL) PF-S and GP-S;
 - .1 Backing sheet: BK Grade by manufacturer of facing sheet.
 - .2 Core: CSA O151
 - .3 Laminating adhesive: CSA O112.
 - .4 Core sealer: clear water resistant synthetic resin sealer.
 - .5 Colours, pattern, gloss and texture will be selected by Consultant from full range of products by one of the following:
 - .1 Formica,
 - .2 Arborite,
 - .3 Wilsonart,
 - .4 Or approve equivalent.
 - .6 Up to three colours and patterns will be selected by the Consultant.

2.4 Accessories

- .1 Rough Hardware: Bolts, lag screws, anchors, nails and expansion shields required to secure this portion of work. Rough hardware hot dip galvanized conforming to latest edition of CSA G164. All fasteners used in damp or wet areas to be suitable for use in corrosive environment. Use hot dipped galvanized or other material approved by the Consultant.
- .2 Nails and staples: to ASTM F1667 galvanized.
- .3 Wood screws: to CSA B35.4 plain type and size to suit application.
- .4 Stainless Steel hardware: Type 316 Stainless steel for exposed or wet locations, tamper proof.
- .5 Splines: wood or metal to suit application.
- .6 Adhesive: recommended by manufacturer, waterproof type, maximum VOC limit 30 g/L SCAQMD

Rule 1168 - Adhesives and Sealants Applications.

PART 3 EXECUTION

3.1 Construction

- .1 Fastening:
 - .1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
 - .2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
 - .3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round smooth cut hole and plug with wood plug to match material being secured.
 - .4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.
- .2 Interior and exterior frames: Set frames with plumb sides, level heads and sills, and secure.

3.2 Fabrication

- .1 General:
 - .1 Field measure all dimensions.
 - .2 Fabricate all finish carpentry items to AWMAC premium grade, and in accordance with the reviewed shop drawings.
 - .3 Set nails and screws, apply stained plain wood filler to indentations, sand smooth and leave ready to receive finish.
 - .4 Provide 10 mm thick solid matching wood strip on plywood and particle board edges 13 mm or thicker, exposed in final assembly.
 - .5 Ease edges of solid lumber components to 1.6 mm radius.
- .2 Plastic Laminate Components
 - .1 Fabricate plastic laminate window stools as detailed. Stools shall be minimum 19 mm thick plastic laminate plywood, with edge banding on all exposed faces. Fabricate in one piece, without joints, wherever as possible. Where necessary, joints shall be centred on window mullions and tightly butted together with concealed splines.
 - .2 Fabricate vanities and change room shelving units as detailed.
 - .3 Unless otherwise specified herein, comply with requirements of ANSI/NEMA LD 3 Annex 'A'.
 - .4 Assembly: Bond plastic laminate to core with adhesive, under pressure.
 - .5 Core: unless otherwise indicated: 19 mm thick.
 - .6 Balanced construction: plastic laminate covered components shall be of balanced construction, with plastic laminate on both faces of core. Seal core edges not covered with plastic laminate.
 - .7 Use largest practicable plastic laminate sheet size.
 - .8 Provide joints symmetrically; provide joints as corners and at changes in superficial areas; provide concealed draw bolt anchors and joints. All butt joints shall have a blind spine.
 - .9 Openings and cutouts:
 - .1 Radius internal corners at least 3 mm and chamfer edges.
 - .2 Where core edge is to remain exposed, cover with plastic laminate edging.
 - .3 Where core edge is to be concealed, seal with sealer.

3.3 Installation

- .1 Do finish carpentry to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.

- .2 All fastenings shall be concealed.
- .3 Provide heavy duty grounds as necessary for secure installation of finish carpentry work.
- .4 All wood surfaces shall be sanded smooth, ready to receive finish.
- .5 Scribe and cut as required, fit to abutting walls and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.
- .6 Form joints to conceal shrinkage.
- .7 Set and secure materials and components in place, rigid plumb and square.
- .8 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
- .9 Set finishing nails to receive filler. Where screws are used to secure members, countersink screws in round, cleanly cut hole and plug with wood plug to match material being secured.
- .10 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.
- .11 Install window stools with wood levelling shims, after installation of windows and interior finishing is complete. Screw levelling shims to metal stud framing with self-tapping sheet metal screws. Bond stools to shims with waterproof adhesive. Tightly butt all joints and bond together with adhesive and concealed splines. Cut to fit tight to all penetrations.
- .12 Apply mildew resistant sealant to perimeter of all vanity tops and window stools as specified in Section 07 92 00.

3.4 Door Installation

- .1 Install doors in accordance with instructions in Section 08 11 00 and Section 08 14 16 and manufacturer's printed instructions.

3.5 Finish Hardware Installation

- .1 Finish hardware will be supplied for installation under this Section.
- .2 Prepare doors and frames in accordance with manufacturer's instructions and templates. Install finish hardware complete in all respects, hang doors and make adjustments necessary.
- .3 Doors shall swing freely. Where thresholds are to be used, door bottom shall be finished to suit thresholds as required.
- .4 Where indicated on door schedules or drawings, under-cut doors.

3.6 Miscellaneous

- .1 Install Toilet and Bath Accessories as specified in Section 10 28 10, including accessories supplied by Owner.

3.7 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 05 50 00 Metal Fabrications
- .2 Section 06 10 00 Rough Carpentry
- .3 Section 06 20 00 Finish Carpentry
- .4 Section 07 92 00 Joint Sealants
- .5 Section 08 80 05 Glazing
- .6 Section 09 21 16 Gypsum Board
- .7 Section 09 91 23 Interior Painting

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM F1667/F1667M-21a Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
- .2 Architectural Woodwork Manufacturer's Association of Canada (AWMAC)
 - .1 Architectural Woodwork Standards Manual
- .3 American National Standards Institute (ANSI)
 - .1 ANSI A208.1-2009 Particleboard
 - .2 ANSI/NPA A208.2-2009 Medium Density Fibreboard (MDF)
 - .3 ANSI/NEMA LD 3-2005 High-Pressure Decorative Laminates (HPDL)
 - .4 ANSI/HPVA HP-1-2009 Standard for Hardwood and Decorative Plywood
- .4 CSA Group (CSA)
 - .1 CSA O112 SERIES-M1977 (R2006) Wood Adhesives
 - .2 CSA O121-08 (R2013) Douglas Fir Plywood
 - .3 CSA O151-17 (R2022) Canadian Softwood Plywood
 - .4 CSA O153:19 Poplar Plywood
 - .5 CSA Z809-08 Sustainable Forest Management
- .5 Canadian General Services Board (CGSB)
 - .1 CAN/CGSB-11.3-M, Hardboard
- .6 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-2004 FSC Principle and Criteria for Forest Stewardship.
 - .2 FSC-STD-20-002-2004 Structure and Content of Forest Stewardship Standards V2-1
 - .3 FSC Accredited Certified Bodies.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit shop drawings conforming to AWMAC's STANDARDS (NAAWS).
 - .1 Show proposed assembly, connections, anchorage, materials, dimensions, thickness, and finishes.
 - .2 On casework and countertop elevations show location of backing required for attachment within walls.
- .3 Samples:
 - .1 Submit duplicate, 300 mm long samples of each type of solid wood and 300 x 300 mm samples of each type of plywood used in exposed work and scheduled to receive stained or

- natural finish, complete with specified finish, prior to fabrication of cabinetwork.
- .2 Veneer samples minimum 304 mm x 304 mm. Each sample set of three to represent range of colour and grain expected.
 - .3 Submit full range of manufacturer's standard plastic laminates for selection by the Consultant.
 - .4 Submit sample of each type of cabinet hardware component used.

1.5 Quality Assurance

- .1 Unless otherwise specified, carry out finish carpentry work in accordance with the requirements of "Millwork Standards" (latest issue) of Architectural Woodwork Manufacturers' Association of Canada (AWMAC), Custom Grade.
- .2 Woodwork Manufacturer Qualifications:
 - .1 Minimum 5 years of production experience similar to this project, whose qualifications indicate ability to comply with requirements of this Section.
- .3 Preinstallation Conference:
 - .1 Before framing completed hold a meeting with the contractor, casework manufacturer, casework installer, and framing sub-contractor.
 - .2 Review locations of backing required for casework installation as shown on casework shop drawings.
 - .3 Review method of attachment for backing to wall system as shown on architectural drawings.
- .4 Mock-up: Prepare mock-ups in accordance with Section 01 45 00 – Quality Control.
 - .1 Provide mockups of one base cabinet, one wall hung cabinet, and one countertop. Base cabinet to have minimum one drawer. Mockup of material and finish to be provided. Approved mockup may be incorporated in the project.

1.6 Definition

- .1 "Exposed" when referred to in this Section, shall mean all parts which can be viewed and shall include interiors of cabinets, backs of doors, shelving and gables.

1.7 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Protect against damage, including damage by excessive changes in moisture content, during delivery and storage. Maintain minimum storage temperature of 16 ° C, and relative humidity of 25% to 55%.
- .4 Cover plastic laminate faces at shop with heavy Kraft paper.
- .5 Do not deliver finish carpentry components to site before all wet trades are completed, the building is closed in and humidity conditions on site are acceptable. Do not deliver during rain or damp weather
- .6 Store materials on site in such a way as to prevent deterioration or loss or impairment of essential properties. Prevent excessive moisture gain of materials.

1.8 Protection

- .1 Provide coverings as necessary to protect finish carpentry components from damage of any kind during storage and after installation.

1.9 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.10 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Materials

- .1 All materials CSA Z809 or FSC Certified.
- .2 Solid Wood:
 - .1 Unless otherwise indicated, provide AWMAC Custom 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 7%.
 - .4 Softwood: to CSA O141, dressed all sides used in concealed locations.
- .3 Veneers: As required by AWMAC's STANDARDS (NAAWS) for its use and Grade specified. Flat sliced maple veneers from architectural grade flitches to provide uniform grain pattern and colour throughout, free of dark streaks and blemishes. Sharp variation of grain patterns and colour between adjacent jointed pieces is not acceptable.
- .4 Plywood:
 - .1 Veneer core plywood: hardwood with a non-telegraphing grain manufactured with exterior glue. To ANSI/HPVA HP-1-09, minimum five (5) plies.
 - .2 Soft Plywood: to CSA O151-M Standard Grade, solid two sides. Use in concealed locations only, except as indicated.
 - .3 To ANSI/HPVA HP-1-09, Grade A face, book matched, flat cut maple face and No. 3 edge.
- .5 Particleboard: Meeting requirements of AWMAC's STANDARDS (NAAWS). To ANSI A208.1 , minimum density of 720kg/m³ Grade "R".
- .6 MDF: Medium Density Fiberboard meeting requirements of AWMAC's STANDARDS (NAAWS).
- .7 Edgeband
 - .1 For wood veneer casework: Veneer of same species and cut as exposed surfaces.
 - .2 For plastic laminate casework: High Pressure Decorative Laminate (HPDL).
- .8 Hardboard: To CGSB 11-GP-3M, Type 2, 6 mm thick or as indicated.
- .9 Plastic laminate facing sheet: ANSI/NEMA LD 3 High-Pressure Decorative Laminates (HPDL) PF-S and GP-S;
 - .1 Backing sheet: BK Grade by manufacturer of facing sheet.

- .2 Core: CAN3-0188.1M, Grade R.
- .3 Laminating adhesive: CAN3-O112 Series M.
- .4 Core sealer: clear water resistant synthetic resin sealer.
- .5 Colours, pattern, gloss and texture will be selected by Consultant from full range of products by one of the following:
 - .1 Formica,
 - .2 Arborite,
 - .3 Pionite,
 - .4 Nevamar
 - .5 Wilsonart
 - .6 Or approved equivalent

- .10 Melamine Overlaid Panels:
 - .1 Melamine overlay, heat and pressure laminated with phenolic resin to 12.7 mm thick particle board.
 - .2 Overlay bonded to both faces where exposed two sides, and when panel material require surface on one side only, reverse side to be overlaid with a plain balancing sheet.
 - .3 Furniture finish: solid colour as selected by the Consultant.
 - .4 Edge Finishing: matching melamine and polyester overlay edge strip with self-adhesive.

- .11 Fasteners and Adhesive:
 - .1 Nails and staples: ASTM F1667, galvanized, spiral head nails.
 - .2 Screws: Zinc, cadmium or chrome plated steel.
 - .3 Splines: wood or metal, to suit application.
 - .4 Adhesive: Type 1 waterproof. To CSA O112-M, type as appropriate for the intended application. Complying with ANSI/WDMA I.S-1 series. Contact bond not acceptable.
 - .5 Avoid the use of adhesives, preservatives, synthesizing agents and finish coatings that contain formaldehyde and high V.O.C. content.

- .12 Cabinet Hardware: Products listed are a standard of acceptance. Products by other manufacturers, of equal quality and similar appearance may also be accepted subject to review and approval by Consultant.
 - .1 Draw bolt fasteners: Knapé & Vogt KV 516
 - .2 Recessed Shelf Standard:
 - .1 Knapé & Vogt KV 255, Zinc, finish.
 - .2 Knapé & Vogt KV 256AL Series Aluminum Shelf Support Clip
 - .3 Hinges: Blum concealed hinges, 125° clip and 125° opening with self-closing spring. Soft close. Full or half overlay. Nickel plated steel.
 - .4 Cabinet Pulls: Richelieu D-Pull No: 30134-170, 96 mm c.c. brushed stainless steel.
 - .5 Cabinet Locks: CCL 0737 pin tumbler MK & KA by room.
 - .6 Catches: Type optional with manufacturer.
 - .7 Drawer Slides: Knapé & Vogt 8450FM Soft-Close Full-Extension Drawer Slide
 - .8 Door and Drawer Bumpers: "Quietex" bumpers.
 - .9 Provide other hardware and hardware accessories as detailed or required.

2.2 Fabrication

- .1 Materials and methods of construction to meet requirements of AWMAC's STANDARDS (NAAWS) for grade or grades specified.
 - .1 If there is conflict between plans and/or specifications and AWMAC's STANDARDS (NAAWS), plans and specifications shall govern.

- .2 Wood Casework: AWMAC Standard Custom Grade.

- .3 Construction Type: Frameless
- .4 Cabinet and door interface: Flush overlay.
- .5 Exposed joints and edges:
 - .1 Uniformly space exposed joints unless otherwise indicated.
 - .2 No edge grain shall be visible; mitre external corners, house internal fasteners. Glue mitred corners.
 - .3 All exposed edges of plywood and particle board shall have solid wood edging, pressure glued. AWMAC No. 3 edge.
 - .4 Ease edges of solid lumber components to 1.6 mm radius.
- .6 Mechanical Fasteners:
 - .1 Inconspicuously locate mechanical fasteners. Wherever possible, conceal fastenings.
 - .2 Countersink nail heads.
 - .3 Where exposed to view, countersink screw and bolt heads and fill holes with matching wood plugs.
 - .4 Cutting and fitting: make cut-outs in work of this Section as required to accommodate work of other Sections.
 - .5 Make provisions in cabinetwork to accept built-in appliances, provided by others.

2.3 Wood Casework

- .1 Materials and methods of construction to meet requirements of AWMAC's STANDARDS (NAAWS) for grade or grades specified.
- .2 If there is conflict between plans and/or specifications and AWMAC's STANDARDS (NAAWS), plans and specifications shall govern.
- .3 Wood Casework:
 - .1 Grade: AWMAC's STANDARDS (NAAWS) Custom Grade
- .4 Exposed Surfaces [[species], [cut]], [[book][slip] matched] [material suitable for opaque finish] meeting requirements of AWMAC's STANDARDS (NAAWS) for Grade specified.
- .5 Exposed interior surfaces: Veneer of same species and cut [and grade] as exposed exterior surfaces.
- .6 Semi-exposed surfaces: veneer of same species as exposed faces

2.4 Plastic Laminate Casework

- .1 Construct cabinetwork components of plastic laminate faced particle board as indicated and in accordance with AWMAC Custom grade.
- .2 Tenon, dado, dowel, or rabbet interior construction with all parts well glued. Shoulder mitre all exposed corners. Open ends or skeleton frames against walls are not permitted. Unless otherwise permitted by Consultant, use unitized construction system for all components.
- .3 Exposed Surfaces: High Pressure Decorative Laminate (HPDL), meeting requirements of AWMAC's Standards (NAAWS) for Grade specified.
- .4 Construct door and drawer fronts of 19 mm plastic laminate faced MDF.

- .5 Exposed interior surfaces: LPDL of a colour and pattern compatible with exposed surfaces
- .6 Semi-exposed surfaces: LPDL
- .7 Apply self-edged minimum 1.0 mm thick plastic laminate to exposed ends of countertops.
- .8 Rout gables for pilaster strips where adjustable shelving is required.
- .9 Construct shelving with edge moulding to match. Shelving to cabinetwork to be adjustable unless otherwise noted.
- .10 Apply moisture repellent sealer to concealed backs of cabinetwork.
- .11 Install cabinet hardware in accord with hardware manufacturer's directions. Unless otherwise indicated, provide each door with pull and with minimum two hinges. Provide locks where indicated.

2.5 Drawers

- .1 Sides: Particle board with melamine surfaces.
- .2 Bottoms: MDF or hardboard with melamine surfaces
- .3 Joinery: Meeting requirements of AWMAC's STANDARDS (NAAWS) for Grade specified.

2.6 Laminated Plastic Countertops

- .1 Core material: exterior grade hardwood plywood with a non-telegraphing grain.
- .2 Use largest practicable plastic laminate sheet size.
- .3 Back splashes: as indicated, 100 mm high.
- .4 Front edges: As indicated
- .5 Provide joints symmetrically; provide joints as corners and at changes in superficial areas; provide concealed draw bolt anchors and joints. All butt joints shall have a blind spine.

2.7 Finishes

- .1 All exposed exterior surfaces: plastic laminate as indicated. Colours selected by the Consultant.
- .2 Wood Finish: 3 coats clear polyurethane finish on all sides as specified in Section 09 91 23. Factory finish wherever practical.
- .3 All exposed interior surfaces: melamine unless indicated otherwise.
- .4 Cabinet and case backs unexposed to view shall be back primed with one coat of moisture repellent sealer.
- .5 Apply finishes in accordance with the AWMAC Manual.
- .6 Stainless Steel: Type 316 stainless steel, brushed finish.

PART 3 EXECUTION

3.1 Examination

- .1 Verify mechanical, electrical, plumbing, HVAC and other building components, affecting work in this Section are in place and ready.
- .2 Verify HVAC controls and systems are operating properly.
- .3 Verify adequacy of backing and support framing. Advise Contractor of areas and surfaces requiring further modifications for plumb, level, even or square fitting.

3.2 Installation

- .1 Install work in accordance with AWMAC Installation Manual, Custom grade.
- .2 Secure all work in place, square, plumb, and level.
- .3 Accurately scribe and closely fit components to irregularities of adjacent surfaces.
- .4 Accurately fit joints in true plane, locate joints over bearing or supporting surfaces.
- .5 Countersink mechanical fasteners used at exposed and semi-exposed surfaces, excluding installation attachment screws and those securing cabinets end to end.
- .6 Where permitted, nail with small headed finishing nails. Countersink nail heads with nail setter.
- .7 Install plastic laminate components using concealed fastening devices.
- .8 Where components are fastened with screws or bolts, countersink screw and bolt heads and provide wood plugs matching surrounding wood.
- .9 Where cabinetwork abuts other building elements, provide wood trim matching cabinetwork except where otherwise detailed.
- .7 Cut equipment cutouts shown on plans using templates provided.
 - .1 Radius internal corners at least 3 mm and chamfer edges.
 - .2 Where core edge is to remain exposed, cover with plastic laminate edging.
 - .3 Where core edge is to be concealed, seal with sealer.
- .10 Where access is required to valves and other mechanical and electrical components, located behind cabinetwork, provide removable plywood access panels of size required and secure with four brass screws.
- .11 Provide for wiring and cable management systems wiring grommets as indicated on the drawings.
- .12 Apply mildew resistant silicone sealant to perimeter of all countertops as specified in Section 07 92 00.

3.3 Adjustment

- .1 Adjust all moving and operating parts to function smoothly and correctly.
- .2 Fill and retouch all nicks, chips and scratches. Replace all un-repairable damaged items.
- .3 Replace damaged components which, in the opinion of the Consultant, cannot be satisfactorily repaired.

3.4 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Upon completion of installation, clean installed items of pencil and ink marks and broom clean the area of operation.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 07 84 00 Firestopping

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM E84-24 Standard Test Method for Surface Burning Characteristics of Building Materials
 - .2 ASTM E119-22 Standard Test Methods for Fire Tests of Building Construction and Materials
 - .3 ASTM E605/E605M-19 Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members
 - .4 ASTM E736/E736M-19(2023) Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
 - .5 ASTM E759/E759M-92(2023) Standard Test Method for Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members
 - .6 ASTM E760/E760M-92(2020) Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members
 - .7 ASTM E761/E761M-92(2020) Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members
 - .8 ASTM E859/E859M-23 Standard Test Method for Air Erosion of Sprayed Fire-Resistive Materials (SFRMs) Applied to Structural Members
 - .9 ASTM E937/E937M-93(2020) Standard Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members
 - .10 ASTM G21-15(2021)e1 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
- .2 Underwriters Laboratories Inc. (ULC)
 - .1 Fire Resistance Directory (Latest Edition)
 - .2 ULC 101 2014 Standard Methods of Fire Endurance Tests of Building Construction and Materials
 - .3 ULC 102 2018 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
- .3 Uniform Building Code (UBC)
 - .1 UBC Standard No. 7-6 – Thickness and Density Determination for Spray Applied Fireproofing
 - .2 UBC Standard No. 7-7 – Methods for Calculating Fire Resistance of Steel, Concrete and Wood Construction
- .4 Association of the Wall and Ceiling Industry (AWCI)
 - .1 AWCI Technical Manual 12-A: Standard Practice for the Testing and Inspection of Spray Applied Fire-Resistive Materials.
 - .2 AWCI Technical Manual 12: Design Selection Utilizing Spray Applied Fire-Resistive Materials.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

- .2 Submit manufacturer's instructions for proper application of aggregate slurry fireproofing.
 - .3 Fire Testing: Submit evidence that the aggregate slurry fireproofing has been subjected to full-scale UL 263/ASTM E119 fire testing at Underwriters Laboratories Inc., or another accredited laboratory, by the manufacturer.
 - .4 Submit test results in accordance with ULC 101 for fire endurance and ULC 102 for surface burning characteristics.
 - .5 Test Data: Independent laboratory test results for fireproofing shall be submitted for the following performance criteria:
 - .1 Compressive Strength per ASTM E761
 - .2 Bond Strength per ASTM E736
 - .3 Deflection per ASTM E759
 - .4 Bond Impact per ASTM E760
 - .5 Air Erosion per ASTM E859
 - .6 Corrosion Resistance per ASTM E937
 - .7 Abrasion Resistance
 - .8 Impact Penetration
 - .9 High Speed Air Erosion per ASTM E859
 - .10 Surface Burning Characteristics per ASTM E84
 - .11 Combustibility per ASTM E1354 Cone Calorimeter
 - .12 Mould Resistance per ASTM G21
 - .6 Thickness Schedule: Provide schedule indicating material to be used, structural elements to be protected with spray applied fireproofing, hourly rating and material thickness provided and appropriate references.
 - .7 For assemblies not tested and rated, submit engineered proposals based on related designs using accepted fireproofing design criteria. Criteria must include statement that building structures and structural elements have been reviewed, and are included in the design of the proposed fire proofing. Proposals shall be prepared by an Engineer registered in the province of Ontario.
- 1.5 Quality Control
- .1 Refer to Section 01450 Quality Control.
 - .2 Cooperate with inspection and testing agency and repair or restore all areas of fireproofing removed by the agency for laboratory analysis.
 - .3 Testing will be in accordance with AWCI Publication: Inspection Procedure for Field Applied Sprayed Fire Protection Materials and ASTM E605
- 1.6 Qualifications of Applicator
- .1 Licensed by manufacturer of fireproofing materials.
- 1.7 Quality Assurance
- .1 Fireproofing work shall be performed by a firm acceptable to the aggregate slurry fireproofing material manufacturer.

- .2 Products, execution, and fireproofing thicknesses shall conform to the applicable code requirements for the required fire-resistance ratings.
- .3 Contractor, fireproofing subcontractor and independent testing laboratory shall attend a pre-installation conference to review the substrates for acceptability, method of application, applied thicknesses, inspection procedures and other issues.
- .4 Submit evidence that the aggregate slurry fireproofing has been tested per ASTM E119 by Underwriters Laboratories Inc or another accredited testing laboratory. Include evidence that the fire testing was sponsored by the manufacturer and that the material tested was produced at the manufacturer's facility under the supervision of laboratory personnel.
- .5 Mock-up
 - .1 Apply fireproofing to approximately 5 square metres of surface to be treated, including deck and steel structure.
 - .2 Allow 24 hours for inspection of mock-up by Testing Agency and Consultant before proceeding with fireproofing work.

1.8 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Deliver materials in original unopened packages, fully identified as to manufacturer, brand or other identifying data and bearing the proper independent testing laboratory labels for Surface Burning Characteristic and Fire Resistance Classification.
- .4 Store material off the ground, under cover, and in a dry location until ready for use. All bags that have been exposed to water before use shall be found unsuitable and discarded. Stock of material is to be rotated and used prior to its expiration date.

1.9 Protection

- .1 Ensure the work area is adequately ventilated, in compliance with manufacturer's requirements.
- .2 Ensure continuous and proper ventilation of the work area, through a fresh air intake and the extraction of foul air, during the course of the application process and for 24 hours thereafter.
- .3 Install temporary partitions in order to prevent any overspray outside of the work area from the sprayed-on insulation material.
- .4 Protect all adjacent surfaces and equipment against any damage that may be caused by dispersion and overspray of insulation material beyond prescribed limits.
- .5 Ensure all structures are well protected, in accordance with the manufacturer's recommendations.
- .6 Clean equipment in areas designated for this purpose.

1.10 Project Conditions

- .1 Ensure all concrete and masonry materials are cured.

- .2 A minimum air and substrate temperature of 4 °C shall be present before application of spray applied fireproofing. Maintain a minimum air and substrate temperature of 4 °C during and for 24 hours after application of the fireproofing. Provide enclosures with heat to maintain temperature.
- .3 Provide ventilation to achieve a minimum total fresh air exchange rate of 4 times per hour until the material is substantially dry.

1.11 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.12 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Systems

- .1 Cementitious fireproofing shall be aggregate slurry mixture Monokote MK-6/HY or MK-10HB as manufactured by GCP Applied Technologies Inc.
- .2 ULC labelled and listed cementitious fireproofing, asbestos free, qualified for use in specified standards as manufactured by one of the following is acceptable subject to submission and review of proposed materials, technical data and application procedures:
 - .1 Cafco Industries Inc./Isolatek
 - .2 A/D Fire Protection Systems

2.2 Materials

- .1 Fireproofing material shall meet the following physical performance standards:
 - .1 Dry Density: The field density shall be measured in accordance with ASTM Standard E605. Minimum average density shall be that required by the manufacturer, or as listed in the UL Fire Resistance Directory for each rating indicated, or as required by the authority having jurisdiction, or a minimum average 240 kg/m³ whichever is greater.
 - .2 Deflection: Material shall not crack or delaminate from the surface to which it is applied when tested in accordance with ASTM E759.
 - .3 Bond Impact: Material subject to impact tests in accordance with ASTM E760 shall not crack or delaminate from the surface to which it is applied.
 - .4 Bond Strength: Fireproofing, when tested in accordance with ASTM E736, shall have a minimum average bond strength of 9.6 kN/m² and a minimum individual bond strength of 7.2 kN/m².
 - .5 Air Erosion: Maximum allowable total weight loss of the fireproofing material shall be 0.00 g/m² when tested in accordance with ASTM E859. Sample surface shall be “as applied” (not pre-purged) and the total reported weight loss shall be the total weight loss over a 24 hour period from the beginning of the test.
 - .6 High Speed Air Erosion: Materials to be used in plenums or ducts shall exhibit no continued erosion after 4 hours at an air speed of 12.7 m/s when tested per ASTM E859.
 - .7 Compressive Strength: The fireproofing shall not deform more than 10% when subjected to compressive forces of 71 kPa when tested in accordance with ASTM E761.

- .8 Abrasion Resistance: No more than 15 cm³ shall be abraded or removed from the fireproofing substrate when tested in accordance with the test methods developed by the City of San Francisco, Bureau of Building Inspection.
- .9 Impact Penetration: The fireproofing material shall not show a loss of more than 6 cm³ when subjected to impact penetration tests in accordance with the test methods developed by the City of San Francisco, Bureau of Building Inspection.
- .10 Surface Burning Characteristics: Material shall exhibit the following surface burning characteristics when tested in accordance with ASTM E84:
 - .1 Flame Spread 0
 - .2 Smoke Development 0
- .11 Corrosion Resistance: Fireproofing applied to steel shall be tested in accordance with ASTM E937 and shall not promote corrosion of steel.
- .12 Resistance to Mould: The fireproofing material shall be formulated with a mould inhibitor. Fireproofing material shall be tested in accordance with ASTM G21 and shall show resistance to mould growth for a period of 28 days for general use.
- .13 Combustibility: Material shall have a maximum total heat release of 20 MJ/m² and a maximum 125 kw/m² peak rate of heat release 600 seconds after insertion when tested in accordance with ASTM E1354 at a radiant heat flux of 75 kw/m² with the use of electric spark ignition. The sample shall be tested in the horizontal orientation.
- .14 Fire Resistance Classification: The spray applied fireproofing material shall have been tested and reported by Underwriters Laboratories of Canada, or another accredited laboratory, in accordance with the procedures of ANSI/ASTM E119 and shall be listed in the Underwriters Laboratories Fire Resistance Directory.

- .2 Mixing water shall be clean, fresh, potable and free from such amounts of mineral or organic substances as would affect the set of the fireproofing material. Provide water with sufficient pressure and volume to meet the fireproofing application schedule.

2.3 Accessories

- .1 Provide accessories to comply with manufacturer's recommendations and to meet fire resistance design and code requirements. Such accessories include, but are not limited to, any required or optional items such as bonding agents, mechanical attachments; application aids such as metal lath, scrim, or netting; and accelerator.

PART 3 EXECUTION

3.1 Inspection

- .1 All surfaces to receive spray applied fireproofing shall be provided free of oil, grease, loose mill scale, dirt or other foreign substances which may impair proper adhesion of the fireproofing to the substrate. Where necessary, cleaning or other corrections of surfaces to receive fireproofing shall be the responsibility of the supplier of the incompatible surface.
- .2 Application of the fireproofing shall not begin until the contractor, applicator and fireproofing testing laboratory (inspector) have examined surfaces to receive fireproofing and determined that the surfaces are acceptable to receive the fireproofing material.

3.2 Preparation

- .1 Prior to application of the fireproofing material, a bonding agent, approved by the fireproofing material manufacturer, shall be applied to all substrates to receive fireproofing.

- .2 Other trades shall install clips, hangers, support sleeves and other attachments required to penetrate the fireproofing, prior to application of the fireproofing materials.
- .3 Other trades shall not install ducts, piping, equipment or other suspended items until the fireproofing is complete.

3.3 Application

- .1 Clean all structural steel, joists, and metal deck to remove all loose scale or oily coatings, in accordance with manufacturer's recommendations. Remove existing coatings, paint, etc. if necessary to satisfy design criteria for fireproof assemblies.
- .2 Apply bonding adhesive or primer to substrate if recommended by manufacturer.
- .3 Apply fireproofing over substrates, building up to required thickness with as many passes or stages necessary to provide monolithic blanket of uniform density and texture. Total thickness shall be in accordance with submitted and approved designs.
- .4 At ducts, pipes and similar items, passing through fire rated assemblies and structural members, extend fireproofing 150 mm on either side along the penetrating item.

3.4 Tests and Inspections

- .1 Installed assembly will be tested and inspected for conformance with specifications by an independent inspection and testing company retained and paid for by the Owner.

3.5 Patching

- .1 Patch damage to fireproofing caused by testing or by other trades before fireproofing is concealed, or if exposed, before Substantial Performance.

3.6 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 04 22 00 Concrete Unit Masonry
- .2 Section 07 81 16 Cementitious Fireproofing
- .3 Section 07 92 00 Joint Sealants
- .4 Section 09 21 16 Gypsum Board

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM E84-24 Standard Test Method for Surface Burning Characteristics of Building Materials
 - .2 ASTM E119-20 Standard Test Methods for Fire Tests of Building Construction and Materials
 - .3 ASTM E136-19a Standard Test Method for Behavior of Material in a Vertical Tube Furnace at 750° C
 - .4 ASTM E814-13a (2017) Standard Test Method for Fire Tests of Penetration Firestop Systems
 - .5 ASTM E1966-15(2019) Standard Test Method for Fire-Resistive Joint Systems
 - .6 ASTM E2307-20 Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus
- .2 Underwriter's Laboratories of Canada (ULC)
 - .1 ULC 101-2014 Standard Methods of Fire Endurance Tests of Building Construction and Materials
 - .2 ULC 102.2-2018 Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies
 - .3 ULC 115-2018 Standard Method of Fire Tests of Firestop Systems
- .3 National Fire Protection Association (NFPA)
 - .1 NFPA 252 Standard Methods of Fire Test and Door Assemblies
- .4 South Coast Air Quality Management District (SCAQMD) California State
 - .1 SCAQMD Rule 1168-03: Adhesives and Sealants.
- .5 Ontario Building Code

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings: Submit shop drawings to show location, proposed material, reinforcement, anchorage, fastenings and method of installation. Construction details should accurately reflect actual job conditions.
- .4 Samples: Submit duplicate 300 x 300 mm samples showing actual fire stop material proposed for project.
- .5 Quality Assurance Submittals: submit following in accordance with Section 01 45 00 - Quality Control.
 - .1 Test reports: in accordance with ULC 101 for fire endurance and ULC 102 for surface burning

characteristics.

- .2 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties
- .3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .4 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

1.5 Definitions

- .1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.
- .2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.
- .3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.

1.6 Quality Assurance

- .1 One installer shall install all firestopping on the project. Each trade shall not firestop their own service penetrations. Installer shall be certified by fire stopping manufacturer.
- .2 Qualifications:
 - .1 Qualified Installer: specializing in fire stopping installations with 5 years documented experience approved and trained by manufacturer.
 - .3 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with contractor's representative and Consultant 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.
- .4 Site Meetings:
 - .1 As part of Manufacturer's Services described in 3.5- Field Quality Control, schedule site visits, to review Work, at stages listed.
 - .2 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.
 - .3 Twice during progress of Work at 25% and 60% complete.
 - .4 Upon completion of Work, after cleaning is carried out.
 - .5 Single Source Responsibility: Obtain through-penetration fire-stop systems for each kind of penetration and construction condition indicated from a single manufacturer.
- .5 Field-Constructed Mockup: Prior to installing fire-stopping, erect mockups for each different through-penetration fire-stop system indicated to verify selections made and to demonstrate qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final installations.
 - .1 Locate mockups on site in locations indicated or, if not indicated, as directed by Consultant.

- .2 Notify Consultant one week in advance of the dates and times when mockups will be erected.
- .3 Obtain Consultant's acceptance of mockups before start of final unit of Work.
- .4 Retain and maintain mockups during construction in an undisturbed condition as a standard for judging completed unit of Work.
- .5 Accepted mockups in an undisturbed condition at time of Substantial Performance may become part of completed unit of Work.

1.7 Sustainable Requirements

- .1 Materials shall be Low VOC type conforming to SCAQMD Rule 1168-03. Maximum VOC level of firestopping materials shall be 250 g/l.

1.8 Project Conditions

- .1 Environmental Conditions: Do not install fire-stopping when ambient or substrate temperatures are outside limits permitted by fire-stopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- .2 Ventilation: Ventilate fire-stopping per fire-stopping manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.

1.9 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings.
- .4 Storage and Protection:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

1.10 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 All fire stopping shall consist of ULC listed firestop system.
- .2 Applications: Provide fire-stopping systems composed of materials specified in this Section that comply with system performance and other requirements.
- .3 General: Provide fire-stopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gases.
- .4 All firestopping material shall be:
 - .1 From one manufacturer;
 - .2 Intumescent where an appropriate system exists.

- .5 Fire stopping and smoke seal systems: ULC listed in accordance with ULC 115.
 - .1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of ULC 115 and not to exceed opening sizes for which they are intended.
- .6 Service penetration assemblies: ULC listed systems tested to ULC 115.
- .7 Service penetration fire stop components: ULC listed and certified by test laboratory to ULC 115.
- .8 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.
- .9 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.
- .10 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.
- .11 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
- .12 Water: potable, clean and free from injurious amounts of deleterious substances.
- .13 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .14 F-Rated Through-Penetration Fire-stop Systems: Provide through-penetration fire-stop systems with F ratings indicated, but not less than that equaling or exceeding the fire-resistance rating of the constructions penetrated.
- .15 T-Rated Through-Penetration Fire-stop Systems: Provide through-penetration fire-stop systems with T ratings, in addition to F ratings, where indicated and where systems protect penetrating items exposed to contact with adjacent materials in occupy-able floor areas. T-rated assemblies are required where the following conditions exist:
 - .1 Where fire-stop systems protect penetrations located outside of wall cavities.
 - .2 Where fire-stop systems protect penetrations located outside fire-resistive shaft enclosures.
 - .3 Where fire-stop systems protect penetrations located in construction containing doors required to have a temperature-rise rating.
 - .4 Where fire-stop systems protect penetrating items larger than a 100 mm diameter nominal pipe or 10,000 mm² in overall cross-sectional area.
- .16 Fire-Resistive Joint Sealants: Provide joint sealants with fire-resistance ratings indicated, but not less than that equaling or exceeding the fire-resistance rating of the construction in which the joint occurs. Sealants for vertical joints: non-sagging.
- .17 For fire-stopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.
 - .1 For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration fire-stop systems.
 - .2 For floor penetrations with annular spaces exceeding 100 mm or more in width and exposed to possible loading and traffic, provide fire-stop systems capable of supporting the floor loads involved either by installing floor plates or by other means.
 - .3 For penetrations involving insulated piping, provide through-penetration fire-stop systems not requiring removal of insulation.

- .18 For firestopping exposed to view, provide products with flame-spread values of less than 25 and smoke-developed values of less than 450.
- .19 Compatibility: Provide fire-stopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by fire-stopping manufacturer based on testing and field experience.
- .20 Accessories: Provide components for each fire-stopping system that are needed to install fill materials and to comply with "System Performance Requirements". Use only components specified by the fire-stopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire resistance-rated systems. Accessories include but are not limited to the following items:
 - .1 Permanent forming/damming/backing materials including the following:
 - .1 Semi-refractory fibre (mineral wool) insulation.
 - .2 Ceramic fibre.
 - .3 Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
 - .4 Fire-rated formboard.
 - .5 Joint fillers for joint sealants.
 - .2 Temporary forming materials.
 - .3 Substrate primers.
 - .4 Collars.
 - .5 Steel sleeves.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

- .1 Compliance: comply with manufacturer's written recommendations or specifications.

3.2 Preparation

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.
- .2 Ensure that substrates and surfaces are clean, dry and frost free.
- .3 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .4 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour retarder.
- .5 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.3 Installation

- .1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing and as necessary to maintain fire resistance ratings of floor and wall assemblies.

- .2 Provide fire stopping for all disciplines.
- .3 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.
- .4 Fill spaces between openings, ducts, pipes and unused sleeves passing through fire separations with firestop material and install firestopping systems in accordance with the appropriate ULC system number for the products and type of penetration.
- .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 Sequences of Operation

- .1 Proceed only when submittals have been reviewed by Consultant.
- .2 Mechanical pipe insulation: certified fire stop system component.
 - .1 Ensure pipe insulation installation precedes fire stopping.

3.5 Field Quality Control

- .1 Inspections: notify Consultant when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.
- .2 Employ a ULC accredited Designated Responsible Individual (DRI) to inspect and label all fire stop applications on site.
- .3 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 Article 1.4 - Submittals.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in Article 1.6 - Quality Assurance.

3.6 Commissioning

- .1 Employ a ULC accredited Designated Responsible Individual (DRI) to inspect and label all fire stop applications on site. Submit DRI's written reports within 3 days of review, verifying compliance of Work.
- .2 Perform a thorough examination of the fire stopping system to determine if the assembly is installed as per its ULC listing.
- .3 Allow for destructive testing of installed firestopping. Repair all tested assemblies.
- .4 The examination shall take place prior to close-up to confirm assembly components and installation configuration.

- .5 Any and all deviations from the ULC listed system shall be considered grounds for rejection and replacement.

3.7 Schedule

- .1 Fire stop and smoke seal at:
 - .1 Penetrations through fire-resistance rated partitions and walls.
 - .2 Perimeter of fire-resistance rated partitions.
 - .3 Intersection of fire-resistance rated partitions.
 - .4 Control and sway joints in fire-resistance rated partitions and walls.
 - .5 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
 - .6 Around mechanical and electrical assemblies penetrating fire separations.
 - .7 Rigid ducts: greater than 129 cm²: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.
 - .8 All electrical boxes installed in fire rated gypsum board assemblies.
 - .9 All locations required by the Ontario Building Code.
 - .10 Any other locations indicated.

3.8 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- | | | |
|----|------------------|-------------------------------------|
| .1 | Section 03 30 00 | Cast-in-Place Concrete |
| .2 | Section 04 22 00 | Concrete Unit Masonry |
| .3 | Section 06 10 00 | Rough Carpentry |
| .4 | Section 06 20 00 | Finish Carpentry |
| .5 | Section 06 40 00 | Architectural Woodwork |
| .6 | Section 07 84 00 | Firestopping |
| .7 | Section 08 11 00 | Metal Doors and Frames |
| .8 | Section 08 50 00 | Aluminum Doors, Windows and Screens |
| .9 | Section 08 80 05 | Glazing |

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM C510-16(2022) Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants
 - .2 ASTM C661-15(2022) Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer
 - .3 ASTM C679-15(2022) Standard Test Method for Tack-Free Time of Elastomeric Sealants
 - .4 ASTM C719-22 Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)
 - .5 ASTM C793-05(2017) Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants
 - .6 ASTM C794-18(2022) Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
 - .7 ASTM C834-17 Standard Specification for Latex Sealants
 - .8 ASTM C919-22 Standard Practice for Use of Sealants in Acoustical Applications
 - .9 ASTM C920-18 Standard Specification for Elastomeric Joint Sealants
 - .10 ASTM C1087-23 Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems
 - .11 ASTM C1183/C1183M-13(2018) Standard Test Method for Extrusion Rate of Elastomeric Sealants
 - .12 ASTM C1193-16 Standard Guide for Use of Joint Sealants
 - .13 ASTM C1246-17(2022) Standard Test Method for Effects of Heat Aging on Weight Loss, Cracking, and Chalking of Elastomeric Sealants After Cure
 - .14 ASTM C1247-20 Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids
 - .15 ASTM C1248-22 Standard Test Method for Staining of Porous Substrate by Joint Sealants
 - .16 ASTM C1311-22 Standard Specification for Solvent Release Sealants
 - .17 ASTM C1330-23 Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.
 - .18 ASTM D412-16(2021) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
 - .19 ASTM D2203-01(2023) Standard Test Method for Staining from Sealants
 - .20 ASTM E84-24 Standard Test Method for Surface Burning Characteristics of Building Materials

- .21 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
- .2 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .3 U. S. Environmental Protection Agency (EPA)
 - .1 EPA 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings.
- .4 South Coast Air Quality Management District (SCAQMD) California State
 - .1 SCAQMD Rule 1168-03: Adhesives and Sealants.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit product data for all sealant materials and accessories including:
 - .1 Preparation instructions and recommendations.
 - .2 Standard drawings illustrating manufacturer's recommended sealant joint profiles and dimensions applicable to Project.
- .3 Joint Sealant Schedule: Indicate joint sealant location, joint sealant type, manufacturer and product name, and colour, for each application. Utilize joint sealant designations included in this Section.
- .4 Samples:
 - .1 Samples for Colour Selection: For each joint sealant type.
 - .2 Samples for Verification: For each joint sealant product, for each colour selected.
- .5 Greenguard Certificates: For each sealant and accessory product specified to meet volatile organic emissions standards of the Greenguard Children and Schools Certification.

1.5 Quality Assurance

- .1 Installer Qualifications: Company with minimum of three years of experience specializing in work of this section, employing applicators trained for application of joint sealants required for this project, with record of successful completion of projects of similar scope, and approved by manufacturer.
- .2 Single Source Responsibility: Provide joint sealants by a single manufacturer responsible for testing of Project substrates to verify compatibility and adhesion of joint sealants.
- .3 Caulking work shall be carried out in strict accordance with manufacturer's printed directions.
- .4 Preconstruction Manufacturer Laboratory Compatibility, Staining, and Adhesion Testing: Submit samples of each substrate or adjacent material that will be in contact with or affect joint sealants. Current manufacturer test data of products on matching substrates will be acceptable.
- .5 Adhesion: Use ASTM C719 and ASTM C794 to determine requirements for joint preparation, including cleaning and priming.
- .6 Compatibility: Use ASTM C1087 to determine materials forming joints and adjacent materials do not adversely affect sealant materials and do not affect sealant colour.
- .7 Stain Testing: Use ASTM C510, ASTM C1248, or ASTM D2203 to verify non-staining characteristics of proposed sealants on specified substrates.

- .8 Pre-construction manufacturer laboratory testing is not required when sealant manufacturer can furnish data acceptable to Consultant based on previous testing for materials matching those of the Work.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.7 Project Conditions

- .1 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .2 Ventilate area of work by use of approved portable supply and exhaust fans.

1.8 Scheduling

- .1 Schedule work so waterproofing, water repellents and preservative finishes are installed after sealants, unless sealant manufacturer approves otherwise in writing.
- .2 Ensure sealants are cured before covering with other materials.

1.9 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Manufacturer

- .1 Basis-of-Design Products: Provide joint sealant products manufactured by Tremco, Inc., Commercial Sealants and Waterproofing, 220 Wicksteed Avenue, Toronto, www.tremcosealants.com, or comparable products of other manufacturer approved by Consultant.

2.2 Materials, General

- .1 VOC Content for Interior Applications: Provide sealants and sealant primers complying with the following VOC content limits per 40 CFR 59, Subpart D (EPA Method 24):
 - .1 Architectural Sealants: 250 g/L.
 - .2 Sealant Primers for Nonporous Substrates: 250 g/L.
 - .3 Sealant Primers for Porous Substrates: 775 g/L.
- .2 Low-Emitting Sealants for Interior Applications: Provide sealants and sealant primers complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- .3 Compatibility: Provide joint sealants and accessory materials that are compatible with one another, and with adjacent materials, as demonstrated by sealant manufacturer using ASTM C1087 testing

and related experience.

- .4 Joint Sealant Standard: Comply with ASTM C920 and other specified requirements for each joint sealant.
- .5 Stain Test Characteristics: Where sealants are required to be non-staining, provide sealants tested per ASTM C1248 as non-staining on porous joint substrates specified.

2.3 Silicone Joint Sealants

- .1 SJS#1: Single-Component, Nonsag, Non-Staining, Moisture-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 100/50, Use NT; SWRI validated.
 - .1 Basis of Design Product: Tremco Spectrem 1.
 - .2 Volatile Organic Compound (VOC) Content: 1 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Staining, ASTM C1248: None on concrete, marble, granite, limestone, and brick.
 - .5 Colour: As selected by Consultant from manufacturer's standard line.
- .2 SJS#2: Single-Component, Nonsag, Non-Staining, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, Use NT; SWRI validated.
 - .1 Basis of Design Product: Tremco Spectrem 2.
 - .2 Volatile Organic Compound (VOC) Content: 50 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Staining, ASTM C1248: None on concrete, marble, granite, limestone, and brick.
 - .5 Colour: As selected by Consultant from manufacturer's standard line.
- .3 SJS#3: Single-Component, Nonsag, Non-Staining, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, Use NT.
 - .1 Basis of Design Product: Tremco Spectrem 3.
 - .2 Volatile Organic Compound (VOC) Content: 20 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Staining, ASTM C1248: None on concrete, marble, granite, limestone, and brick.
 - .5 Colour: As selected by Consultant from manufacturer's standard line.
- .4 SJS#4: Multi-Component, Nonsag, Non-Staining, Field-Tintable Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, Use NT.
 - .1 Basis of Design Product: Tremco Spectrem 4-TS.
 - .2 Volatile Organic Compound (VOC) Content: 20 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Staining, ASTM C1248: None on concrete, marble, granite, limestone, and brick.
 - .5 Colour: As selected by Consultant from manufacturer's standard line.
- .5 SJS#5: Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, Use NT.
 - .1 Basis of Design Product: Tremco Tremsil 200 Sanitary.
 - .2 Volatile Organic Compound (VOC) Content: 1 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Colour: White and Clear.

2.4 Urethane Joint Sealants

- .1 UJS#1: Single-Component, Nonsag, Moisture-Cure, Polyurethane Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, Use NT; Greenguard certified.
 - .1 Basis of Design Product: Tremco Dymonic 100.
 - .2 Volatile Organic Compound (VOC) Content: 40 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Tensile Strength ASTM D412: 350 to 450 psi
 - .5 Percent Elongation ASTM D412: 800 to 900%
 - .6 Modulus at 100% ASTM D412: 75 to 85 psi
 - .7 Tear Strength ASTM D412: 65 to 75 psi
 - .8 Smoke Development ASTM E84: 5
 - .9 Colour: As selected by Consultant from manufacturer's standard line.
- .2 UJS#2: Single-Component, Nonsag, Moisture-Cure, Polyurethane Hybrid Joint Sealant: ASTM C920, Type S, Grade NS, Class 35, Use NT; Greenguard certified.
 - .1 Basis of Design Product: Tremco Dymonic FC.
 - .2 Extrusion Rate ASTM C1183: 93.1 mL/min
 - .3 Weight Loss ASTM C1246: Pass
 - .4 Tack Free Time ASTM C679: 3 to 4 hours.
 - .5 Volatile Organic Compound (VOC) Content: 10 g/L maximum.
 - .6 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .7 Colour: As selected by Consultant from manufacturer's standard line.
- .3 UJS#3: Single-Component, Nonsag, Polyurethane Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, Use NT.
 - .1 Basis of Design Product: Tremco Vulkem 116.
 - .2 Volatile Organic Compound (VOC) Content: 60 g/L maximum.
 - .3 Colour: As selected by Consultant from manufacturer's standard line.
- .4 UJS#4: Immersible, Single-Component, Pourable, Traffic Grade Polyurethane Joint Sealant: ASTM C920, Type S, Grade P, Class 50, Use T and I.
 - .1 Basis of Design Product: Tremco Vulkem 45 SSL.
 - .2 Volatile Organic Compound (VOC) Content: 110 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Colour: As selected by Consultant from manufacturer's standard line.
- .5 UJS#5: Immersible, Multi-Component, Pourable, Traffic-Grade Polyurethane Joint Sealant: ASTM C920, Type M, Grade P, Class 35, Use T, O, and I.
 - .1 Basis of Design Product: Tremco Vulkem 445SSL.
 - .2 Tensile Strength, ASTM D412: 1.7 MPa, at 100 percent elongation.
 - .3 Tear Strength, ASTM D412: 6.1 kN/m.
 - .4 Adhesion to Concrete, After Water, ASTM C794: 4.4 kN/m
 - .5 Hardness, ASTM C661: 40 durometer Shore A, minimum.
 - .6 Accelerated Weathering, ASTM C793: Pass.
 - .7 Volatile Organic Compound (VOC) Content: 106 g/L maximum.
 - .8 Colour: As selected by Consultant from manufacturer's standard line.
- .6 UJS#6: Multi-Component, Non-sag, Polyurethane Joint Sealant: ASTM C920, Type M, Grade NS, Class 50, Use I.
 - .1 Basis of Design Product: Tremco Dymonic 240 FC.

- .2 Volatile Organic Compound (VOC) Content: 0 g/L maximum.
- .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
- .4 Colour: As selected by Consultant from manufacturer's standard line.

2.5 Latex Joint Sealants

- .1 LJS#1: Latex Joint Sealant: Siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
 - .1 Basis of Design Product: Tremco Tremflex 834.
 - .2 Volatile Organic Compound (VOC) Content: 35 g/L maximum.
 - .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
 - .4 Colour: White, paintable.

2.6 Solvent-Release-Curing Joint Sealants

- .1 BJS#1: Butyl-Rubber-Based Joint Sealant: ASTM C1311.
 - .1 Basis of Design Product: Tremco Tremco Butyl Sealant.
 - .2 Volatile Organic Compound (VOC) Content: 250 g/L maximum.
 - .3 Colour: As selected by Consultant from manufacturer's standard colours.

2.7 Acoustical Sealants

- .1 AJS#1: Acoustical/Curtainwall Sealant: Single-component, non-hardening, non-sag, paintable synthetic rubber-tested to reduce airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing of similar assemblies according to ASTM E90.
 - .1 Basis of Design Product: Tremco Acoustical/Curtainwall Sealant.
 - .2 Volatile Organic Compound (VOC) Content: 160 g/L maximum.
 - .3 Colour: White, paintable.

2.8 Joint Sealant Accessories

- .1 Cylindrical Sealant Backing: ASTM C1330, Type B non-absorbent, bi-cellular material with surface skin, or Type O open-cell polyurethane, as recommended by sealant manufacturer for application.
- .2 Bond Breaker Tape: Polymer tape compatible with joint sealant and adjacent materials and recommended by sealant manufacturer.
- .3 Joint Substrate Primers: Substrate primer recommended by sealant manufacturer for application.
- .4 Cleaners: Chemical cleaners acceptable to joint sealant manufacturer.
- .5 Masking tape: Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

PART 3 EXECUTION

3.1 Examination

- .1 Examine joint profiles and surfaces to determine if work is ready to receive joint sealants. Verify joint dimensions are adequate for development of sealant movement capability. Verify joint surfaces are clean, dry, and adequately cured. Proceed with joint sealant work once conditions meet sealant manufacturer's written recommendations.

3.2 Preparation

- .1 Joint Surface Cleaning: Clean joints prior to installing joint sealants using materials and methods recommended by sealant manufacturer. Comply with ASTM C1193.
 - .1 Remove curing compounds, laitance, form-release agents, dust, and other contaminants.
 - .2 Clean nonporous and porous surfaces utilizing chemical cleaners acceptable to sealant manufacturer.
 - .3 Protect elements surrounding the Work of this section from damage or disfiguration. Apply masking tape to adjacent surfaces when required to prevent damage to finishes from sealant installation.

3.3 Application

- .1 Sealant and Primer Installation Standard: Comply with ASTM C1193 and manufacturer's written instructions.
- .2 Joint Backing: Select joint backing materials recommended by sealant manufacturer as compatible with sealant and adjacent materials. Install backing material at depth required to produce profile of joint sealant allowing optimal sealant movement.
 - .1 Install joint backing to maintain the following joint ratios:
 - .1 Joints up to 13 mm wide: 1:1 width to depth ratio.
 - .2 Joints greater than 13 mm wide: 2:1 width to depth ratio; maximum 13 mm joint depth.
 - .2 Install bond breaker tape over substrates when sealant backings are not used.
- .3 Masking: Mask adjacent surfaces to prevent staining or damage by contact with sealant or primer.
- .4 Joint Priming: Prime joint substrates when recommended by sealant manufacturer or when indicated by preconstruction testing or experience. Apply recommended primer using sealant manufacturer's recommended application techniques.
- .5 Liquid Sealant Application: Install sealants using methods recommended by sealant manufacturer, in depths recommended for application. Apply in continuous operation from bottom to top of joint vertically and horizontally in a single direction. Apply using adequate pressure to fill and seal joint width.
 - .1 Tool sealants immediately with appropriately shaped tool to force sealants against joint backing and joint substrates, eliminating voids and ensuring full contact.
 - .2 Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
 - .3 Tool exposed joint surface concave using tooling agents approved by sealant manufacturer for application.
- .6 Installation of Acoustical Sealant: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations on both sides of assemblies with a continuous bead of acoustical sealant. Comply with ASTM C919 and with manufacturer's written recommendations.

3.4 Field Quality Control

- .1 Field-Adhesion Testing: Perform adhesion tests in accordance with manufacturer's instructions and with ASTM C1193, Method A.
 - .1 Perform 5 tests for the first 300 m of joint length for each kind of sealant and joint substrate, and one test for each 300 m of joint length thereafter or 1 test per each floor per building elevation, minimum.

- .2 For sealant applied between dissimilar materials, test both sides of joint.
- .2 Remove sealants failing adhesion test, clean substrates, reapply sealants, and re-test. Test adjacent sealants to failed sealants.
- .3 Submit report of field adhesion testing to Consultant indicating tests, locations, dates, results, and remedial actions taken.

3.5 Exterior Joint Sealant Schedule

- .1 Exterior concealed transition joints in air barrier.
 - .1 SJS#1: Single-component neutral-curing low-modulus silicone sealant.
 - .2 UJS#1: Single-component non-sag urethane sealant.
 - .3 Compatibility: Compatible with air barrier components specified in Section 07 27 13.
- .2 Exterior movement joints in concrete unit masonry.
 - .1 SJS#1, SJS# 2: Single-component neutral-curing non-staining silicone sealant.
 - .2 SJS#4: Multi-component neutral-curing non-staining field tintable silicone sealant.
 - .3 UJS#1, UJS#2, UJS#3: Single-component non-sag urethane sealant.
- .3 Exterior movement joints in brick masonry.
 - .1 SJS#1, SJS# 2: Single-component neutral-curing non-staining silicone sealant.
 - .2 SJS#4: Multi-component neutral-curing non-staining field tintable silicone sealant.
 - .3 UJS#1, UJS#2, UJS#3: Single-component non-sag urethane sealant.
- .4 Exterior joints between different materials listed above.
 - .1 SJS#1, SJS# 2: Single-component neutral-curing non-staining silicone sealant.
 - .2 SJS#4: Multi-component neutral-curing non-staining field tintable silicone sealant.
 - .3 UJS#1, UJS#2: Single-component non-sag urethane sealant.
- .5 Exterior perimeter joints at frames of doors, windows, storefront frames, curtain wall frames, and louvers.
 - .1 SJS#1, SJS# 2: Single-component neutral-curing non-staining silicone sealant.
 - .2 SJS#4: Multi-component neutral-curing non-staining field tintable silicone sealant.
 - .3 UJS#1, UJS#2: Single-component non-sag urethane sealant.
- .6 Exterior joints within aluminum storefront framing, curtain walls, and window systems:
 - .1 SJS#1, SJS# 2: Single-component neutral-curing non-staining silicone sealant.
- .7 All other exterior non-traffic joints.
 - .1 SJS#1, SJS# 2: Single-component neutral-curing non-staining silicone sealant.
 - .2 SJS#4: Multi-component neutral-curing non-staining field tintable silicone sealant.
 - .3 UJS#1, UJS#2: Single-component non-sag urethane sealant.

3.6 Interior Joint Sealant Schedule

- .1 Interior movement joints in interior unit masonry.
 - .1 UJS#1, UJS#2: Single-component non-sag urethane sealant.
- .2 Interior perimeter joints of exterior aluminum frames.
 - .1 UJS#1: Single-component non-sag urethane sealant.

- .3 Interior perimeter joints of interior frames.
 - .1 UJS#2: Single-component non-sag urethane sealant.
 - .2 LJS#1: Siliconized acrylic latex

 - .4 Interior sanitary joints between plumbing fixtures, food preparation fixtures, and casework and adjacent walls, floors, and counters.
 - .1 SJS#5: Mildew-Resistant, Single-Component, nonsag, acid-curing silicone joint sealant.

 - .5 Interior traffic joints in floor and between floor and wall construction.
 - .1 UJS# 4, UJS#5: Single-component pourable urethane sealant.

 - .6 Interior non-moving joints between interior painted surfaces and adjacent materials.
 - .1 LJS#1: Siliconized acrylic latex
 - .2 Joint-Sealant Colour: Paintable.

 - .7 Interior concealed sealants at thresholds and sills.
 - .1 BJS#1: Butyl-rubber-based joint sealant.
- 3.7 Cleaning
- .1 Proceed in accordance with Section 01 74 11 – Cleaning.

 - .2 Cleaning: Remove excess sealant using materials and methods approved by sealant manufacturer that will not damage joint substrate materials.
 - .1 Remove masking tape immediately after tooling joint without disturbing seal.
 - .2 Remove excess sealant from surfaces while still uncured.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- | | | |
|-----|------------------|--------------------------|
| .1 | Section 04 22 00 | Concrete Unit Masonry |
| .2 | Section 06 10 00 | Rough Carpentry |
| .3 | Section 07 92 00 | Joint Sealants |
| .4 | Section 08 14 16 | Flush Wood Doors |
| .5 | Section 08 71 10 | Door Hardware |
| .6 | Section 08 71 13 | Automatic Door Operators |
| .7 | Section 08 80 05 | Glazing |
| .8 | Section 09 21 16 | Gypsum Board |
| .9 | Section 09 91 13 | Exterior Painting |
| .10 | Section 09 91 23 | Interior Painting |

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 ASTM C177-19e1 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
 - .3 ASTM C518-21 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
 - .4 ASTM C553-13(2019) Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
 - .5 ASTM C591-22 Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
 - .6 ASTM C1289-22a Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
 - .7 ASTM D6386-22 Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting
 - .8 ASTM D7396-14(2020) Standard Guide for Preparation of New, Continuous Zinc-Coated (Galvanized) Steel Surfaces for Painting
 - .9 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - .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.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181-99 Ready-Mixed Organic Zinc-Rich Coating.
 - .2 CGSB 41-GP-19M-84 Rigid Vinyl Extrusions for Windows and Doors.
- .3 CSA Group (CSA)
 - .1 CSA-G40.20-13/G40.21-13 General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA W59-18 Welded Steel Construction (Metal Arc Welding).
- .4 Canadian Steel Door Manufacturers' Association (CSDMA)
 - .1 CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames, 2000
 - .2 CSDMA Recommended Specifications for Commercial Steel Doors and Frames, 2006.

- .3 CSDMA Selection and Usage Guide for Commercial Steel Door and Frame Products, 2009.
- .5 Underwriters Laboratories Canada (ULC)
 - .1 ULC 104-2015 Standard Method for Fire Tests of Door Assemblies.
 - .2 ULC 105- 2016 Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC-S104.
 - .3 ULC 106-2015 Standard Method for Fire Tests of Window and Glass Block Assemblies
 - .4 ULC 701-2011 Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .5 ULC 702.1- 2014 Standard for Thermal Insulation, Mineral Fibre, for Buildings.
 - .6 ULC 704-11 Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
- .6 Underwriters Laboratories (UL)
 - .1 UL10B Fire Tests of Door Assemblies.
 - .2 UL10C Standard for Positive Pressure Fire Tests of Door Assemblies.
- .7 National Fire Protection Association (NFPA)
 - .1 NFPA 80-22 Standard for Fire Doors and Other Opening Protectives.
 - .2 NFPA 252-2017 Fire Tests of Door Assemblies.
- .8 American National Standards Institute (ANSI)
 - .1 ANSI 250.4-2018 Test Procedure and Acceptance Criteria for — Physical Endurance for Steel Doors, Frames and Frame Anchors
 - .2 ANSI 250.10-2011 Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Provide shop drawings
 - .1 Indicate each type of door, frame, steel, construction and core.
 - .2 Indicate fire ratings.
 - .3 Indicate material thicknesses, mortises, reinforcements, anchorages, location of exposed fasteners, openings, arrangement of hardware, and finishes.
 - .4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.

1.5 System Description

- .1 Design exterior frame assembly to accommodate expansion and contraction when subjected to minimum and maximum surface temperature of -35° C to 35° C.

1.6 Defining Opening Sizes

- .1 Width - Widths of openings shall be measured from inside to inside of frame jamb rabbets. (Referred to as "frame rabbet width" or "nominal door width")
- .2 Height - Heights of openings shall be measured from the finished floor (exclusive of floor coverings) to the head rabbet of the frame. (Referred to as "frame rabbet height" or "nominal door height")
- .3 Door Sizes - Doors shall be sized so as to fit the above openings and allow a 3 mm nominal clearance at jambs and head of frame. A clearance of 13 mm maximum shall be allowed between the bottom of the door and the finished floor (exclusive of floor coverings).
- .4 Tolerances - Doors and frame product shall be manufactured and installed in accordance with the CSDMA's, "Recommended Dimensional Standards for Commercial Steel Doors and Frames".

1.7 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.8 Requirements of Regulatory Agencies

- .1 Steel fire rated doors and frames: labeled and installed by an organization accredited by Standards Council of Canada in conformance with ULC 104 or NFPA 252 for ratings specified or indicated.
- .2 Provide fire labeled frame products for those openings requiring fire protection ratings, as scheduled. Test products in strict conformance with ULC 104 or NFPA 252 and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.

1.9 Testing and Performance

- .1 Fire labeled products shall be provided for those openings requiring fire protection ratings as scheduled on the drawings. Products shall be tested in strict conformance with ULC 104 and listed by Underwriters Laboratory of Canada Ltd. or Warnock Hersey under an active Factory Inspection Program.
- .2 Product quality shall meet the standards established by the Canadian Steel Door Manufacturer's Association.
- .3 Door construction shall meet acceptance criteria of ANSI A250.10 and shall be certified as meeting Level A (1,000,000 cycles) and Twist Test Acceptance Criteria deflection not to exceed 6.4 mm/13.6 kg force, total deflection at 136.1 kg force not to exceed 64 mm and permanent deflection not to exceed 3.0 mm when tested in strict conformance with ANSI A250.4. Test shall be conducted by an independent nationally recognized accredited laboratory.
- .4 Core materials for insulated doors shall attain a thermal resistance rating of RSI 2.17 when tested in accordance with ASTM C177 or ASTM C518.

1.10 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 Acceptable Materials
 - .1 Steel doors and frame product manufactured in accordance with this Specification by CSDMA members, are eligible for use on this project.
- .2 Steel: Commercial grade steel to ASTM A653, CS, Type B, Coating Designation ZF75 (A25) minimum. Minimum steel thicknesses shall be in accordance with Appendix 1 of the CSDMA, Recommended Specifications for Commercial Steel Door and Frame Products unless noted otherwise.
- .3 Reinforcement channel: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A653, ZF75.

4 Door Core Materials

- .1 Interior Doors: Structural small cell, 24.5mm maximum kraft paper 'honeycomb'. Weight 36.3 kg per ream minimum, density: 16.5 kg/m³ minimum sanded to required thickness. ULC approved.
- .2 Exterior Doors: Polyisocyanurate: Rigid, modified polyisocyanurate, closed cell board. Density; 32 kg/m³ minimum, thermal values; RSI 2.17 minimum, in accordance with ASTM C591 (un-faced) or ASTM C1289 (faced).
- .3 Temperature Rise Rated (TRR): Core composition to provide the fire-protection rating and limit the temperature rise on the unexposed side of door to 250°C at 30 or 60 minutes, as determined by governing building code requirements. Core to be tested as part of a complete door assembly, in accordance with ULC 104 and shall be listed by a nationally recognized testing agency having a factory inspection service.

5 Primers:

- .1 Touch-up prime CAN/CGSB-1.181, organic zinc rich, rust inhibitive.
 - .1 Maximum VOC limit 50 g/L to GC-03.

2.2 Adhesives

- .1 Adhesive: maximum VOC content 50 g/L to SCAQMD Rule 1168.
- .2 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.
- .3 Polyisocyanurate: heat resistant, epoxy resin based, low viscosity, contact cement.
- .4 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, low VOC sealant/adhesive or U.L.C. approved equivalent.

2.3 Accessories

- .1 Glazing Stops: Minimum 0.9 mm base thickness sheet steel with wipe zinc finish to ASTM A525. Fasteners to be #6 x 32 mm cadmium plated oval head scrulox self-drilling type screws. Tamper proof screws.
- .2 Exterior top caps: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.
- .3 Frame Thermal Breaks: Rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19MA.
- .4 Door silencers: single stud rubber/neoprene type.
- .5 Fiberglass: to ULC 702, loose batt type, minimum density of 24 kg/m³.
- .6 Metallic paste filler: to manufacturer's standard.
- .7 Sealant: As specified in Section 07 92 00.

2.4 Fabrication - Frame Products

- .1 General
 - .1 Fabricate frames in accordance with CSDMA specifications.
 - .2 Fabricate frames to profiles and maximum face sizes as indicated.

- .3 Exterior frame product shall be 1.60 mm welded type construction, thermally broken.
 - .4 Interior frame product shall be 1.60 mm. Interior frames, transoms, sidelights and window assemblies shall be welded type construction.
 - .5 Blank, reinforce, drill and tap frames for templated hardware and electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
 - .6 Prepare frames to receive electrical conduit for door operators where indicated and required.
 - .7 Protect mortised cutouts with steel guard boxes.
 - .8 Provide anchorage appropriate to floor, wall and frame construction. Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb. For rebate opening heights up to and including 1520 mm provide two (2) anchors, and an additional anchor for each additional 760 mm of height or fraction thereof, except as indicated below. Frames in previously placed concrete, masonry or structural steel shall be provided with anchors located not more than 150 mm from the top and bottom of each jamb, and intermediate anchors at 660 mm on centre maximum. Fasteners for such anchors shall be provided by others.
 - .9 Minimum reinforcing, anchor and other component thickness shall be in accordance with Table 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".
 - .10 Each interior door opening shall be prepared for single stud rubber door silencers, three (3) for single door openings, two for double door openings, except on gasketed frame product.
 - .11 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
 - .12 Fire-rated frame products shall be provided for those openings requiring fire protection as determined and scheduled by the Consultant. Frames, transom and sidelight assemblies shall be listed for conformance with ULC 104. Window assemblies shall be listed for conformance with ULC 106. All fire-rated frame products shall bear the label of and be listed by a nationally recognized testing agency having a factory inspection service. Labeling shall be in accordance with NFPA 80, the listing authority's policies and label materials, and shall identify the manufacturer. Fire-rated frame products shall be constructed as listed for labeling in the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers.
- .2 Welded Type
- .1 Welding in accordance with CSA W59.
 - .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
 - .3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails and sills.
 - .4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.
 - .5 Where frame product is to be installed prior to the adjacent partition, a floor anchor shall be securely attached to the inside of each jamb profile. Each floor anchor shall be provided with two holes for securing to the floor. For conditions that do not permit the use of a floor anchor, an additional wall anchor, located within 150 mm of the base of the jamb, shall be substituted.
 - .6 Weld in two temporary jamb spreaders per door opening to maintain proper alignment during shipment and handling, which shall not be used for installation.
 - .7 Glazing stops shall be formed steel channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.
 - .8 When required due to site access, when advised by the contractor responsible for coordination or installation, as specified on the drawings or due to shipping limitations, frame product for large openings shall be fabricated in sections as designated on the approved submittal drawings, with splice joints for field assembly and welding by others.
 - .9 Prior to shipment, mark each frame product with an identification number as shown on the approved submittal drawings.

- .10 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .11 Manufacturer's nameplates on frames and screens are not permitted

2.5 Fabrication - Doors

- .1 General
 - .1 Interior doors: insulated steel construction with honeycomb core laminated to minimum 1.19 mm nominal thickness steel face sheets under pressure.
 - .2 Exterior doors: insulated steel construction with polyisocyanurate core laminated to minimum 1.19 mm nominal thickness steel face sheets under pressure.
 - .3 Voids between vertical stiffeners shall be filled with fiberglass batt type insulation.
 - .4 Doors: swing type, flush.
 - .5 Doors: manufacturers' proprietary construction, tested and/or engineered as part of a fully operable assembly, including door, frame, gasketing and hardware in accordance with ASTM E330.
- .2 Longitudinal edges shall be mechanically inter-locked, adhesive assisted. Seams: visible grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.
- .3 Doors shall be mortised, blanked, reinforced, drilled and tapped at the factory for templated hardware and electronic hardware, in accordance with the approved hardware schedule and templates provided by the hardware supplier.
- .4 Holes 12.7 mm diameter and larger shall be factory prepared, except mounting and through-bolt holes, which are by others, on site, at time of hardware installation. Holes less than 12.7 mm diameter shall be factory prepared only when required for the function of the device (for knob, lever, cylinder, thumb or turn pieces) or when these holes over-lap function holes.
- .5 Doors shall be reinforced where required, for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware.
- .6 Provide top and bottom of doors with inverted, recessed, welded steel channels. Exterior doors shall be provided with rigid PVC top caps.
- .7 Minimum reinforcing and component thickness shall be in accordance with Table 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".
- .8 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
- .9 Fire-rated doors shall be provided for those openings requiring fire protection and temperature rise ratings, as indicated. Such products shall be listed for conformance with ULC 104. All fire-rated doors shall bear the label of and be listed by a nationally recognized testing agency having a factory inspection service. Labeling shall be in accordance with NFPA 80, the listing authority's policies and label materials, and shall identify the manufacturer. Fire-rated doors shall be constructed as listed for labeling in the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers.
- .10 Prior to shipment, mark each door with an identification number as shown on the approved submittal drawings.
- .11 Fabricate transom panels to match door construction.

.12 Manufacturer's nameplates on doors are not permitted.

2.6 Glazing Stops

- .1 Glazing stops shall be accurately fitted, butted at corners with removable stops located on push side of door.
- .2 Provide tamper proof screws on all doors and screens.

2.7 Finishes

- .1 Doors and frames shall wipe coat zinc, ready for painting.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

- .1 Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.

3.2 Installation

- .1 Install doors and frames to CSDMA Installation Guide, NAAMM-HMMA 840, Installation Guide for Commercial Steel Doors and Frames.
- .2 Fire-rated door and frame product shall be installed in accordance with NFPA-80.
- .3 Prior to installation, remove temporary shipping spreaders.
- .4 Prior to installation, the area of floor on which the frame is to be installed, and within the path of the door swing, shall be checked and corrected for flatness.
- .5 Check door and frame product for correct size, swing, rating and opening number.
- .6 The supplier shall be advised of any discrepancies prior to installation.
- .7 Set frames plumb, square, level and at correct elevation.
- .8 Secure anchorages and connections to adjacent construction.
- .9 Brace frames rigidly in position while building-in. Install wood spreaders at third points of frame rebate height to maintain frame width. Provide vertical support at centre of head for openings exceeding 1200 mm in width.
- .10 During the setting of frame product, check and correct as necessary for opening width, opening height, square, alignment, twist and plumb, in accordance with the CSDMA "Recommended Dimensional Standards for Commercial Steel Doors and Frames".
- .11 Remove wood spreaders after frames have been built-in.
- .12 Make allowance for deflection to ensure structural loads are not transmitted to frame product.

- .13 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 10 - Door Hardware. Coordinate with Section 08 71 10 for preparation and installation of automatic door operators.
- .14 Adjust operable parts for correct clearances and function.
- .15 Install glazing and door silencers.
- .16 Install transom panels using concealed fasteners.
- .17 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows:
 - .1 Hinge side: 1.0 mm.
 - .2 Latch side and head: 1.5 mm.
 - .3 Finished floor and thresholds: 13 mm.
- .18 Caulk perimeter of frames. Refer to Section 07 92 00 – Joint Sealants.

3.3 Finish Repairs

- .1 Touch up with primer finishes damaged during installation.
- .2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

3.4 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 06 20 00 Finish Carpentry
- .2 Section 08 11 00 Metal Doors and Frames
- .3 Section 08 71 10 Door Hardware
- .4 Section 09 91 23 Interior Painting

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM D1761-20 Standard Test Methods for Mechanical Fasteners in Wood and Wood-Based Materials
 - .2 ASTM D5456-21e1 Standard Specification for Evaluation of Structural Composite Lumber Products
 - .3 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
 - .4 ASM E413-22 Classification for Rating Sound Insulation
 - .5 ASTM E1332-22 Standard Classification for Rating Outdoor-Indoor Sound Attenuation
 - .6 ASTM E2235-04(2020) Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods
- .2 CSA Group (CSA)
 - .1 CSA O115-M1982 (R2001) Hardwood and Decorative Plywood.
 - .2 CSA O132.2 Series-90 (R1998) Wood Flush Doors
- .3 Canadian General Services Board (CGSB)
 - .1 CAN/CGSB-71.19 Adhesive, Contact, Sprayable
 - .2 CAN/CGSB-71.20 Adhesive, Contact, Brushable
- .4 American National Standards Institute (ANSI)
 - .1 ANSI A208.1 Standard for Particleboard.
- .5 Underwriters Laboratories Canada (ULC)
 - .1 ULC 104-2015 Standard Method for Fire Tests of Door Assemblies.
- .6 National Fire Protection Association (NFPA)
 - .1 NFPA 80 Standard for Fire Doors and Other Opening Protectives.
 - .2 NFPA 252 Standard Method of Fire Test for Door Assemblies.
- .7 Architectural Woodwork Manufacturers Association of Canada (AWMAC): Quality Standards for Architectural Woodwork
- .8 Window and Door Manufacturer's Association (WDMA)
 - .1 ANSI/WDMA I.S. 1A-21 Interior Architectural Wood Flush Doors
- .9 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1113-06 Architectural Coatings.
 - .2 SCAQMD Rule 1168-03 Adhesives and Sealants Applications.
- .10 Green Seal Environmental Standards
 - .1 Standard GS-11-97 Architectural Paints.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

- .2 Submit manufacturer's printed product literature, specifications and data sheets for door materials and adhesives.
- .3 Submit shop drawings and door schedules.
 - .1 Indicate door types, cutout sizes & core construction.
- .4 Submit samples.
 - .1 Submit one 300 x 300 mm corner sample of each type wood door.
 - .2 Show door construction, core, glazing detail and faces.
- .5 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.5 Quality Assurance

- .1 The "Quality Standards" of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), 1991 Edition, together with authorized additions and amendments, shall be used as a reference standard and shall form part of this project specification.
- .2 Where modifications to the AWMAC Quality Standards contained within the Manual are included in this project specification, then such modifications shall govern in case of conflict.
- .3 Any reference to Custom or Premium grade in this specification shall be as defined in the AWMAC Quality Standards.
- .4 Any item not given a specific quality grade shall be Custom grade as defined in the AWMAC Quality Standards.
- .5 References in this specification to part and item numbers mean those parts and items contained within the AWMAC Quality Standards Manual.
- .6 **Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.**

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 16 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Wood door delivery, storage and handling shall be in accordance with Part 6, Item 3, of the AWMAC Quality Standards.
- .4 Do not deliver wood doors until the building and storage areas are sufficiently dry so that the wood doors will not be damaged by excessive changes in moisture content.
- .5 Delivered materials which are damaged in any way or do not comply with these specifications will be rejected by the Consultant and shall be removed from the job site and replaced with acceptable materials.

1.7 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.8 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Manufacturers

- .1 Acceptable Manufacturers: Member in good standing of the Architectural Woodwork Manufacturers Association of Canada (AWMAC) with minimum 5 years of production experience similar to this project, whose qualifications indicate ability to comply with requirements of this Section.

2.2 Materials

- .1 All door materials to conform to CSA O132.2.
- .2 Doors shall be constructed of solid laminated wood core with 3.0 mm thick Grade A face, book matched, flat cut birch, 50 mm stiles and 76 mm top and bottom rails. Stiles to be No. 3 birch edge.
- .3 Core shall consist of low density wood blocks, random lengths with staggered joints. All cores shall be drum sanded both sides.
- .4 Door thickness: as indicated.
- .5 Adhesive: To CSA 0132.2, Type II, water resistant, for interior use.

PART 3 EXECUTION

3.1 Fabrication

- .1 Fabricate doors in accordance with CSA 0132.2.
- .2 Provide No. 3 vertical edge strips to match face veneer.
- .3 Bevel vertical edges of single acting doors 3.0 mm on lock side and 1.6 mm on hinge side.
- .4 Prepare doors for hardware.
- .5 Fabricate doors with reinforced openings for louvres, door grilles and glazed lites. Provide manufacturer's standard trim and stops.
- .6 Sand and prepare doors to receive clear urethane finish as indicated on the Room Finish and Door Schedules.

3.2 Installation

- .1 Unwrap and protect doors in accordance with CSA-O132.2 Series, Appendix A.

- .2 Install doors and hardware in accordance with manufacturer's printed instructions and CSA-0132.2 Series, Appendix A.
- .3 Adjust hardware for correct function.
- .4 Doors to receive clear urethane finish as specified in Section 09 91 23.

3.3 Final Adjustment

- .1 Re-adjust doors and hardware just prior to completion of building to function freely and properly

3.4 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 06 20 00 Finish Carpentry
- .3 Section 07 21 13 Building Insulation
- .4 Section 07 27 15 Modified Bituminous Sheet Air Barriers.
- .5 Section 07 92 00 Joint Sealants.
- .6 Section 08 71 10 Finishing Hardware
- .7 Section 08 80 05 Glazing
- .8 Section 09 21 16 Gypsum Board

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM B221-21 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
 - .2 ASTM B456-17(2022) Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
 - .3 ASTM B633-23 Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
 - .4 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
 - .5 ASTM E783-02(2018) Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
 - .6 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
 - .7 ASTM E1186-22 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.40-97 Anticorrosive Structural Steel Alkyd Primer.
- .3 CSA Group (CSA)
 - .1 AAMA/WDMA/CSA 101/I.S.2/A440-11, NAFS - North American Fenestration Standard for Windows, Doors, and Skylights
 - .2 CSA A440S1-09 Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS - North American Fenestration Standard for Windows, Doors, and Skylights
 - .3 CSA-A440.4-07(R2012) Window, Door, and Skylight Installation
 - .4 CSA-A440.2-14/A440.3-14 Fenestration energy performance/User guide to CSA A440.2-14, Fenestration energy performance.
 - .5 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
- .4 Aluminum Association (AA)
 - .1 Designation System for Aluminum Finishes (2000)
- .5 Ontario Ministry of Municipal Affairs and Housing (MMAH)
 - .1 Ontario Building Code
 - .2 MMAH Supplementary Standard SB-10, Energy Efficiency Requirements.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Submit shop drawings.
 - .1 Indicate materials and details in full size scale for head, jamb and sill, profiles of components, interior and exterior trim, junction between combination units, elevations of unit, anchorage details, location of isolation coating, description of related components and exposed finishes, fasteners, and caulking. Indicate location of manufacturer's nameplates.
 - .2 Submit point to point wiring diagrams for electric strikes.
 - .3 Submit a complete finishing hardware schedule for each door.
 - .3 Submit test reports from approved independent testing laboratories, certifying compliance with specified performance characteristics and physical properties, for:
 - .1 Energy efficiency (MMAH SB-10 compliance for complete assembly including glass units)
 - .2 Windows classifications.
 - .3 Anodized finish, weathering characteristics.
 - .4 Air infiltration
 - .5 Water tightness.
 - .6 Wind load resistance.
 - .7 Condensation resistance.
 - .8 Forced entry resistance.
 - .9 Mullion deflection.
 - .4 Certificates: submit product certificates signed by manufacturer certifying materials and assemblies comply with specified performance characteristics and criteria and physical requirements.
 - .5 Closeout Submittals: Provide operation and maintenance data for doors, windows and hardware for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- 1.5 System Description
- .1 Performance Requirements: Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follows:
 - .1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.
 - .2 Insulating glass units in combination with aluminum window or storefront framing shall be designed by the supplier to comply with energy efficient requirements specified in MMAH Supplementary Standard SB-10. Submit engineered shop drawings, calculations and certificates certifying compliance with that standard.
- 1.6 Shipping, Handling and Storage
- .1 Refer to Section 01 61 00 – Common Product Requirements.
 - .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- 1.7 Waste Management and Disposal
- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.
- 1.8 Field Quality Control

- .1 Manufacturer's field services: 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.
 - .2 Schedule site visits to review work at stages listed:
 - .1 After delivery and storage of products, and when preparatory work on which work of this Section depends is complete, but before installation begins.
 - .2 Twice during progress of work at 25% and 60% complete.
 - .3 Upon completion of work, after cleaning is carried out.
 - .3 Field Tests: Consultant shall select units 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 per AAMA 503 by a qualified independent testing agency. Refer to Testing Section for payment of testing and testing requirements.
 - .1 Air Leakage Tests: Conduct tests in accordance with ASTM E783. Allowable air leakage shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft², whichever is greater.
 - .2 Water Infiltration Tests: Conduct tests in accordance with ASTM E1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 383 Pa.
 - .2 Evaluate installed system by thermo-photographic scan.
 - .4 Obtain reports within three days of review and submit immediately to Consultant.
- 1.9 Sequencing
- .1 Co-ordinate work of this Section with air barrier placement, flashing placement, and other related components or materials.
- 1.10 Project Conditions
- .1 Do not install sealants when ambient and surface temperature is less than 5 °C. Maintain this minimum temperature during and after installation of sealants
- 1.11 Warranty
- .1 Warrant the work of this Section against defects of workmanship and material, for a period of five years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.
 - .2 Provide a warranty stating that the anodized finish will be non-fading, nonconvertible, and permanently a part of the metal surface for a period of five years from the date of Substantial Performance. The warranty shall state that any item showing failure during the warranty period will be replaced or refinished to the original condition, at no cost to the Owner.

PART 2 PRODUCTS

2.1 Manufacturers

- .1 Manufacture: The following manufacturers are considered as acceptable subject to approval by the Consultant, of supporting technical literature, samples, drawings, engineering data and performance data:
 - .1 Alumicor
 - .2 Commdoor
 - .3 CRL United States Aluminum
 - .4 Kawneer
 - .5 Oldcastle
 - .6 Windspec
 - .7 Zimcor
 - .8 Or approved equivalent

2.2 Materials

- .1 Materials: to AAMA/WDMA/CSA 101/I.S.2/A440 supplemented as follows:
 - .1 All doors, windows and storefront framing shall be by same manufacturer.
 - .2 Sash: aluminum, thermally broken.
 - .3 Main frame: aluminum, thermally broken.
 - .4 Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.
- .2 Aluminum Extrusions: Alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish and not less than 1.8 mm wall thickness at any location for the main frame and complying with ASTM B221: 6063-T6 alloy and temper.
- .3 Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum framing members, trim hardware, anchors, and other components. Manufacturer's standard corrosion-resistant, non-staining, nonbleeding fasteners and accessories compatible with adjacent materials. Stainless steel where exposed.
- .4 Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
- .5 Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- .6 Reinforcing Members: 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; provide sufficient strength to withstand design pressure indicated.
- .7 Sealant: For sealants required within fabricated systems, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.
- .8 Exterior aluminum sills and facings: extruded aluminum and brake formed aluminum sheet metal of type and size to suit job conditions; minimum 3 mm thick, complete with joint covers, jamb drip deflectors, chairs, anchors and anchoring devices.

2.3 Window and Screen Types

- .1 Entrance Framing:
 - .1 Exterior Units: Thermally Broken Storefront Framing: thermally broken, inside glazed.
 - .1 Classification rating: to CSA-A440/A440.1.
 - .2 Air Tightness: A3.
 - .3 Water tightness: B3.
 - .4 Wind load resistance: C3.
 - .5 Surface condensation control: compliant with standard CSA-A440.2/A440.3.
 - .6 Forced Entry: Pass test for resistance to forced entry.
 - .7 Basis of Design: Kawneer 451 T series
 - .2 Depth of framing units as indicated or as required by engineered design.

2.4 Doors

- .1 Exterior Doors
 - .1 To size indicated on schedules and drawings.
 - .2 Thermally broken medium stile with intermediate horizontal rails where detailed.
 - .3 The door stile and rail face dimensions of the entrance door will be as follows:
 - .1 Vertical Stile 103.2 mm,
 - .2 Top Rail 103.2 mm,
 - .3 Bottom Rail 179.4 mm
 - .4 Major portions of the door members to be 3.2 mm nominal in thickness and glazing molding to be 1.3 mm thick.
 - .5 Reinforce doors for continuous hinges.
 - .6 Clear anodized finish.
 - .7 Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.
 - .8 Provide adjustable glass jacks to help center the glass in the door opening.
 - .9 Provide flush stops for insulating glass in exterior doors.
 - .10 Exterior glass: 25 mm sealed units, insulating glass specified in Section 08 80 05.

2.5 Door Hardware

- .1 Provide the following hardware for aluminum doors, as appropriate to location and configuration:
 - .1 Exterior Doors S01a, S02, S03, S04, S07, S08, S11 & S12:
 - .1 1 ½ pair stainless steel ball bearing butt hinges.
 - .1 Door width: Up to 915 mm: 114 mm x 102 mm hinge
 - .2 Door width: Over 915 mm: 127 mm x 114mm hinge.
 - .2 Kawneer 1786 Rim Exit Device.
 - .1 Cylinder provided under Section 08 71 10.
 - .3 Style CO-12 Architects Classic Pull with clear anodized finish.
 - .4 Concealed heavy duty closer 2030 LCN.
 - .5 Kawneer controller locking system for paired doors.
 - .6 Extruded aluminum threshold for barrier free access, 102 mm wide x 12 mm high. Thermally broken.
 - .7 Weather-seal to head and jambs. Aluminum with sponge neoprene a minimum of 6.0 mm thick, width to suit frame. Type TW2000.
 - .8 Meeting stiles: adjustable astragal utilizing wool pile with polymeric fin.
 - .9 Door sweeps to be Sealeze EB 395 EPDM blade gasket x door width.
 - .2 Exterior Door S01:
 - .1 1 ½ pair stainless steel ball bearing butt hinges.

- .1 Door width: Up to 915 mm: 114 mm x 102 mm hinge
- .2 Door width: Over 915 mm: 127 mm x 114mm hinge.
- 2 Kawneer 1786 Rim Exit Device.
 - .1 Cylinder provided under Section 08 71 10.
- .3 Concealed heavy duty closer 2030 LCN.
- .4 Extruded aluminum threshold for barrier free access, 102 mm wide x 12 mm high. Thermally broken.
- .5 Weather-seal to head and jambs. Aluminum with sponge neoprene a minimum of 6.0 mm thick, width to suit frame. Type TW2000.
- .6 Door sweeps to be Sealeze EB 395 EPDM blade gasket x door width.
- .7 Automatic Door Operator: SW200i X 626 (110 V to head frames by Electrical).
- .8 Push to open button #CM-45/4 X 630 (single gang junction boxes and all low voltage wiring by Electrical)
- .9 Electric Strike: Adams Rite 7130 electric strike. 24V AC.
- .10 Card Readers (Reinstall existing card reader)

2.6 Glazing

- .1 Glaze doors, windows and screens in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.
- .2 Glass: As scheduled and as specified in Section 08 80 05– Glazing.

2.7 Fabrication

- .1 Fabricate in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 supplemented as follows:
 - .1 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1800 mm or less and plus or minus 3 mm for units with a diagonal measurement over 1800 mm.
 - .2 Face dimensions detailed are maximum permissible sizes.
 - .3 Brace frames to maintain squareness and rigidity during shipment and installation.
 - .4 Finish steel clips and reinforcement with shop coat primer to CAN/CGSB-1.40.

2.8 Air Barrier and Vapour Retarder

- .1 Equip frames with site installed air barrier and vapour retarder material for sealing to building air barrier and vapour retarder 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.

2.9 Aluminum Finishes

- .1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.
- .2 Clear anodic finish: AA-M10C21A41 / AA-M45C22A41, AAMA 611, Architectural Class I Clear Anodic Coating not less than 18 micrometre thick.

2.10 Isolation Coating

- .1 Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements

except containing no asbestos, formulated for 0.762 mm thickness per coat.

PART 3 EXECUTION

3.1 Window and Screen Installation

- .1 Install in accordance with AAMA/WDMA/CSA 101/I.S.2/A440, shop drawings and manufacturer's instructions.
- .2 Arrange components to prevent abrupt variation in colour.
- .3 Erect and secure window units in prepared openings, plumb and square, free from warp, twist or superimposed loads.
- .4 Secure work accurately to structure and in a manner not restricting thermal movement of materials.
- .5 Provide shims under sill frame at setting block locations, and as recommended by window frame manufacturer.
- .6 Conceal all anchors and fitments. Exposed heads of fasteners not permitted.
- .7 Mechanically fasten flexible membrane air and vapour seal to window frame with continuous aluminum channel as detailed on drawings.
- .8 Maintain dimensional tolerances after installation. Maintain alignment with adjacent work.
- .9 Isolate aluminum surfaces from dissimilar materials adjacent after installation, using coating of bituminous paint.
- .10 Seal framing joints with butyl polyisobutylene or silicone sealant.
- .11 Install glazing splines and gaskets uniformly, with accurately formed corners and bevels. Ensure that proper contact is made with glass and rabbet interfaces.
- .12 Continuously and uniformly compress glazing splines and gaskets during installation.

3.2 Door Installation

- .1 Erect and secure aluminum framing plumb, square and level, free from warp, twist or superimposed loads.
- .2 Use concealed fastenings where possible. Where concealed fasteners are not feasible, use flat headed screws in countersink holes. Exposed bolt or nut heads are not permitted.
- .3 Match exposed fastenings with finish or surfaces on which they occur.
- .4 Assess each component for appearance and colour. Any variations in appearance and colour will not be permitted.
- .5 Secure work adequately and accurately to the structure in the required position.

- .6 Install and adjust hardware in accordance with hardware templates and manufacturer's instructions.
- .7 All hardware shall be installed by technicians skilled in the application of architectural hardware and satisfactory to the aluminum door supplier. Instruction sheets, details and templates shall be read and understood before installation.
- .8 Coordinate installation of electrically operated hardware with Electrical and Security subcontractors.
- .9 Coordinate installation of Automatic Door Operators with Section 08 71 10.

3.3 Caulking

- .1 Seal joints between windows and window sills with sealant. Bed sill expansion joint cover plates and drip deflectors in bedding compound. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.
- .2 Apply sealant in accordance with Section 07 92 00 - Joint Sealants. Conceal sealant within window units except where exposed use is permitted by Consultant.

3.4 Protection

- .1 Protect the work of this trade from damage. Protect work of other trades resulting from the work of this Section.
- .2 Provide at the factory, strippable coatings on all exposed surfaces of aluminum. This coating and protective wrappings shall remain on the surfaces through the period that other trades' works proceed on the building and shall be removed on completion of the building.
- .3 Make good all damaged work caused by failure to provide adequate protection. Remove unsatisfactory work and replace at no expense to the Owner.

3.5 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Wash down exposed interior metal surfaces using a solution of mild domestic detergent in warm water, applied with soft clean wiping cloths.
- .3 Clean exposed exterior non-metal surfaces as recommended by manufacturer of the material.
- .4 Clean interior and exterior surfaces as soon as adjacent construction which might soil surfaces, is completed.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 06 20 00 Finish Carpentry
- .2 Section 08 11 00 Metal Doors and Frames
- .3 Section 08 50 00 Aluminum Doors, Windows and Screens

1.3 References

- .1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
 - .1 ANSI/DHI A115.1G-1994 Installation Guide for Doors and Hardware
 - .2 ANSI/ICC A117.1-2017 Accessible and Usable Buildings and Facilities
 - .3 ANSI/BHMA A156.1-2013 American National Standard for Butts and Hinges.
 - .4 ANSI/BHMA A156.2-2011 Bored and Preassembled Locks and Latches.
 - .5 ANSI/BHMA A156.3-2014 Exit Devices.
 - .6 ANSI/BHMA A156.4-2013 Door Controls - Closers.
 - .7 ANSI/BHMA A156.5-2014 Auxiliary Locks and Associated Products.
 - .8 ANSI/BHMA A156.6-2010 Architectural Door Trim.
 - .9 ANSI/BHMA A156.8-2010 Door Controls - Overhead Stops and Holders.
 - .10 ANSI/BHMA A156.10-2011 Power Operated Pedestrian Doors.
 - .11 ANSI/BHMA A156.12-2013 Interconnected Locks and Latches.
 - .12 ANSI/BHMA A156.13-2012 Mortise Locks and Latches Series 1000.
 - .13 ANSI/BHMA A156.16-2013 Auxiliary Hardware.
 - .14 ANSI/BHMA A156.18-2012 Materials and Finishes.
 - .15 ANSI/BHMA A156.19-2013 Power Assist and Low Energy Power - Operated Doors.
 - .16 ANSI/BHMA A156.21-2014 Thresholds.
 - .17 ANSI/BMHA A156.22-2012 Door Gasketing and Edge Seal Systems
- .2 Canadian Steel Door Manufacturers' Association (CSDMA)
 - .1 CSDMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction): Standard Hardware Location Dimensions.
- .3 National Wood Window and Door Association (NWWDA)
- .4 Door Hardware Institute (DHI)
- .5 Accessibility for Ontarians with Disabilities Act (AODA)

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Submit manufacturer's printed product literature, specifications and data sheets.
- .3 Samples:
 - .1 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.
 - .2 After approval samples will be returned for incorporation in the Work.
- .4 Hardware List:
 - .1 Submit contract hardware list.
 - .2 Indicate specified hardware, including make, model, material, function, size, finish and other

pertinent information.

- .5 Manufacturer's Instructions: Submit manufacturer's installation instructions.
- .6 Provide operation and maintenance data for door closers, locksets, door holders, electrified hardware and fire exit hardware for incorporation into Operations and Maintenance Manuals specified in Section 01 78 00 - Closeout Submittals.

1.5 Quality Assurance

- .1 Regulatory Requirements:
 - .1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.
 - .2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
 - .3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .2 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .4 Receive the delivery of the Finishing Hardware and identify all items against the Finishing Hardware Schedule. Ensure each hardware item is accompanied by the correct template, installation instructions, special tools, fastening devices and other loose items. Advise the finish hardware supplier and Consultant in writing of errors or omissions.
- .5 Storage and Protection: Store finishing hardware in locked, clean and dry area.
- .6 Remove all hardware from doors and frames prior to painting. After painting is complete and dry, reinstall all hardware to manufacturer's recommendations.

1.7 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.8 Warranty

- .1 Warrant all hardware against defects of workmanship and material, for a period of one year, except for door closers which shall be warranted for ten years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Materials

- .1 Hardware supplier shall submit finishing hardware schedule for review.
- .2 All finishes shall be as indicated in the Finishing Hardware Schedule by international codes.
- .3 All door handles shall be lever type meeting requirements of the referenced accessibility standards and the Ontario Building Code.
- .4 Power Door Operators and controls shall be CSA approved and shall meet the requirements of the Ontario Building Code and the Accessibility for Ontarians with Disabilities Act (AODA).

2.2 Fastenings

- .1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.
- .2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .3 Exposed fastening devices to match finish of hardware.
- .4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.
- .5 Use fasteners compatible with material through which they pass.

2.3 Electrified Devices

- .1 Electrified exit devices shall conform to all traditional exit device standards as specified above. All power requirements for exit devices used must utilize a continuous circuit electric hinge for clean design and no visible means of interrupting power to device.
- .2 All exit devices with electric latch retraction shall provide for a remote means of unlocking for momentary or maintained periods of time.
- .3 Exit devices with electrified trim shall be fail-secure unless otherwise specified.

2.4 Keying

- .1 Keying: All permanent cylinders to be grandmaster-keyed as directed by the Owner. The factory shall key all locks and cylinders and maintain keying records. The factory shall establish a System Information Document (SID) to designate primary system administrators and require a separate letter of authorization for all future shipments of keyed products.
- .2 Remove all construction cores and install all permanent cores. Unless otherwise directed by the Owner.
- .3 Construction master/change keys are to be delivered by the contractor directly to The Owner.

- .4 Ship all permanent cylinders and keys separately. Identify door number and keyset symbol on each envelope for direct factory delivery to the owner.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- .3 Furnish manufacturers' instructions for proper installation of each hardware component.

3.2 Examination

- .1 Before installing any hardware, carefully check all architectural drawings of the work requiring hardware, verify door swings, door and frame materials and operating conditions, and assure that all hardware will fit the work to which it is to be attached.
- .2 Check all shop drawings and frame and door lists affecting hardware type and installation, and certify to the correctness thereof, or advise the hardware supplier and Consultant in writing of required revisions.

3.3 Templates

- .1 Check the hardware schedule, drawings and specifications, and furnish promptly to the applicable trades any patterns, templates, template information and manufacturer's literature required for the proper preparation for and application of hardware, in ample time to facilitate the progress of the work.

3.4 Installation

- .1 Installation of hardware shall be in accordance with ANSI A115.1G, manufacturer's templates and instructions.
- .2 Install each item of mechanical and electromechanical hardware and access control equipment to comply with the manufacturer's written instructions and according to specifications. All items to be installed with fasteners identified by manufacturer's installation instructions unless otherwise noted.
- .3 Mounting Heights: Install door hardware at heights indicated in the following applicable publications unless; specifically indicated or required by local governing regulations, requirements to match for special templates, necessary coordination with door elevations, and or to ensure consistency with pairs of doors.
 - .1 DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames"
 - .2 DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors"
 - .3 ANSI/ICC A117.1 Accessibility Guidelines for Buildings and Facilities
 - .4 NWWDA
 - .5 AODA

- .4 Power door operator products and accessories are required to be installed by an AAADM certified technician as approved by the manufacturer. Adjust for proper opening and closing operation after final balancing of HVAC system.
- .5 Coordinate installation of electric door strikes, keypad locks, card readers, washroom duress systems, and other electronic door control and security devices with Electrical contractor including supply and installation of wiring and all terminations.
- .6 All hardware shall be installed by carpenters, skilled in the application of architectural hardware and satisfactory to the hardware supplier. Refer to Section 06 20 00 - Finish Carpentry. Instruction sheets, details and templates shall be read and understood before installation.
- .7 Install all materials as listed in the Finishing Hardware Schedule on the doors and frames listed. Interchanging of hardware will not be allowed.
- .8 Use only manufacturer's supplied fasteners. Failure to comply may void manufacturer's warranties and applicable licensed labels. Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
- .9 Where door stop contacts door pulls, mount stop to strike bottom of pull.
- .10 Remove construction cores when directed by Owner's Representative.
- .11 After installation, templates, installation instructions and details shall be put in a file and turned over to the Owner, when building is Substantially Performed.

3.5 Field Quality Control

- .1 Conduct periodic inspections to ensure that door frames are installed plumb, level and square with verification by installer prior to installation of doors and door hardware.
- .2 Hardware supplier to attend site meetings as required to ensure proper execution of the guidelines set forth herein.
- .3 Hardware supplier will perform final field inspection of installed door hardware after final adjustment of all products and will document and report any deficiencies or omissions for correction and written acceptance by the Contractor.

3.6 Adjusting

- .1 Adjust door hardware, operators, closers and controls for optimum, smooth operating condition, safety and for weather tight closure.
- .2 Lubricate hardware, operating equipment and other moving parts.
- .3 Adjust door hardware to provide tight fit at contact points with frames.

3.7 Demonstration

- .1 Instruct Owner's maintenance personnel in the proper adjustment, operation and maintenance of mechanical and electromechanical door hardware, electronic devices and maintenance of finishes.

3.8 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .3 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.
- .4 Remove protective material from hardware items where present.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 08 11 00 Metal Doors and Frames
- .2 Section 08 50 00 Aluminum Doors, Windows and Screens
- .3 Section 08 71 10 Door Hardware

1.3 References

- .1 American National Standards Institute/Builders Hardware and Manufacturers Association (ANSI/BHMA):
 - .1 BHMA A156.10- 2017 Power Operated Pedestrian Doors
- .2 CSA Group (CSA)
 - .1 CSA C22.1:21 Canadian Electrical Code
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.108-M89 Bituminous Solvent Type Paint
- .4 Ontario Building Code.
- .5 Accessibility for Ontarians with Disabilities Act (AODA)

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop Drawings: Submit shop drawings for review indicating all components, required clearances, electrical hook-up and coordination required with the work of related trades.
 - .1 Indicate materials, thickness, anchorage, finishes and operation. Indicate minimum acceptable clearances required.
 - .2 Provide layout for installation of door controller paddles and devices including mounting heights and conduit requirements.
 - .3 Submit wiring diagrams and schematics.
- .3 Provide maintenance data for automatic door operators complete with operation and maintenance instructions, pertinent details and spare parts list for incorporation into Maintenance Manuals specified in Section 01 78 00 – Closeout Submittals.

1.5 Maintenance

- .1 Instruct Owner in operation and maintenance of door operators.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.7 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.8 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 General

- .1 Power Door Operators and controls shall be CSA approved and shall meet the requirements of the Ontario Building Code and the Accessibility for Ontarians with Disabilities Act (AODA).
- .2 Manufacturer: This specification is based on Stanley Access technologies Magic Swing Door Operators. Equivalent products by the following manufacturers are acceptable, subject to approval of the Consultant:
 - .1 Besam/Assa -Abloy
 - .2 Dormakaba
 - .3 Dor-O-Matic.
 - .4 Horton Automatics.
 - .5 Rhinotek
 - .6 Or approved equivalent

2.2 Material/Design/Operation

- .1 Operator
 - .1 Shall be Stanley Magic-Swing, electro-mechanical system sealed against dirt, dust and corrosion in a cast aluminum case and fully lubricated to minimize wear and friction of the moving parts between temperature extremes of -20 ° C and +60 ° C. The entire operator shall be removable from the header as a unit.
 - .2 Size operators to suit weight of doors as indicated on the Door and Frame Schedule.
 - .3 Aluminum header extrusions to be minimum 3.0 mm wall thickness and have a clear anodized finish to match adjacent frames.
 - .4 Back paint all aluminum in contact with steel with bituminous paint to CGSB 1.108 and install PVC isolating strips.
 - .5 All automatic entrance equipment is to comply with all sectors of ANSI A-156.10 and be C.S.A. approved.
- .2 Power Opening: The operator shall open the door with a 1/8 hp DC motor through reduction gears, ball screw actuator and a forged steel rack and pinion. Opening time to back-check (approximately 75°) shall be 1.25-1.6 seconds. The drive train shall have positive, constant engagement. A force no greater than 25 lbF at the lock stile shall stop the door from opening. The operator shall stop the door in the open position by electrically reducing the motor voltage and holding against an adjustable 90° stop.
- .3 Spring Closing: The operator shall close the door by spring energy. Closing speed shall be controlled by employing the motor as a dynamic brake and closing to latch check (approximately 10°) shall be in 3 seconds. Closing through last 10° shall be in 1.5 seconds minimum. The closing spring shall be a helical compression spring, pre-loaded for positive closing action at a low material stress level for long spring life.

- .4 Emergency Release: The operator shall have built in emergency release with controlled spring return to the closed position without manual resetting. While the door is in the emergency release mode, a disconnect switch shall prevent powered operation. No header or jamb mounted stops or cams shall be required for emergency function. Not more than 50 lbF at the lock stile shall be required for emergency use per ANSI A-156.10.
- .5 Manual Use: The operator shall function as a manual door closer in the direction of swing with or without electrical power.
 - .1 Entrapment Protection: the forces and speeds of power opening, manual opening in both directions of swing, and spring closing in both directions of swing shall conform to the requirements of ANSI-A-156.10.
- .6 Electrical Control: A solid state, completely enclosed electronic control with quick connect plugs shall incorporate the following features:
 - .1 A "safety plus" - 1 ½ second extension of both operate and safety signals after pressure has been removed from the control mats.
 - .2 A 2 ½ ampere current limiting circuit which limits the opening force of the operator to a maximum of 24 lbF at the lock stile.
 - .3 A "soft-start" motor driving circuit that reduces power to the motor after seven seconds of maintained opening speed.
 - .4 A cam actuated emergency breakout switch to disconnect power to the motor when the door is manually pushed in the emergency direction. The operator shall then automatically reset and power will be resumed.
- .7 Door Arm
 - .1 Linkage assembly shall provide positive control of door through entire swing; shall permit use on butt hung doors.
 - .2 Header shall be 140 mm wide by 152 mm high extruded aluminum of 3.0 mm thickness. Access to the operator and electronic control box shall be by a full length removable cover, edge rabbited to the header to insure flush fit. Finish to be anodized.
- .8 Controls
 - .1 Shall be manufacturer's standard Touchless, stainless steel push plate embossed with Handicap Symbol and "WAVE TO OPEN". Size of plate to meet Code requirements.
 - .1 BEA 10MS31U Universal Wave to Open Touchless Actuator or Camden 325. Black.
 - .2 Provide CSA approved 50 x 100 mm minimum galvanized steel junction box or size to match frames.
 - .3 Control devices shall be weatherproof.
 - .4 Where indicated, install junction box/control on door control pedestal. Pedestal shall be stainless steel, brushed finish purpose made for door operator controls.
 - .1 152 x 152 mm stainless steel pedestal.
 - .2 1220 mm high with sloped top.
 - .3 1 single gang and 2 double gang openings. (Intercom/Card Reader/Door operator). Centrelines between 900mm and 1100mm to meet OBC Barrier Free requirements.

PART 3 EXECUTION

3.1 Examination

- .1 Inspect the site to ensure that no defects are present in the completed phases of the work which would result in poor application or installation or cause latent defects of the automatic door equipment.

3.2 Installation

- .1 Install components and wire operators in accordance with Manufacturer's instructions.
- .2 Power door operator products and accessories are required to be installed by an AAADM certified technician as approved by the manufacturer. Adjust for proper opening and closing operation after final balancing of HVAC system
- .3 Coordinate installation of operators with other Sections. Supply material to be built into the work when required.
- .4 Install control switches at heights in accordance with referenced standards and reviewed shop drawings.
- .5 Pedestals for automatic door operators shall be mounted on concrete foundations in accordance with manufacturer's recommendations and installation instructions. Exterior air entrained concrete as specified in Section 03 30 00.
- .6 Maintain minimum headroom requirements at doors as indicated on the reviewed shop drawings.
- .7 Adjust door operating components to ensure smooth opening and closing of doors.
- .8 Instruct the Owner in the correct operation, care and maintenance of the door operators.

3.3 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 07 92 00 Joint Sealants
- .2 Section 08 11 00 Metal Doors and Frames
- .3 Section 08 50 00 Aluminum Doors, Windows and Screens
- .4 Section 10 28 10 Toilet and Bath Accessories

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM C162-05 (2015) Standard Terminology of Glass and Glass Products.
 - .2 ASTM C542-05(2017) Standard Specification for Lock-Strip Gaskets
 - .3 ASTM C1048-18 Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass
 - .4 ASTM C1376-15 Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass
 - .5 ASTM C1503-18 Standard Specification for Silvered Flat Glass Mirrors
 - .6 ASTM D790-17 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
 - .7 ASTM D1003-13 Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics
 - .8 ASTM D1929-20 Standard Test Method for Determining Ignition Temperature of Plastics
 - .9 ASTM D2240-15e1 Standard Test Method for Rubber Property—Durometer Hardness
 - .10 ASTM E84-23d Standard Test Method for Surface Burning Characteristics of Building Materials
 - .11 ASTM E330/E330M-14 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
 - .12 ASTM E1300-16 Standard Practice for Determining Load Resistance of Glass in Buildings
- .2 American National Standards Institute (ANSI).
 - .1 ANSI Z97.1 American National Standard for Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
- .3 American Architectural Manufacturer's Association (AAMA)
- .4 National Fire Protection Association
 - .1 NFPA 80 Standard for Fire Doors, Fire Windows.
- .5 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-12.1-17 Safety Glazing
 - .2 CAN/CGSB-12.2-91 (R2017) Flat, Clear Sheet Glass.
 - .3 CAN/CGSB-12.3-91 (R2017) Flat, Clear Float Glass.
 - .4 CAN/CGSB-12.4-91 (R2017) Heat Absorbing Glass
 - .5 CAN/CGSB-12.8-17 Insulating Glass Units
- .6 CSA Group (CSA)
 - .1 AAMA/WDMA/CSA 101/I.S.2/A440-11, NAFS - North American Fenestration Standard for Windows, Doors, and Skylights.
- .7 Consumer Product Safety Commission
 - .1 CPSC 16 CFR 1201 Safety Standard for Architectural Glazing Materials.
- .8 Environmental Choice Program (ECP).
 - .1 CCD-045-95 Sealants and Caulking.
- .9 Flat Glass Manufacturers Association (FGMA).
 - .1 FGMA Glazing Manual - 1997.
- .10 Glass Association of North America (GANA)

- .1 GANA Glazing Manual 50th Anniversary Edition-2008.
- .2 GANA Laminated Glazing Reference Manual - 2009.
- .3 GANA Sealant Manual-2008.
- .4 GANA Guide to Architectural Glass (2010).
- .5 GANA/PGC International Protective Glazing Manual (2010).
- .11 South Coast Air Quality Management District, California State (SCAQMD)
 - .1 SCAQMD Rule 1168-03, Adhesives and Sealants Applications.
- .12 Ontario Ministry of Municipal Affairs and Housing (MMAH)
 - .1 Ontario Building Code
 - .2 MMAH Supplementary Standard SB-10, Energy Efficiency Requirements.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
- .3 Product Data: Submit manufacturer's printed product literature, specifications and data sheets.
- .4 Certificates: submit product certificates signed by manufacturer certifying materials and assemblies comply with specified performance characteristics and criteria and physical requirements.
- .5 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .6 Samples: Submit duplicate 300 x 300 mm size samples of glass and sealant material.
- .7 Manufacturer's Instructions: Submit manufacturer's installation instructions.
- .8 Provide maintenance data for glazing for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.

1.5 Quality Assurance

- .1 Perform work in accordance with FGMA Glazing Manual and Laminators Safety Glass Association Standards Manual for glazing installation methods.
- .2 Installer: Company specializing in the installation of structural glazing with five years proven experience and approved by the manufacturer for installation of their products.
- .3 Safety glass products shall comply with the testing requirements of CAN/CGSB-12.1, Type 1 for Laminated Glass and Type 2 for Tempered Glass.
- .4 Provide safety glass permanently marked with the company name or logo and CAN/CGSB-12.1 if the product meets categories 1 and 2, or mark as CAN/CGSB 12.1M-1 if the product meets the requirements of Category 1 only.
- .5 Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this section or referenced standards.
 - .1 GANA Publications
 - .2 AAMA Publications

.3 IGMA/IGMAC Publications

- .6 Insulating Glass products are to be permanently marked either on spacers or at least one insulating unit component with appropriate certification label of the Insulating Glass Manufacturers Alliance (IGMA) or Insulating Glass Manufacturers Association of Canada (IGMAC)
- .7 Single-source fabrication responsibility: All glass fabricated for each type shall be processed and supplied by a single fabricator.
- .8 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .9 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 System Description

- .1 Performance Requirements: Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follows:
 - .1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.
 - .2 Insulating glass units in combination with aluminum window or storefront specified elsewhere shall be designed by the supplier to comply with energy efficient requirements specified in MMAH Supplementary Standard SB-10. Submit engineered shop drawings, calculations and certificates certifying compliance with that standard.

1.7 Design Requirements

- .1 Design glass, glazing channels, connections, attachments and glazing accessories to withstand loads designated by the Ontario Building Code and to accommodate all building deflections.
- .2 Size glass to withstand wind loads, dead loads and positive and negative live loads acting normal to plane of glass to a design pressure of 1.2 kPa as measured in accordance with ANSI/ASTM E330.
- .3 Limit glass deflection to 1/200 with full recovery of glazing materials.
- .4 Glass thicknesses indicated are minimum and are for detailing only. Confirm glass thickness by analyzing project conditions, including in-service conditions and loads. Provide glass lites for various size openings in nominal thicknesses indicated but not less than required to meet performance requirements of referenced standards including energy efficiency requirements of MMAH-SB-10. Coordinate glass thicknesses with manufacturers of framing systems.

1.8 Project Conditions

- .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 for 24 hours after installation of glazing compounds.

1.9 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

- .3 Provide glass units with interleaving protection between lites. Keep glass and interleaving dry and store cases in clean, cool, dry areas with temperatures above the dew point. Circulation of cool, dry air in storage areas is essential. Open cases and inspect units periodically for moisture accumulation.
- .4 Do not store glass in direct sunlight without an opaque protective covering over same.

1.10 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.11 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of ten years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.
- .2 Warrant insulating glass units for ten years from date of Substantial Performance against seal failure, interpane dusting, or interpane misting.
- .3 Warrant low-emissivity coatings when applied to the second or third surfaces of an insulating glass unit, for ten years against peeling or coating deterioration due to product failure.
- .4 Warrant Laminated glass for ten years against delamination and discolouration.

PART 2 PRODUCTS

2.1 Materials-Flat Glass

- .1 Float glass: to CAN/CGSB-12.3, glazing quality, 6 mm thick minimum.
- .2 Sheet glass: to CAN/CGSB-12.2, selected, 6 mm thick minimum.

2.2 Insulating Glass Units

- .1 Performance requirements for insulating glass units specified herein are the minimum permitted requirements. Provide engineered shop drawings and calculations showing that glazed assemblies including framing and glazing products in combination, meet or exceed the minimum requirements of MMAH Supplementary Standard SB-10.
- .2 Insulating Glass Units: To CAN/CGSB-12.8-M, double glazed sealed units, 25 mm overall thickness.
 - .1 Glass: to CAN/CGSB-12.1(tempered)
 - .2 Glass thickness: 6.4 mm each light
 - .3 Inter-cavity space thickness: 12.7 mm with low conductivity spacers.
 - .4 Glass coating: surface number 2, low "E".
 - .5 Inert gas fill: argon.

2.3 Glazing Products

- .1 Select appropriate glazing sealants, tapes, gaskets and other glazing materials of proven compatibility with other materials that they contact. These include glass products, insulating glass unit seals and glazing channel substrates under installation and service conditions, as demonstrated by testing and field experience.

- .2 Setting blocks: Neoprene 80-90 Shore A durometer hardness to ASTM D2240, to suit glazing method, glass light weight and area.
- .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 D 2240; 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, colour as selected.
- .6 Lock-strip gaskets: to ASTM C542.
- .7 Glazing Gaskets: To ASTM C864.
- .8 Sealant: as specified in Section 07 92 00 – Joint Sealants. Low VOC.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

- .1 Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 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.

3.3 Preparation

- .1 Clean contact surfaces with solvent and wipe dry.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.

3.4 Installation – General

- .1 Perform work in accordance with GANA Glazing Manual for glazing installation methods.

3.5 Installation: Exterior Dry Method- Preformed Glazing

- .1 Cut glazing tape to length; install on glazing light. Seal corners by butting tape and sealing junctions with sealant.
- .2 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.

- .3 Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- .4 Install removable stops without displacing glazing tape. Exert pressure for full continuous contact.
- .5 Trim protruding tape edge.

3.6 Installation: Exterior Wet/Dry Method (Preformed Tape and Sealant)

- .1 Cut glazing tape to length and set against permanent stops, 6 mm below sight line. Seal corners by butting tape and dabbing with sealant.
- .2 Apply heel bead of sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapour seal.
- .3 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.
- .4 Rest glazing on setting blocks and push against tape and heel head of sealant with sufficient pressure to attain full contact at perimeter of light or glass unit.
- .5 Install removable stops with spacer strips inserted between glazing and applied stops 6 mm below sight line.
- .6 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 9 mm below sight line.
- .7 Apply cap head of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.7 Installation: Interior - Dry Method

- .1 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 9 mm below sight line.
- .2 Apply cap bead of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.
- .3 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.
- .4 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.
- .5 Rest glazing on setting blocks and push against tape for full contact at perimeter of light or unit.
- .6 Place glazing tape on free perimeter of glazing.
- .7 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- .8 Knife trim protruding tape.
- .9 Glaze hollow metal doors and pressed steel screens. Glass type as indicated.
- .10 Install wired glass in fire rated doors and screens to meet requirements of NFPA 80.

3.8 Glazed Doors and Sidelights

- .1 Doors and sidelights in a barrier-free path of travel consisting of a sheet of glass shall be marked with a continuous opaque strip conforming to Article 3.3.1.18 of the Ontario Building Code.

3.9 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Perform cleaning to remove construction and accumulated environmental dirt.
- .3 Remove traces of primer, caulking.
- .4 Remove glazing materials from finish surfaces.
- .5 Remove labels after work is complete.
- .6 Clean glass using approved non-abrasive cleaner in accordance with manufacturer's instructions.
- .7 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.10 Protection of Finished Work

- .1 After installation, mark light with an "X" by using removable plastic tape.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 06 10 00 Rough Carpentry
- .2 Section 07 84 00 Firestopping
- .3 Section 07 92 00 Joint Sealants
- .4 Section 09 22 16 Non-Structural Metal Framing
- .5 Section 09 91 23 Interior Painting

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM C514-04(2020) Standard Specification for Nails for the Application of Gypsum Board
 - .2 ASTM C840-20 Standard Specification for Application and Finishing of Gypsum Board
 - .3 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
 - .4 ASTM C1002-22 Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
 - .5 ASTM C1047-19 Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
 - .6 ASTM C1177/C1177M-17 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
 - .7 ASTM C1178/C1178M-18 Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel
 - .8 ASTM C1278/C1278M-17 Standard Specification for Fiber-Reinforced Gypsum Panel
 - .9 ASTM C1280 - 18 Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing.
 - .10 ASTM C1288-17 Standard Specification for Fiber-Cement Interior Substrate Sheets
 - .11 ASTM C1325-22 Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units
 - .12 ASTM C1396/C1396M - 17 Standard Specification for Gypsum Board
 - .13 ASTM C1629/C1629M-19 Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels
 - .14 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
 - .15 ASTM E814-13a(2017) Standard Test Method for Fire Tests of Penetration Firestop Systems
 - .16 ASTM E1966-15(2019) Standard Test Method for Fire-Resistive Joint Systems
- .2 American National Standards Institute (ANSI)
 - .1 ANSI A118.9-1992 Test Methods and Specifications for Cementitious Backer Units.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34 Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CAN/CGSB 19-GP-21M Sealing and Bedding Compound for Acoustical Purposes
- .4 Underwriters Laboratories of Canada (ULC)
 - .1 ULC 102-2018 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 ULC 114-2018 Standard Method of Test for Determination of Non-Combustibility in Building Materials

- .3 ULC 129- 2015 Standard Method of Test for Smoulder Resistance of Insulation (Basket Method)
- .4 ULC List of Equipment and Material, Volume III, Fire Resistance Ratings.
- .5 Gypsum Association (GA)
 - .1 GA-214-2022 Recommended Levels of Gypsum Board Finish.
 - .2 GA-216-2021 Application and Finishing of Gypsum Board.
 - .3 GA-253-2021 Application of Gypsum Sheathing
- .6 Wall and Ceiling Bureau (WCB)
 - .1 Technical Bulletin Control Joint Placement in Gypsum Board Assemblies

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for gypsum board assemblies and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Submit for review and acceptance of each unit.
 - .2 Samples will be returned for inclusion into work.

1.5 Quality Assurance

- .1 Dry wall installers: minimum 5 years proven experience.
- .2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .4 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.
- .5 Mock-Ups
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct mock-up gypsum board wall installation including one inside corner and one outside corner. Mock-up may be part of finished work.
 - .3 Allow two working days for inspection of mock-up by Consultant before proceeding with rest of the work.
 - .4 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

1.6 Design Requirements

- .1 Where indicated provide minimum sound transmission rating of installed partitions of STC 50 tested to ASTM E90.
- .2 Provide fire resistance rating of installed partitions as indicated and according to referenced ULC design.

1.7 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Protect gypsum board materials before, during and after installation and to protect the installed work and materials of other trades affected by this work. Store materials in a dry area inside the building. Do not remove wrapping until ready for use. Prevent damage to all edges and surfaces.

1.8 Project Conditions

- .1 Maintain temperature minimum 10 ° C, maximum 21 ° 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.

1.9 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Gypsum Board

- .1 To ASTM C1396/C1396M. Standard for non-rated applications, Type X for rated applications, 1220 mm wide x maximum practical length, ends square cut, edges tapered with round edge, 12.7 mm thick or to thickness indicated on drawings. All fire rated board shall be minimum 16 mm thickness.
- .2 Water and Moisture Resistant Board: to ASTM C1396, 12.7 mm thick, 1220 mm wide with tapered edges.
 - .1 Flexural Strength, Parallel (ASTM C473): 80 lbf, parallel.
 - .2 Humidified Deflection (ASTM C1177): Not more than 6.0 mm.
 - .3 Permeance (ASTM E96): Not less than 23 perms.
 - .4 R-Value (ASTM C518): 0.56.
 - .5 Mold Resistance (ASTM D3273): 10, in a test as manufactured.
 - .6 Microbial Resistance (ASTM D6329, UL Environmental GREENGUARD 3-week protocol): Will not support microbial growth.
 - .1 CGC Securock
 - .2 Georgia Pacific DENS-Glass Gold
 - .3 Certainteed GlasRoc

2.2 Fastening and Adhesives

- .1 Drywall Screws: To ASTM C954 or ASTM C1002 self-drilling, self-tapping, case hardened, length to suit board thickness and provide minimum 12 mm penetration into support.
- .2 Joint Tape: To ASTM C475, 50 mm perforated with preformed seam, mould and mildew resistant.
 - .1 Joint tape for abuse resistant gypsum board: CGC Mould Resistant Fiberglass Drywall Tape.
- .3 Joint Filler and Topping: To ASTM C475 vinyl or latex base, slow setting.

- .4 Joint Treatment for Gypsum Sheathing: 50 mm wide, 10 x 10 woven threads per 25 mm, self-adhering fibreglass joint tape and Borden HPPG Elmer's Siliconized Acrylic Latex Caulk.
- .5 Laminating Compound: as recommended by manufacturer, asbestos-free.

2.3 Acoustic Insulation

- .1 Acoustic Attenuation: Min 50 STC in accordance with ASTM E90.
- .2 Acoustic Insulation: Mineral or Glass Fibre Acoustic Insulation:
 - .1 Mineral Fibre Acoustic Insulation: To ASTM C665, Mineral fibre blanket insulation, minimum density of 40 kg/m³:
 - .1 AFB Acoustical Fire Batts manufactured by Roxul Inc.
 - .2 Creased SAFB manufactured by Owens Corning Canada.
 - .2 Glass Fibre Acoustic Blanket Insulation: To CAN/ULC-S702, type 1, pre-formed unfaced glass fibre batt acoustic insulation.
 - .1 QUIETZONE Acoustic Blanket insulation manufactured by Owens Corning Canada.
- .3 Surface burning characteristics to ULC 102:
 - .1 Flame spread: 15
 - .2 Smoke developed: 5
 - .3 Smoulder resistance: to ULC 129.
 - .4 Non-combustible: to ULC 114
- .4 Thickness to suit depth of wall framing and as indicated.
- .5 Acoustic sealant: as specified in Section 07 92 00 - Joint Sealants.

2.4 Accessories

- .1 Casing beads, corner beads and edge trim: to ASTM C1047, zinc-coated by hot-dip process 0.5 mm base thickness, perforated flanges, one piece length per location.
- .2 Insulating Strip: Rubberized, moisture resistant, 3.0 mm thick, 12 mm wide closed cell neoprene strip, with self-sticking permanent adhesive on one face; lengths as required.
- .3 Sealants: as specified in Section 07 92 00 - Joint Sealants.

PART 3 EXECUTION

3.1 General

- .1 Prior to installation of gypsum wallboard, ensure that all required vapour barriers, air seals, gaskets and the like installed under another Section have been inspected and accepted by Municipal authorities and the Consultant. Failure to do so will result in removal of all gypsum board installed prior to approval and replacement, at no additional cost to the Owner.
- .2 Unless otherwise indicated on the drawings, all gypsum board partitions shall extend from floor level to the underside of floor or roof structures above.

3.2 Acoustic Insulation

- .1 Install acoustic blankets full width and length, with tight joints, between wall framing and around penetrating electrical service boxes, piping, air ducts and frames.

- .2 Place acoustic blankets where indicated on the Drawings and to thickness required to obtain acoustic performance indicated for the assembly.
- .3 Place acoustic blankets between studs ensuring friction fit, free of sags, folds or open joints that may let sound pass through.
- .4 Install blankets from the bottom up, tightly adjusted and trim accurately with a utility knife.

3.3 Gypsum Board Application

- .1 Do application and finishing of gypsum board in accordance with ASTM C840 and/or GA-216 except where specified otherwise.
- .2 Do not apply gypsum board until bucks, anchors, blocking, electrical, and mechanical work are approved.
- .3 Apply gypsum board at right angles to framing members or furring using screw fasteners. Maximum spacing of screws 300 mm o.c.
- .4 Apply water or moisture resistant gypsum wallboard where indicated. Apply water resistant sealant to edges, ends and cut outs which expose gypsum core.
- .5 Carry gypsum board from floor to underside of floor or roof structure above. Furr out and carry gypsum board around any structural members as may be required. Neatly cope gypsum board to fill deck flutes where gypsum board abuts floor or roof deck.

3.4 Accessories

- .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.
- .2 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated.
- .3 Install insulating strips continuously at edges of gypsum board or casing beads abutting exterior door or window frames, to provide thermal break.
- .4 Install continuous bead of acoustic sealant at all penetrations through sound control partitions.
- .5 Provide control joints in gypsum board facing. Construct control joints in accordance with ASTM C840 and as described in Wall and Ceiling Bureau Technical Bulletin "Control Joint Placement in Gypsum Board Assemblies". Place control joints consistent with lines of building spaces as indicated. Where not indicated install as directed at maximum 6.0 m spacing. Control joints shall be supported with metal studs or furring channels on both sides of the joint Construct joints using back-to-back casing beads filled with a low modulus sealant capable of flexible joint movement. Maintain fire-resistance rating of wall assemblies. Control joints shall be provided:
 - .1 At abutting structural elements, steel columns.
 - .2 At expansion or control joints in the substrate.
 - .3 At each door jamb.

3.5 Access Doors

- .1 Install access doors to electrical and mechanical fixtures specified in respective Sections.
- .2 Rigidly secure frames to furring or framing systems, to satisfy fire rating requirements.

3.6 Taping and Filling

- .1 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. Finish to GA-214 Level 5.
- .2 Finish corner beads, control joints and trims as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
- .3 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after painting is completed.
- .4 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .5 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for painting.

3.7 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 09 21 16 Gypsum Board

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 ASTM C645-18 Standard Specification for Nonstructural Steel Framing Members
 - .3 ASTM C754-20 Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
 - .4 ASTM C841-03(2018) Standard Specification for Installation of Interior Lathing and Furring.
 - .5 ASTM C1002-22 Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
 - .6 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
 - .7 ASTM E814-13a(2017) Standard Test Method for Fire Tests of Penetration Firestop Systems
 - .8 ASTM E1966-15(2019) Standard Test Method for Fire-Resistive Joint Systems
- .2 Canadian General Services Board (CGSB)
 - .1 CAN/CGSB-1.40-97 Primer, Structural Steel, Oil Alkyd Type.
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 ULC List of Equipment and Material, Volume III, Fire Resistance Ratings.
- .4 CSSBI Lightweight Steel Framing Manual

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for metal framing and include product characteristics, performance criteria, physical size, finish and limitations.

1.5 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 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.

- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.7 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Metal Stud Framing Systems

- .1 Non-load bearing channel stud framing: to ASTM C645, stud size as indicated, roll formed from 0.53 mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knock-out service holes at 460 mm centres.
 - .1 Thickness of materials to conform to referenced standards unless noted otherwise.
 - .2 Thickness of materials shall be selected from manufacturer's standard span tables to suit total height requirements.
- .2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 32 mm flange height.
- .3 Metal channel stiffener: 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.
- .4 Tie Wire: 0.90 mm, galvanized, soft annealed, steel wire or clip as recommended by the manufacturer of furring channels.
- .5 Wind bearing light weight steel stud framing for exterior wall applications is specified in Section 05 41 00.

2.2 Metal Furring and Suspension Systems

- .1 Channel framing: to ASTM C645, stud size as indicated, roll formed from 0.53 mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board.
 - .1 Thickness of materials to conform to referenced standards unless noted otherwise.
- .1 Metal Furring Runners, Hangers, Tie Wires, Inserts, Anchors: to ASTM C645 , electro-zinc coated steel.
- .2 Runner Channels: 38 x 19 x 0.59 mm and 38 x 9.5 x 0.45 mm, hot dip or electro-galvanized sheet steel. Use of various sizes governed by applied loads and applicable spans.
- .3 Drywall Furring Channel: Channel shaped furring member for screw attachment of drywall with knurled face. For interior use. Furring masonry or concrete surfaces. Cross furring under steel joist or suspended metal channels in suspended ceiling systems: 70 x 22 x 0.9 mm with knurled face, hot dip or electro-galvanized sheet steel. Bailey D-1001.
- .4 Deflection Track: Bailey Multi-Slot Track MST 250, size to suit studs, and top deflection clips TDC 350 and TDC 587.
- .5 Horizontal Flange attachment: Bailey Horizontal Flange Attachment Clip (HFA Clip)
- .6 Hangers: minimum 4.1 mm diameter (or as required by ULC fire rating design requirements) mild steel rods.

2.2 Fasteners

- .1 Powder activated fasteners: to suit structural conditions and fastening requirements and in accordance with manufacturer's recommendations: Ramset; Hilti; or approved equivalent.
- .2 Sheet Metal Screws: To ASTM C1002, self-drilling, self-tapping, case hardened, length to suit board thickness and provide minimum 12 mm penetration into support.

2.3 Accessories

- .1 Acoustic sealant: As specified in Section 07 92 00.
- .2 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self-sticking adhesive on one face, lengths as required.
- .3 Zinc Rich Paint: to CGSB 1-GP-181M. Low VOC type.

PART 3 EXECUTION

3.1 Examination

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for non-structural metal framing application 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.

3.2 Erection

- .1 Comply with ASTM C754.
- .2 All gypsum board shall be supported with steel framing whether indicated or not.
- .3 Unless otherwise indicated on the drawings, all gypsum board partitions shall extend from floor level to the underside of floor or roof structures above.
- .4 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum. Provide top deflection tracks where indicated or as required to permit structural deflection. Install top deflection clips as necessary to increase load capacity.
- .5 Install damp proof course under stud shoe tracks of partitions on slabs on grade.
- .6 Place studs vertically at 400 mm on centre unless noted otherwise and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
- .7 Erect metal studding to tolerance of 1:1000.
- .8 Attach studs to bottom and ceiling track using screws.
- .9 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.

- .10 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.
- .11 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.
- .12 Install heavy thickness single jamb studs at openings.
- .13 Erect track at head of door/window openings and sills of window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.
- .14 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.
- .15 Provide 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.
- .16 Install steel studs or furring channel between studs for attaching electrical and other boxes.
- .17 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use 50 mm leg ceiling tracks.
- .18 Install continuous insulating strips to isolate studs from un-insulated surfaces.
- .19 Install two continuous beads of acoustical sealant under studs and tracks around perimeter of sound control partitions.

3.3 Wall Furring

- .1 Install wall furring for gypsum board wall finishes in accordance ASTM C754 and ASTM C841 except where specified otherwise and indicated on drawings.
- .2 Frame openings and around built-in equipment, cabinets, access panels, etc., on four sides. Extend furring into reveals. Check clearances with equipment suppliers.
- .3 Furr duct shafts, beams, columns, pipes and exposed services where indicated.

3.4 Suspended and Furred Ceilings and Bulkheads

- .1 Erect hanger and runner channels for suspended gypsum board ceilings and bulkheads in accordance with ASTM C754 and ASTM C841 except where specified otherwise and indicated on drawings.
- .2 Securely anchor hanger to structural supports 1220 mm o.c. maximum along runner channels and not more than 150 mm from ends. Under no circumstances shall hanger wires be secured to or supported from mechanical or electrical materials or equipment or penetrate mechanical ductwork.
- .3 Space runner or furring channels as shown on drawings and not more than 610 mm o.c. maximum nor 150 mm from walls. Run channels in long direction of board. Bend hanger sharply

under bottom flange of runner and secure wire in place with a saddle tie. Provide channels below mechanical or electrical equipment and mechanical ductwork to maintain maximum spacing.

- .4 Install furring channels transversely across runner channels in short direction of wallboard at 610 mm o.c. maximum or 150 mm from walls and interruptions in ceiling continuity. Secure channels to support with furring clips or wire. Where splicing is necessary lap minimum 200 mm and wire tie each end with double loops of 0.90 mm galvanized tie wire, 25 mm from each end of overlap.
- .5 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 610 mm around perimeter of fixture. Coordinate with Electrical.
- .6 Install work level to tolerance of 1:1200.
- .7 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles, etc.
- .8 Install furring channels parallel to, and at exact locations of steel stud partition header track.
- .9 Furr for gypsum board faced vertical bulkheads within or at termination of ceilings.

3.5 Gypsum Board

- .1 Installation of gypsum board is specified in Section 09 21 16

3.6 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 03 30 00 Cast-in-Place Concrete
- .2 Section 04 20 00 Concrete Unit Masonry
- .3 Section 07 92 00 Joint Sealants
- .4 Section 09 21 16 Gypsum Board
- .5 Section 09 65 19 Resilient Tile Flooring
- .6 Section 09 91 23 Interior Painting

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM C144-18 Standard Specification for Aggregate for Masonry Mortar
 - .2 ASTM C150/C150M-22 Standard Specification for Portland Cement
 - .3 ASTM C207-18 Standard Specification for Hydrated Lime for Masonry Purposes
 - .4 ASTM C627-18e1 Standard Test Method for Evaluating Ceramic Floor Tile Installation Systems using the Robinson-Type Floor Tester
- .2 American National Standards Institute (ANSI)
 - .1 ANSI A108/A118/A136.1:2017 American National Specifications for the Installation of Ceramic Tile.
 - .2 ANSI A118.10 Waterproof Membrane
 - .3 ANSI A137.1: 2017 American National Standard Specifications for Ceramic Tile
- .3 Canadian General Standards Board (CGSB)
 - .1 CGSB 71-GP 22M 1978 Adhesive, Organic, for Installation of Ceramic Wall Tile
- .4 International Standards Organization (ISO)
 - .1 ISO 10545 Series Ceramic Tiles, Standards for Testing
 - .2 ISO 13006-2012 Ceramic Tiles, Definitions, Classifications, Characteristics and Marking.
 - .3 ISO 13007-2010 Ceramic Tiles, Grouts and Adhesives.
- .5 Terrazzo, Tile and Marble Association of Canada (TTMAC)
 - .1 TTMAC 2019-2021 Specifications Guide 09 30 00, Tile Installation Manual.
 - .2 TTMAC Hard Surface Maintenance Guide.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Provide product data. Include manufacturer's information on:
 - .1 Ceramic tile, marked to show each type, size, and shape required.
 - .2 Mortar and grout.
 - .3 Divider strip.
 - .4 Levelling compound.
 - .5 Waterproofing isolation membrane.
- .3 Submit duplicate samples of tile. Samples to be submitted on 300 x 600 mm sample board for each colour, texture, size and pattern of tile. Grout sample joints for representative sample of final installation.
- .4 Trim and Accessories: submit duplicate samples of each trim.

- .5 Maintenance Data: Provide maintenance data for tile work, for incorporation into Maintenance Manuals specified under Section 01 78 00.

1.5 Quality Assurance

- .1 Do tile work in accordance with Installation Manual 200, Ceramic Tile, by Terrazzo, Tile and Marble Association of Canada (TTMAC), except where this specification is more stringent.
- .2 For the installation of ceramic tile, use only skilled tradesmen who are familiar with the referenced standards and with the requirements for this Work.
- .3 The setting material manufacturer's representative shall review the details with the Contractor prior to the start of work. Instruct the Contractor on the proper installation procedures to ensure compliance with the guarantee requirements.

1.6 Performance Requirements

- .1 Floor Traffic Load Bearing performance: Provide installations rated for the following load bearing performance in accordance with ASTM C627 for ceramic tile installed on walkway surfaces:
 - .1 Moderate: passes cycles 1 through 10.

1.7 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver packaged materials in original unopened containers.
- .3 Keep delivered material dry and free from stains. Store cementitious material off damp surfaces.
- .4 Use all means necessary to protect materials, before, during and after installation and to protect the installed work and materials of all other trades.
- .5 In the event of damage, immediately make all repairs and replacements necessary to the approval of the Consultant and at no additional cost to the Owner.
- .6 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.8 Project Conditions

- .1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12 °C for 48 hours before, during and after installation.
- .2 Do not install tiles at temperatures less than 12 °C or above 38 °C.
- .3 Do not apply epoxy mortar and grouts at temperatures below 15 °C or above 25 °C.
- .4 Provide and maintain temporary lighting. Lighting levels shall be sufficient to complete work including inspections. Provide minimum lighting levels of 400 lux at work areas.

1.9 Qualifications

- .1 Installer of ceramic tiles shall have a minimum of 10 years of experience including at least five projects of similar scope and scale. Submit documented proof of experience prior to commencing work of this Section.

1.10 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.11 Maintenance

- .1 Upon completion of the installation and as a condition of acceptance, deliver to the Owner 2% of tile and accessory tiles in each colour and pattern of ceramic tiles installed under this Section for the Owners maintenance program. Identify each carton for location and installation date. Submission must be made all at one time and prior to Substantial Performance.

1.12 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of five years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Materials

- .1 Materials shall be graded and containers grade sealed, delivered to the job site in their original packages or containers with the manufacturer's labels and seals intact.
- .2 Tile and grout colours shall be selected by the Consultant from the manufacturer's standard range of colours.
- .3 Tile shall conform to ANSI A137.1.
- .4 Floor tile shall have coefficient of slip resistance conforming to ANSI A137.1.
- .5 Provide coves, corners, reveals, surf caps, inners and outers as required to complete the work.
- .6 Metal Lath: ASTM C847 corrosion resistant. 1.4 kg/m².

2.2 Ceramic Tile

- .1 CT1: Ceramic Wall Tile (Washrooms): Daltile RetroSpace Remix Series 76 mm x 152 mm, glazed, Glossy Finish Ceramic Tile. Colour shall be Modern White, RS30
- .2 CT2: Ceramic Floor Tile: Daltile Fabrique Series 305 x 305 mm. Matte Finish. Colour shall be Blanc Linen, P685

2.3 Mortar, Adhesives and Grout Material

- .1 Primer: Low VOC, low viscosity primer as recommended by manufacturer to suit substrate and site conditions; provide proof of bonding ability of setting systems where manufacturer recommends that a primer is not necessary to installation.
- .2 Surface Preparation Materials:
.1 Portland Cement Mortar: Scratch and bond coat, levelling bed containing the following:
.1 Portland Cement: Meeting or exceeding requirements of CSA A3000, Type GU.
.2 Hydrated Lime: Meeting or exceeding requirements of ASTM C207, Type N.

- .3 Sand: Meeting or exceeding requirements of ASTM C144, passing 16 mesh.
 - .4 Water: Potable.
 - .2 Self Levelling and Smoothing Underlayment: Cementitious and self levelling smoothing underlayment meeting or exceeding requirements of ANSI A108.1, Type 2.
 - .3 Wall Tile Systems:
 - .1 Thin Set Interior Installation: Dry set mortar meeting or exceeding requirements of ANSI A118.1 formulated for thin set applications, factory sanded mortar consisting of Portland cement, sand and additives requiring only addition of potable water for installation complete with bond enhancing latex additive.
 - .4 Floor Tile Systems:
 - .1 Thin Set Interior Installation: Latex-Portland cement mortar meeting or exceeding requirements of ANSI A118.1, rated for floor traffic load bearing performance indicated above.
 - .5 Adhesive Systems:
 - .1 Epoxy Adhesive: Thin set adhesive system using 100% solids epoxy resin and epoxy hardener meeting or exceeding requirements of ANSI A108.1; stain proof, chemical resistant and having high temperature resistance and water cleanable.
 - .2 Organic Adhesive: Thin set wall tile adhesive system using non-flammable, water resistant, latex adhesives for interior use meeting or exceeding requirements of ANSI A108.1, Type 1.
 - .6 Tile Grout Systems:
 - .1 Colours:
 - .1 T1: Mapei Timberwolf 5104
 - .2 Unsanded Portland Cement Grout: factory blended dry-set stain resistant, latex modified Portland cement meeting or exceeding requirements of ANSI A118.6, specifically formulated for joints less than or equal to 3 mm in width.
 - .3 Sanded Portland Cement Grout: Factory blended dry-set stain resistant, latex modified Portland cement and graded silica sand meeting or exceeding requirements of ANSI A118.6, specifically formulated for joints greater than 3 mm in width.
 - .4 Polymer Modified Grout: factory blended stain resistant polymer modified Portland cement meeting or exceeding requirements of ANSI A118.7, specifically formulated for joints greater than 3 mm in width.
- 2.4 Patching and Levelling Compound
- .1 Portland cement base, acrylic polymer compound, manufactured specifically for resurfacing and levelling concrete floors, capable of being applied in layers up to 50 mm thick, being brought to feather edge, and being trowelled to smooth finish and having not less than the following physical properties:
 - .1 Compressive strength: 25 MPa.
 - .2 Tensile strength: 7 MPa.
 - .3 Flexural strength: 7 MPa.
 - .4 Density: 1.9
 - .5 Products containing gypsum are not acceptable.
 - .2 Levelling Compound: Laticrete 3701 latex or 226 Mapecem mortar mixed with Planicrete 50.
- 2.5 Floor Sealer and Protective Coating
- .1 To tile and grout manufacturer's recommendations.

2.6 Accessories

- .1 Reducers, edge trim, and transition strips: Schluter Systems purpose made aluminum.
- .2 CT Edge Protection: Schluter RONDEC, size to suit tile thickness. Satin anodized aluminum. Trim to come with all connectors or end caps required for a complete and finished installation. As a minimum, provide edge protection at the following locations:
 - .1 Top of CT Base;
 - .2 Top of CT wall tile;
 - .3 All outside corners of wall tile or porcelain ceramic tile base.
- .3 Transition Strip: (Porcelain ceramic tile to resilient flooring): Schluter RENO.V, satin anodized aluminum transition strips.
- .4 Sealant: as specified in Section 07 92 00.

2.7 Mixes

- .1 Mix premanufactured mortars and grouts in accordance with referenced standards, and mortar and grout manufacturer's written instructions; mix site mixed materials as follows:
 - .1 Scratch Coat (by volume): Mix 1 part Portland cement, 4 parts sand, and latex additive where required by TTMAC detail.

PART 3 EXECUTION

3.1 Surface Conditions

- .1 Surfaces on which tile is to be applied, shall be thoroughly cleaned down.
- .2 Verify that concrete substrates have been allowed to cure for a minimum of 28 days in accordance with TTMAC requirements.
- .3 Verify that substrates for bonding tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and are within starting flatness tolerances as specified in Section 03 30 00 and are ready for application of levelling materials specified in this Section.
- .4 Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of Work, and similar items located in or behind tile have been completed before installing tile.
- .5 Drywall surfaces on which wall and floor tile is to be applied, shall be free from dust, excess plaster and shall be plain and true without any irregularities. Prepare existing gypsum board surfaces as recommended by TTMAC and product manufacturer to support tile installation.
- .6 Existing painted masonry or concrete wall surfaces to receive ceramic tile shall be thoroughly cleaned of all paint down to concrete or concrete block surfaces using paint stripper. Prepare painted surfaces in accordance with manufacturer's instructions and TTMAC recommendations.
- .7 In the event of discrepancies, immediately notify the Consultant and do not proceed with installation in such areas until all such discrepancies have been fully resolved.
- .8 Check that conditions of temperature, humidity, traffic and usage are suitable as required by Installation Manual specifications. Minimum temperature to be not less than 10°C.

- .9 Check that surfaces ready to receive tiling are cured, level and/or graded, plumb, smooth, firm, free from loose particles, droppings, projection, grease, solvent, paint and other foreign matter and from other unsuitable conditions.
- .10 Install transition strips, reducers and edge trim at exposed edges of all tiled walls and floors in accordance with manufacturer's instructions.

3.2 Installation

- .1 Install tiling in accordance with requirements of TTMAC Tile Installation Manual and parts of ANSI A108 Series of tile installation standards that apply to types of bonding and grouting materials, and to methods required for complete tile installation.
- .2 Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions:
 - .1 Terminate Work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
 - .2 Make cut edges smooth, even and free from chipping.
 - .3 Do not split tile.
- .3 Accurately form intersections and returns; perform cutting and drilling of tile without marring visible surfaces:
 - .1 Cut, drill, and fit tile to accommodate work of other subcontractors penetrating or abutting work of this Section.
 - .2 Carefully grind cut edges of tile abutting trim, finish, or built in items for straight aligned joints.
 - .3 Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars, or covers overlap tile and to provide a uniform joint appearance.
- .4 Lay tile in pattern indicated on Drawings and as follows:
 - .1 Align joints when adjoining tiles on floor, base, walls, and trim are the same size.
 - .2 Centre tile patterns between control and movement joints; notify Consultant for further instructions where tile patterns do not align with control or movement joints.
 - .3 Cut tile accurately and without damage.
 - .4 Smooth exposed cut edges with abrasive stone, where exposed.
 - .5 Chipped or split edges are not acceptable.
- .5 Bonding Bed: Set tile in place while bond coat is wet and tacky and as follows:
 - .1 Adjust amount of bonding materials placed on substrates based on temperature and humidity to prevent skinning over of bonding materials.
 - .2 Use sufficient bond coat to provide a minimum 80% contact for tiles smaller than 300 mm x 300 mm with bonding material evenly dispersed and pressed into back of tile; refer to back buttering requirements for larger materials and installations having Moderate or higher Load Bearing Performance requirements.
 - .3 Notch bond coat in horizontal straight lines and set on freshly placed bonding material while moving (sliding) tile back and forth at 90° to notches.
 - .4 Verify that corner and edges are fully supported by bonding material.
 - .5 Set tiles to prevent lippage greater than 1 mm over a 3 mm grout joint.
 - .6 Keep two-thirds of grout joint depth free of bonding materials.
 - .7 Clean excess bonding materials from tile surface prior to final set.
 - .8 Sound tiles after bonding materials have cured and replace hollow sounding tile before grouting.
- .6 Back Buttering: Obtain 100% mortar coverage in accordance with applicable requirements for back buttering of tile in referenced TTMAC and ANSI A108 series of tile installation standards for

the following applications:

- .1 Tile installed with chemical resistant mortars and grouts
- .2 Tile 300 mm or larger in any direction
- .3 Tile with raised or textured backs
- .4 Tile installation rated for Heavy or Extra Heavy Duty.
- .5 All porcelain tiles with more than 20% of the tile backs covered with firing release dust back buttered so that 100% of the back is covered with adhesive mortar rated for C627, Extra Heavy Duty rating.

- .7 Install prefabricated edge strips and control at locations indicated or where exposed edge of floor tile meets different flooring materials and exposed substrates.

- .8 Protect exposed edges of floor tile with properly sized transition strips, use sloped reducer strips where uneven transitions between 6 mm and 13 mm occur.

- .9 Control and Movement Joints: Install control joints and expansion joints in tile work in accordance with TTMAC Detail 301MJ; keep control and expansion joints free of bonding materials and as follows:
 - .1 Cut tiles to establish line of joints; sawn joints after installation of tiles will not be acceptable.
 - .2 Locate joints in tile surfaces directly above joints in concrete substrates.
 - .3 Provide floor control joints over structural control joints.
 - .4 Install prefabricated joint profiles in accordance with manufacturer's written instructions, set with top surface of joint profile slightly below top surface of tile.
 - .5 Prepare joints and apply sealants in accordance with requirements of Section 07 92 00.
 - .6 Keep control and movement joints free from setting materials.
 - .7 Form an open joint for sealant in tile wherever a change in backing material occurs, at all vertical interior corners, around penetrating pipes and fixtures, and where tile abuts other materials or fixtures.
 - .8 Install control joints where indicated or at not less than the following spacings:

Environment	Minimum	Maximum	Joint Width (minimum)
Interior/Shaded	4800 mm	6100 mm	6 mm

3.3 Grouting

- .1 Grouting: Install grout in accordance with manufacturer's written instructions, the requirements of TTMAC, and as follows:
 - .1 Allow proper setting time before application of grout.
 - .2 Pre-seal or wax tiles requiring protection from grout staining.
 - .3 Force grout into joints to a smooth, dense finish.
 - .4 Remove excess grout in accordance with manufacturer's written instructions and polish tile with clean cloths.

- .2 Grout all tile using specified grout in strict accordance with manufacturers written instructions all to give a flush, hard joint.

- .3 Joints in tile shall be filled solid and flush with grout.

- .4 Prepare joints and mix grout in accordance with manufacturer's printed instructions. Force maximum amount of grout into joints, avoiding air traps or voids.

- .5 Remove all excess grout by washing diagonally across the joints. Check for voids, air pockets and gaps and fill same. Remove all discoloured grout and replace with new.

.6 Cure all joints.

3.4 Floor Sealer and Protective Coatings

.1 Apply in accordance with manufacturer's instructions.

3.5 Cleaning and Protection

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Cleaning: Clean tile surfaces so they are free of foreign matter using manufacturer recommended cleaning products and methods after completion of placement and grouting and as follows:

- .1 Remove grout residue from tile as soon as possible.
- .2 Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's written instructions, but no sooner than 10 days after installation; protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning.
- .3 Flush surface with clean water before and after cleaning.

.3 Protection: Leave finished installation clean and free of cracked, chipped, broken, unbonded, or other tile deficiencies as follows:

- .1 Protect finished areas from traffic until setting materials have sufficiently cured in accordance with TTMAC requirements.
- .2 Protect floor areas from traffic after grouting is completed in accordance with manufacturer's written instructions.
- .3 Prevent foot and wheel traffic from floors for a minimum of 24 hours after completion of grouting.
- .4 Provide protective covering until Substantial Performance of the Work.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 09 21 16 Gypsum Board
- .2 Section 09 53 00 Acoustical Suspension

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM C423-23 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 - .2 ASTM E84-24 Standard Test Method for Surface Burning Characteristics of Building Materials
 - .3 ASTM E1264-22 Standard Classification for Acoustical Ceiling Products
 - .4 ASTM E1414/E1414M-21a Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
 - .5 ASTM E1477-98a(2022) Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 ULC 102-2018 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
 - .1 Acoustical Certifications: 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 must carry an approved independent laboratory classification of NRC, CAC, and AC.
- .3 Submit duplicate 300 x 300 mm samples of each type of acoustical units.
- .4 Provide maintenance data for acoustic panel ceilings for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.

1.5 Quality Assurance

- .1 Single-Source Responsibility: Provide acoustical panel units 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 Mock-up:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.

- .2 Construct mock-up 10 m² minimum of acoustical panel tile ceiling including one inside corner and one outside corner.
- .3 Construct mock-up where directed.
- .4 Allow 48 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.

1.6 Project Conditions

- .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.
- .4 Building areas to receive ceilings shall be free of construction dust and debris.

1.7 Performance Requirements

- .1 Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
 - .1 Surface Burning Characteristics: As follows, tested per ASTM E84 and complying with ASTM E1264 Classification.
 - .2 Fire Resistance: As follows tested per ASTM E119 and listed in the appropriate floor or roof design in the Underwriters Laboratories Fire Resistance Directory
- .2 Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to applicable code.

1.8

Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Protect on site stored or installed absorptive material from moisture damage.

1.9 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.10 Extra Materials

- .1 Provide extra materials of acoustic units in accordance with Section 01 78 00 - Closeout Submittals.
- .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.

PART 2 PRODUCTS

2.1 Materials

- .1 Acoustic units for suspended ceiling system: to ASTM E1264
- .2 Panel Type 1: CGC Fissured.
 - .1 Class A.
 - .2 Composition: Water Felted Mineral Fiber
 - .3 Pattern regular fissured.
 - .4 Texture: medium.
 - .5 Flame spread: ASTM E1264, Class A (U.L.C.), 25 or less.
 - .6 Smoke developed 50 or less in accordance with ULC 102.
 - .7 Noise Reduction Coefficient (NRC): ASTM C423; Classified with UL label, 0.55
 - .8 Ceiling Attenuation Class (CAC): ASTM C1414; Classified with UL label, 35
 - .9 Light Reflectance (LR) range of 0.81 to ASTM E1477.
 - .10 Dimensional Stability: Standard
 - .11 Edge Profile: Square Lay-In
 - .12 Colour: White.
 - .13 Size 610 x 1219 x 16 mm thick.
 - .14 Shape flat.
 - .15 Surface coverings: Ecolabel certified paint.
- .3 Alternate manufacturer: Products as manufactured by the following are acceptable, subject to Consultants approval of style, finish, performance characteristics and texture:
 - .1 Armstrong Industries
 - .2 Certainteed
 - .3 Or approved equivalent
- .4 Ceiling Suspension System: as specified in Section 09 53 00.

PART 3 EXECUTION

3.1 Examination

- .1 Do not install acoustical panels until work above ceiling has been inspected by Consultant.

3.2 Installation

- .1 Co-ordinate with Section 09 53 00 - Acoustical Suspension.
- .2 Coordinate layout and installation of ceilings with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, and fire-suppression system.
- .3 Install acoustical panels and tiles in ceiling suspension system.
- .4 Install acoustical units parallel to building lines with edge unit not less than 50% of unit width, with directional pattern running in same direction. Refer to reflected ceiling plan.
- .5 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.

3.3 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 05 12 23 Structural Steel
- .2 Section 09 21 16 Gypsum Board
- .3 Section 09 51 13 Acoustic Panel Ceilings
- .4 Division 23 Mechanical
- .5 Division 26 Electrical

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A307-21 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
 - .2 ASTM A641/A641M-19 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
 - .3 ASTM A653 / A653M – 23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .4 ASTM A1011/A1011M-23 Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
 - .5 ASTM C635/C635M-22 Standard Specification for the 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 E119-22 Standard Test Methods for Fire Tests of Building Construction and Materials
 - .9 ASTM E1264-22 Standard Classification for Acoustical Ceiling Products

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
- .3 Acoustical Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.
- .4 Submit one representative model of each type of ceiling suspension system.
 - .1 Ceiling system to show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, acoustical unit installation.

1.5 Design Requirements

- .1 Determine the superimposed loads that will be applied to suspension systems by components of the building other than the ceiling and ensure that adequate hangers are installed to support the

additional loads in conjunction with the normal loads of the system.

- .2 Design supplemental suspension members and hangers where width of ducts and other construction within ceiling plenum produces hanger spacing that interferes with location of hangers at required spacing to support standard suspension system members:
 - .1 Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- .3 Rigidly secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of L/360 to ASTM C635 deflection test.

1.6 Performance Requirements

- .1 Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
 - .1 Surface Burning Characteristics: Tested per ASTM E84 and complying with ASTM E1264 Classification.
- .2 Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to applicable code.

1.7 Quality Assurance

- .1 Single-Source Responsibility: Provide acoustical panel units 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 Where required, provide fire-resistance rated suspension system: certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- .4 Construct mock-ups in accordance with Section 01 45 00 - Quality Control and as described in Section 09 51 13.

1.8 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.9 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 Components: All main beams and cross tees, base metal and end detail shall be commercial quality hot-dipped galvanized steel as per ASTM C635. Main beams and cross tees shall be double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping pre-finished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.

- .2 Face width: 22 mm
- .3 Edge Moldings and Trim: Hemmed angle moulding to match main beams and cross tees.
- .4 Structural Classification: Intermediate Duty System, ASTM C635.
- .5 Colour: White and match the actual colour of the specified ceiling tile.
- .6 Standard of Acceptance:
 - .1 Armstrong Prelude XL
 - .2 Donn DXT
 - .3 Certainteed Classic Environmental Stab.
 - .4 Or approved equivalent
- .7 Attachment Devices: Size for five times design load indicated in ASTM C635, Table 1, Direct Hung unless otherwise indicated or required.
- .8 Threaded Rod: to ASTM A397. Galvanized or zinc plated.
- .9 Wire for Hangers and Ties: ASTM A641, Class 1 zinc coating, soft annealed, with a yield stress load of at least three times design load, but not less than 2.06 mm thick.
- .10 Channel Framing and Fittings: Strut type metal framing and components to ASTM A1011 or ASTM A653. Unistrut P1000SL or equivalent. Galvanized.

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 Examination

- .1 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 whose installation is specified in other sections.
 - .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 Install suspension system and panels in compliance with ASTM C636; CISCA Seismic Guidelines and in accordance with the manufacturer's installation instructions.
 - .2 Install wall moldings at intersection of suspended ceiling and vertical surfaces.
 - .3 Do not erect ceiling suspension system until work above ceiling has been inspected by Consultant.
 - .4 Secure hangers to overhead structure using attachment methods as indicated by manufacturer. Do not suspend ceiling systems from building services including plumbing lines, conduit, cable trays or duct work.
 - .5 Hanger and bracing wires shall not attach to or bend around obstructions including but not limited to: piping, ductwork, conduit and equipment. Provide trapeze or other supplementary support members at obstructions to allow typical hanger spacing. Brace assemblies must be configured and/or located in order to avoid obstructions in addition to maintaining the required brace assembly spacing.
 - .6 Install hangers spaced at maximum 1219 mm centres and within 152 mm from ends of main tees. Install hanger wires plumb and straight.
 - .7 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.
 - .8 Ensure suspension system is coordinated with location of related components.
 - .9 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers, grilles, and speakers.
 - .10 Support at light fixtures and diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 610 mm around perimeter of fixture.
 - .11 Interlock cross member to main runner to provide rigid assembly.
 - .12 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.
 - .13 Install access splines to provide ceiling access.
 - .14 Finished ceiling system to be square with adjoining walls and level within 1:1000
- 3.5 Cleaning
- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
 - .2 Touch up scratches, abrasions, voids and other defects in painted surfaces.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 03 30 00 Cast-in-Place Concrete

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM E84-20 Standard Test Method for Surface Burning Characteristics of Building Materials
 - .2 ASTM F710-19e1 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
 - .3 ASTM F1066-04(2018) Standard Specification for Vinyl Composition Floor Tile
 - .4 ASTM F1344-15 Standard Specification for Rubber Floor Tile
 - .5 ASTM F1861-16 Standard Specification for Resilient Wall Base
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 ULC 102.2-2018 Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies
- .3 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1168-03, Adhesives and Sealants Applications.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit duplicate samples of manufacturer's full range of colours for specified products for selection of colours by the Consultant.
- .3 Submit a complete list of all materials proposed to be furnished and installed under this portion of the Work, stating manufacturer's name and catalogue number for each item, and product samples in colours specified.
 - .1 Accompanying the materials list, submit two copies of the manufacturer's current recommended method of installation for each item.
- .4 Provide maintenance data for resilient flooring for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.

1.5 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Use all means necessary to protect resilient flooring materials before, during and after installation and to protect the installed work and materials of all other trades.

1.6 Extra Materials

- .1 Provide extra stock materials of resilient flooring, base and adhesives in accordance with Section 01 78 00 – Closeout Submittals.
 - .1 Provide one carton of each colour, pattern and type flooring material required for this project for maintenance use.
 - .2 Provide one container of adhesive.
 - .3 Clearly identify each container of floor tile and each container of adhesive.
- .2 Extra materials to be from same production run as installed materials.

1.7 Environmental Requirements

- .1 Maintain air temperature and structural base temperature at floor installation area above 20° C for 48 hours before, during and after installation.

1.8 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.9 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of ten years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Materials

- .1 Rubber tile flooring: to ASTM F1344, Rubber Tile Flooring.
 - .1 Basis of Design: Mondo Harmoni.
 - .2 Thickness: 3mm
 - .3 Size: 610mm x 610mm
 - .4 Colour: To be selected from Manufacturer's full range of colours.
 - .5 Test Data:
 - .1 Hardness (ASTM D2240): ≥ 85 Shore A
 - .2 Abrasion Resistance (ASTM D3389): Passes
 - .3 Thickness Tolerance (ASTM F386): Passes
 - .4 Resistance to Chemicals (ASTM F925): Passes
 - .5 Static Load Resistance (ASTM F970): 250 psi
 - .6 Resistance to Heat (ASTM F 1514): $\Delta E \leq 8$
 - .7 Size/Squareness Tolerance (ASTM F2055): Passes
 - .8 Dimensional Stability (ASTM F2199): Passes
 - .9 Static Coefficient of Friction (ASTM D 2047): ≥ 0.5 SCOF Dry
 - .10 Flamability (ASTM E648, Critical Radiant Flux): Class 1 (≥ 0.45 W/cm²)
- .2 Resilient Base: To ASTM F1861, 100 mm high thermoplastic rubber, not less than 3.0 mm thickness with preformed internal and external corners. Base at resilient tile shall have standard toe.
 - .1 Johnsonite DuraCove DC Rubber Wall Base.
 - .2 Roppe Pinnacle Rubber Base.
 - .3 Amtico Marathon.
 - .4 Burke Mercer BurkeBase.

- .5 Or approved equivalent
- .3 Primers, Adhesives and Caulking: non-flammable, solvent free, waterproof, recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade.
- .4 Sub-floor filler and leveler shall be white premixed latex compatible with flooring products and adhesive as recommended by flooring manufacturer for specific flooring types.
- .5 Metal edge strips: aluminum extruded, smooth, mill finish with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .6 Transition strips, mouldings and adaptors shall be rubber or vinyl, manufactured by Johnsonite, Roppe or Burke Mercer with lip to extend under floor tile with tapered edge, colour matched to flooring.
- .7 Sealer: water based, type recommended by flooring manufacturer.
- .8 Wax: type recommended by flooring manufacturer.
- .9 All colours and patterns shall be as selected by the Consultant from the complete range of manufacturer's colours and patterns.

PART 3 EXECUTION

3.1 Surface Conditions

- .1 Conform to requirements of ASTM F710.
- .2 Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- .3 Confirm that resilient flooring and base may be installed in accordance with the original design and the manufacturer's recommendations.
- .4 Ensure concrete floors are dry, by using test methods recommended by tile manufacturer. Concrete must be cured a minimum of 35 days prior to commencement of resilient flooring application.
- .5 In the event of discrepancy, immediately notify the Consultant. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 Sub Floor Treatment

- .1 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .2 Install sub floor to manufacturer's recommended standard limits and deviations.
- .3 Remove all substance and materials affecting adhesive bond.
- .4 Vacuum clean floors.

- .5 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler is cured and dry.
- .6 Prime or seal substrates to flooring and adhesive manufacturer's instructions.
- .7 Allow for excessive leveling of existing slabs.

3.3 Application

- .1 Provide a high ventilation rate, with maximum outside air, during installation, and for 48 hours after installation. Whenever possible, ventilate directly to outside. Do not allow contaminated air to re-circulate through the building ventilation system.
- .2 Install all resilient flooring in strict accordance with the manufacturer's printed instructions and recommendations.
- .3 Do not lay floor coverings and base until all trades, except painter, have completed their work and just prior to completion of the building.
- .4 Apply adhesive uniformly with recommended trowels, at coverage as recommended by the manufacturer. Do not spread more adhesive than can be covered before initial set takes place.
- .5 Lay flooring with joints parallel to building lines unless otherwise indicated, to produce symmetrical tile pattern. Patterns shall be as directed by the consultant. Allow for one field tile and one accent tile in each room or space. Border tiles shall be minimum ½ tile width.
- .6 Install flooring to square grid pattern with all joints aligned unless otherwise indicated.
- .7 As installation progresses, and after installation, roll flooring in 2 directions with a 45 kg roller to ensure full adhesion.
- .8 Cut and fit tile neatly around fixed objects.
- .9 Install feature strips or feature tiles where directed. Fit joints tightly.
- .10 Continue flooring throughout areas to receive movable type partitions or fitments without interrupting floor pattern.
- .11 Install flooring full depth of closets, toe spaces, and recesses.
- .12 Terminate flooring at centre line of door in openings where adjacent floor finish or colour is dissimilar.
- .13 Install transition strips at unprotected or exposed edges where flooring terminates. Locate transition strip at centre line of door where a door occurs.

3.4 Base Application

- .1 Lay out base to keep number of joints to a minimum. Locate joints at maximum available spacing or at internal or pre moulded corners.
- .2 Clean substrate and prime with one coat of adhesive.

- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using a 3 kg hand roller.
- .5 Install straight and level to variation of 1:1000.
- .6 Scribe and fit to door frames and other obstructions. Use pre-moulded end pieces at flush door frames.
- .7 Cope internal corners. Use pre moulded corner units for right angle external corners. Use formed straight base materials for external corners of other angles, minimum 300 mm each leg.
- .8 Provide rubber base at all locations specified, regardless of floor finish.

3.5 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Remove excess adhesive from resilient floor coverings, base and adjacent finished surfaces as the work progresses.
- .3 Clean, seal and wax floor and base surfaces to manufacturer's instructions. In carpeted areas, clean base before installation of carpet.

3.6 Protection

- .1 Protect new floors until time of final inspection.
- .2 Prohibit traffic on floors for 48 hours after installation.
- .3 Immediately prior to final inspection, remove protection, clean, dry or damp mop resilient flooring and apply one additional coat of wax.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 09 91 23 Interior Painting

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A780/A780M-20 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
- .2 Environmental Protection Agency (EPA)
 - .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings)
- .3 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual, 2018
 - .2 MPI Standard GPS-1-12 and GPS-2-12 MPI Green Performance Standard for Painting and Coatings.
- .4 Society for Protective Coatings (SSPC)
 - .1 Systems and Specifications, SSPC Painting Manual 2009
- .5 South Coast Air Quality Management District, California State (SCAQMD)
 - .1 SCAQMD Rule 1113-96 Architectural Coatings
- .6 Green Seal GS-11 Green Seal Environmental Standard for Paints and Coatings, January 1997
- .7 National Fire Code of Canada

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .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, stain, clear coating and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards.
 - .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties and SCAQMD Rule 1113-96.
- .5 Provide maintenance data for paint products for incorporation into Operating and Maintenance Manuals specified in Section 01 78 00- Closeout Submittals. Include following:
 - .1 Product name, number, type and use.
 - .2 Colour numbers.
 - .3 MPI Environmentally Friendly classification system rating.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Contractor: to have a minimum of five years proven satisfactory experience. When requested, provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
 - .2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work.
 - .3 Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.
- .2 Conform to latest MPI requirements for exterior painting work including preparation and priming.
- .3 Paint materials to be highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and to be compatible with other coating materials as required.
- .4 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Consultant.
- .5 Provide mock-up in accordance with Section 01 45 00 - Quality Control.
 - .1 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 and textures. Locate where directed.
 - .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 Allow 24 hours for inspection of mock-up before proceeding with work.
 - .4 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver and store materials in original containers, sealed, with labels intact. Labels to indicate:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .3 Provide and maintain dry, temperature controlled, secure storage. Store materials and equipment in well-ventilated area with temperature range 7 °C to 30 °C. Store materials and supplies away from heat generating devices.
- .4 Observe manufacturer's recommendations for storage and handling.
- .5 Keep areas used for storage, cleaning and preparation, clean and orderly. After completion of operations, return areas to clean condition.
- .6 Remove paint materials from storage only in quantities required for same day use.
- .7 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .8 Remove damaged, opened and rejected materials from site.

1.7 Fire Safety Requirements

- .1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.
- .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
- .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.8 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Place materials defined as hazardous or toxic in designated containers. Handle and dispose of hazardous materials in accordance with Municipal regulations.
- .3 Unused materials must be disposed of at official hazardous material collections site.
- .4 Paint and related materials are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from the Ministry of the Environment.
- .5 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .6 Place materials defined as hazardous or toxic waste in containers or areas designated for hazardous waste.

1.9 Maintenance

- .1 Extra Materials:
 - .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Quantity: provide one four litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
 - .3 Deliver to Owner and store where directed.

1.10 Ambient Conditions

- .1 Heating, Ventilation and Lighting:
 - .1 Ventilate enclosed spaces in accordance with Section 01 51 00 – Temporary Utilities.
 - .2 Do not perform painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10 °C for 24 hours before, during and after paint application until paint has cured sufficiently.
 - .3 Provide continuous ventilation for seven days after completion of application of paint
 - .4 Provide minimum lighting level of 323 Lux on surfaces to be painted.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
 - .1 Unless specifically pre-approved by Consultant and product manufacturer, perform no painting work when:
 - .1 Ambient air and substrate temperatures are below 10 °C.
 - .2 Substrate temperature is over 32 °C unless paint is specifically formulated for application at high temperatures.
 - .3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.

- .4 Relative humidity is above 85 % or when dew point is less than 3 °C variance between air/surface temperature.
 - .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
 - .2 Perform no painting work when maximum moisture content of substrate exceeds 12%.
 - .3 Conduct moisture tests using a properly calibrated electronic Moisture Meter.
 - .4 Test concrete 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 wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
 - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.
 - .3 Apply paint when previous coat of paint is dry or adequately cured.
 - .4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.
 - .5 Do not apply paint when:
 - .1 Temperature is expected to drop below 10 °C before paint has thoroughly cured.
 - .2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.
 - .3 Surface to be painted is wet, damp or frosted.
 - .6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.
 - .7 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.
 - .8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

PART 2 PRODUCTS

2.1 Materials

- .1 Paint materials listed in latest edition of MPI Approved Products List (APL) and from a single manufacturer for each system used are acceptable for use on this project.
- .2 Paint materials for paint systems: to be products of single manufacturer.
- .3 Only qualified products with E2 or E3 "Environmentally Friendly" ratings are acceptable for use on this project.
- .4 Use only MPI listed 'L' rated materials.
- .5 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids, to be as follows:
 - .1 Be water-based water soluble water clean-up.
 - .2 Be non-flammable biodegradable.
 - .3 Be manufactured without compounds which contribute to ozone depletion in upper atmosphere.
 - .4 Be manufactured without compounds which contribute to smog in the lower atmosphere.
 - .5 Do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.
- .6 Water-borne surface coatings must be manufactured and transported in a manner that steps of processes, including disposal of waste products arising therefrom, will meet requirements of

applicable governmental acts, by-laws and regulations including Fisheries Act and Canadian Environmental Protection Act (CEPA).

- .7 Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .8 Water-borne surface coatings and recycled water-borne surface coatings must have flash point of 61 °C or greater.
- .9 Both water-borne surface coatings and recycled water-borne surface coatings must be made by a process that does not release:
 - .1 Matter in undiluted production plant effluent generating a 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
 - .2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
- .10 Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes must meet a minimum "Environmentally Friendly" E2 or E3 rating.
- .11 Recycled water-borne surface coatings must contain 50 % post-consumer material by volume.
- .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 Hexavalent 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 The following must be performed on each batch of consolidated post-consumer material before surface coating is reformulated and canned. These tests must be performed at a laboratory or facility which has been accredited by the 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.

2.2 Colours

- .1 Consultant will provide Colour Schedule.
- .2 Exterior colour schedule will be based upon selection of three base colours and two deep tint accent colours.
- .3 Selection of colours will be from manufacturer's full range of colours.
- .4 Where specific products are available in restricted range of colours, selection will be based on limited range.
- .5 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible

difference between coats.

2.3 Mixing and Tinting

- .1 Perform colour tinting operations prior to delivery of paint to site.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Add thinner to paint manufacturer's recommendations. Do not use kerosene or organic solvents to thin water-based paints.
- .4 Thin paint for spraying according in accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Consultant.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 Gloss/Sheen Ratings

- .1 Paint gloss: defined as sheen rating of applied paint, in accordance with following values:

Gloss Level Category/	Units @ 60 Degrees	Units @ 85 Degrees
G1 – matte finish	0 to 5	Max. 10
G2 – velvet finish	0 to 10	10 to 35
G3 – eggshell finish	10 to 25	10 to 35
G4 – satin finish	20 to 35	Min. 35
G5 – semi-gloss finish	35 to 70	
G6 – gloss finish	70 to 85	
G7 – high gloss finish	> 85	

- .2 Gloss level ratings of painted surfaces as specified.

2.5 Exterior Painting Systems

- .1 Steel Doors, Frames and Metal Fabrications:
 - .1 EXT 5.1D – Alkyd G5 semi-gloss finish over alkyd primer.

PART 3 EXECUTION

3.1 General

- .1 Perform preparation and operations for 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 application instructions, and data sheets.

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.

3.3 Preparation

- .1 Perform preparation and operations for exterior painting in accordance with MPI Maintenance Repainting Manual except where specified otherwise.
- .2 Clean and prepare exterior surfaces to be repainted in accordance with MPI Maintenance Repainting Manual requirements. Refer to the MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and surface debris by vacuuming, wiping with dry, clean cloths or compressed air.
 - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and 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. Allow sufficient drying time and test surfaces using electronic moisture meter before commencing work.
 - .5 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.
 - .6 Many water-based paints cannot be removed with water once dried. Minimize use of kerosene or such organic solvents to clean up water-based paints.
- .3 Clean metal surfaces to be repainted by removing rust, dirt, oil, grease and foreign substances in accordance with MPI requirements and SSPC-SP 6. Remove such contaminants from surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/vacuum cleaning as required.
- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

3.4 Protection

- .1 Protect existing building surfaces and adjacent structures from paint splatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products and equipment.
- .4 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas.

3.5 Application

- .1 Apply paint materials in accordance with paint manufacturer's written application instructions.
- .2 Brush and Roller Application:
 - .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Consultant.
 - .5 Remove runs, sags and brush marks from finished work and repaint.

- .3 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Consultant.
- .4 Apply coats of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .6 Sand and dust between coats to remove visible defects.
- .7 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.
- .8 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.6 Mechanical/Electrical Equipment

- .1 Unless otherwise specified, paint exterior exposed conduits, piping, hangers, duct work and other mechanical and electrical equipment with colour and finish to match adjacent surfaces.
- .2 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .3 Do not paint over nameplates.

3.7 Field Quality Control

- .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.

.2 Standard of Acceptance:

- .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 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

3.9 Restoration

- .1 Remove protective coverings and warning signs as soon as practical after operations cease.
- .2 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 05 50 00 Metal Fabrications
- .2 Section 06 20 00 Finish Carpentry
- .3 Section 08 11 00 Metal Doors and Frames
- .4 Section 09 21 16 Gypsum Board
- .5 Section 09 91 13 Exterior Painting

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A780/A780M-20 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
- .2 Environmental Protection Agency (EPA)
 - .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).
- .3 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual, 2018
 - .2 MPI Standard GPS-1-12 and GPS-2-12 MPI Green Performance Standard for Painting and Coatings.
- .4 Society for Protective Coatings (SSPC)
 - .1 Systems and Specifications, SSPC Painting Manual 2009
- .5 Underwriters Laboratories of Canada (ULC)
 - .1 ULC 102-18 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
- .6 South Coast Air Quality Management District, California State (SCAQMD)
 - .1 SCAQMD Rule 1113-96, Architectural Coatings.
- .7 Green Seal GS-11 Green Seal Environmental Standard for Paints and Coatings, January 1997.
- .8 National Fire Code of Canada

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Submit full range colour sample chips.
 - .2 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards.
 - .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties and SCAQMD Rule 1113-96.

- .5 Provide maintenance data for paint products for incorporation into Operating and Maintenance Manuals specified in Section 01 78 00- Closeout Submittals. Include following:
 - .1 Product name, number, type and use.
 - .2 Colour numbers.
 - .3 MPI Environmentally Friendly classification system rating.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Contractor: to have a minimum of five years proven satisfactory experience.
 - .2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work.
 - .3 Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.
- .2 Conform to latest MPI requirements for painting work including preparation and priming.
- .3 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.
- .4 Paint materials to be highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and to be compatible with other coating materials as required.
- .5 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Consultant.
- .6 Provide mock-up in accordance with Section 01 45 00 - Quality Control.
 - .1 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 and textures. Locate where directed.
 - .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 Allow 24 hours for inspection of mock-up before proceeding with work.
 - .4 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.6 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver and store materials in original containers, sealed, with labels intact. Labels to indicate:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .3 Provide and maintain dry, temperature controlled, secure storage. Store materials and equipment in well-ventilated area with temperature range 7 ° C to 30 ° C. Store materials and supplies away from heat generating devices.
- .4 Observe manufacturer's recommendations for storage and handling.
- .5 Keep areas used for storage, cleaning and preparation, clean and orderly. After completion of operations, return areas to clean condition.

- .6 Remove paint materials from storage only in quantities required for same day use.
- .7 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .8 Remove damaged, opened and rejected materials from site.

1.7 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 National Fire Code of Canada requirements.

1.8 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.
- .2 Place materials defined as hazardous or toxic in designated containers. Handle and dispose of hazardous materials in accordance with Municipal regulations.
- .3 Unused materials must be disposed of at official hazardous material collections site.
- .4 Paint and related materials are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from the Ministry of the Environment.
- .5 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .6 Place materials defined as hazardous or toxic waste in containers or areas designated for hazardous waste.

1.9 Maintenance

- .1 Extra Materials:
 - .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Quantity: provide one four litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
 - .3 Deliver to Owner and store where directed.

1.10 Ambient Conditions

- .1 Heating, Ventilation and Lighting:
 - .1 Ventilate enclosed spaces in accordance with Section 01 51 00 – Temporary Utilities.
 - .2 Provide heating facilities to maintain ambient air and substrate temperatures above 10 °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 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.

- .5 Provide minimum lighting level of 323 Lux on surfaces to be painted.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
 - .1 Unless pre-approved in writing by Consultant and product manufacturer, perform no painting when:
 - .1 Ambient air and substrate temperatures are below 10 ° C.
 - .2 Substrate temperature is above 32 ° 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 under 85% or when the dew point is more than 3 ° C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 ° C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.
 - .2 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
 - .3 Perform painting work when maximum moisture content of the substrate is below:
 - .1 Allow new concrete to cure minimum of 28 days.
 - .2 15% for wood.
 - .3 12% for plaster and gypsum board.
 - .4 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".
 - .5 Test concrete 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 wind or 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.

PART 2 PRODUCTS

2.1 Materials

- .1 Provide paint materials for paint systems from single manufacturer.
- .2 Products to meet requirements of GS-11 or SCAQMD Rule 1113-96
- .3 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .4 Only qualified products with E2 or E3 "Environmentally Friendly" rating are acceptable for use.
- .5 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.
- .6 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids:
 - .1 Non-flammable, biodegradable.
 - .2 Manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
 - .3 Manufactured without compounds which contribute to smog in the lower atmosphere.
 - .4 Do not contain methylene chloride, chlorinated hydrocarbons or toxic metal pigments.

- .5 Recycled content of 15% post-consumer and ½ post-industrial waste.
- .7 Formulate and manufacture water-borne surface coatings with no aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .8 Flash point: 61 °C or greater for water-borne surface coatings and recycled water-borne surface coatings.

2.2 Colours

- .1 Consultant will provide Colour Schedule.
- .2 Colour schedule will be based upon selection of eight base colours and six deep tint accent colours.
- .3 Selection of colours will be from manufacturer's full range of colours.
- .4 Where specific products are available in restricted range of colours, selection will be based on limited range.
- .5 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 Mixing and Tinting

- .1 Perform colour tinting operations prior to delivery of paint to site.
- .2 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .3 Thin paint for spraying in accordance with paint manufacturer's instructions.
- .4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 Gloss/Sheen Ratings

- .1 Paint gloss: defined as sheen rating of applied paint, in accordance with following values:

Gloss Level Category/	Units @ 60 Degrees	Units @ 85 Degrees
G1 – matte finish	0 to 5	Max. 10
G2 – velvet finish	0 to 10	10 to 35
G3 – eggshell finish	10 to 25	10 to 35
G4 – satin finish	20 to 35	Min. 35
G5 – semi-gloss finish	35 to 70	
G6 – gloss finish	70 to 85	
G7 – high gloss finish	> 85	

- .2 Gloss level ratings of painted surfaces as specified and as noted on Finish Schedule.

SPEC NOTE: SEE <http://www.paintinfo.com/mpi/guide/fullspecREV.pdf> FOR FULL MPI SPECIFICATION

2.5 Interior Painting Systems

- .1 Structural Steel:
 - .1 INT 5.1X Latex G5 semi-gloss finish (over quick dry shop primer).
- .2 Metal Fabrications:
 - .1 INT 5.3A Latex G5 semi-gloss finish
- .3 Zinc Coated Metal Deck:
 - .1 INT 5.3H. Interior Latex semi-gloss, dry fog/fall type.
- .4 Galvanized Metal: interior doors, frames, railings, misc. steel, pipes, and ducts.
 - .1 INT 5.3A Latex G5 semi-gloss finish
- .5 Concrete Masonry:
 - .1 INT 4.2D High performance architectural latex G5 semi-gloss finish.
- .6 Wood Clear Polyurethane Finish:
 - .1 INT 6.3K Polyurethane varnish G6 gloss finish.
- .7 Electrical Equipment Backboards:
 - .1 INT 6.4P Fire retardant, pigmented coating. Low odour/low VOC. Semi-gloss (UL/ULC rated).
- .8 Gypsum Board: Walls and Bulkheads.
 - .1 INT 9.2A Latex G3 eggshell finish over latex sealer.
- .9 All other surfaces not noted above: high performance finish suitable for commercial and institutional environment and in accordance with MPI painting manual.

PART 3 EXECUTION

3.1 General

- .1 Perform preparation and operations for interior 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 application instructions, and data sheets.

3.2 Examination

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report damages, defects, unsatisfactory or unfavourable conditions to Consultant before proceeding with work.

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 and in accordance with paint manufacturers and MPI recommendations. 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.

- .2 Surface Preparation:
 - .1 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
 - .2 Place "WET PAINT" signs in occupied areas as painting operations progress.
 - .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. 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 new 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 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 and SSPC-SP 6. 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.
 - .7 Touch up of shop primers with primer as specified.
 - .8 Do not apply paint until prepared surfaces have been accepted by Consultant.
- 3.4 Application
- .1 Apply paint materials in accordance with paint manufacturer's written application instructions.
 - .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, 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 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
 - .5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
 - .6 Sand and dust between coats to remove visible defects.
 - .7 Finish surfaces both above and below sight lines as specified for surrounding surfaces.
 - .8 Finish alcoves as specified for adjoining rooms.
 - .9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.5 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.
- .2 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.
- .9 Paint natural gas piping yellow.
- .10 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
- .11 Do not paint interior transformers and substation equipment.

3.6 Field Quality Control

- .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.
- .2 Standard of Acceptance:
 - .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.

3.7 Cleaning and Restoration

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 09 21 16 Gypsum Board

1.3 References

- .1 Underwriters Laboratories of Canada (ULC)
 - .1 ULC 102-18 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit shop drawings.
 - .1 Show dimensions, layout and details for fabrication and installation of whiteboards, tackboards, aluminum trim and anchorage.
- .3 Provide maintenance data for whiteboards and tackboards for incorporation into Operating and Maintenance Manuals specified in Section 01 78 00- Closeout Submittals.

1.5 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Use all means necessary to protect whiteboards, tackboards, aluminum trim, during and after installation and to protect the installed work and materials of all other trades.
- .4 In the event of damage, immediately make all repairs and replacements necessary to the approval of the Consultant and at no additional cost to the Owner.

1.6 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.7 Requirements of Regulatory Agencies

- .1 Surface burning characteristics of materials: to ULC S102.

PART 2 PRODUCTS

2.1 General

- .1 The following manufacturers have been approved for the work of this Section:
 - .1 ASI Visual Display Products

- .2 Broome Porcelain Company
- .3 Egan Visual
- .4 Global School Products
- .5 Martack Specialties
- .6 Steelcase Inc.
- .7 Or approved equivalent

- .2 Whiteboards and tackboards shall be supplied by one manufacturer.

2.2 Whiteboards

- .1 Basis of Design: Rite-On, Wipe Off, Series 9300 writing boards, white porcelain enamel on steel, factory pre-framed in clear anodized aluminum trim with chalk rail by ASI Visual Display Products or equivalent.
 - .1 Sizes as indicated.
- .2 Provide one package of companion writing pens (3 each red, blue, green and black) for each whiteboard.

2.3 Tackboards

- .1 Tackboards shall be 13 mm factory pre-laminated consisting of 6.4 mm thick fine grained natural cork laminated to 6.4 mm particle board or masonite substrate under mechanical pressure in maximum panel sizes of 1220 x 2440 mm. Bonding of materials by a waterproof adhesive that will not delaminate or rupture at the contact surfaces.
- .2 Basis of design: Series9100, fine grain natural cork, light textured, brown with satin finished anodized aluminum frame and concealed fasteners, as manufactured by ASI Visual Display Products or equivalent.
- .3 Sizes as indicated.
- .4 All tackboards shall meet the minimum requirements of the applicable building code and shall have a flame spread rating of less than 150 when tested in accordance with ULC 102.

2.4 Trim

- .1 Aluminum trim and chalk trays shall be 6063 T5 aluminum alloy with satin finish clear etched and anodized .05 mm satin finish free from extruding draw marks and surface scratches.
 - .1 Perimeter Trim: 19 mm exposed face and weight of approximately 0.372 kg/m.
 - .2 Divider Trim: Trim for adjacent panels of elevations greater than 2440 mm - 13 mm exposed face and weight of approximately 0.372 kg/m.
 - .3 Maprail: Trim for whiteboard elevation only complete with integral natural fine grained cork insert, end stops and two (2) combination roller maphooks per 1.2 lineal metre or portion thereof, - 50 mm exposed face and weight of approximately 0.520 kg/m.
 - .4 Tray: Angle tray box section for whiteboard elevations only complete with contour fitting end castings - 100 mm projection from wall and weight of approximately 1.42 kg/m.

PART 3 EXECUTION

3.1 Coordination

- .1 Co-ordinate with all other trades as required to ensure proper and adequate provision in framing and wall finish for the installation of whiteboards and tackboards in the locations required.
- .2 Prior to installation, inspect locations of all whiteboards and tackboards and verify that all necessary provisions have been made. In the event of discrepancy, immediately notify the Consultant.
- .3 Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 Installation

- .1 Install all whiteboards and tackboards where indicated on the drawings and in full accordance with the manufacturer's recommendations, anchoring all components firmly in place for long life under hard use.
- .2 Erection of materials shall be carried out to ensure a rigid, straight, square, plumb and horizontal installation.
- .3 All aluminum trim to be attached in such a manner that all fastenings shall be concealed. All corners are to be mitred.

3.3 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 All whiteboards, tackboards, and aluminum trim are to be cleaned prior to Substantial Performance.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 10 28 10 Toilet and Bath Accessories.

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- .2 CSA Group (CSA)
 - .1 CSA /ASC B651:23 Accessible Design for the Built Environment
- .3 Accessibility for Ontarians with Disabilities Act (AODA)

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature for toilet compartments or components, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit duplicate copies of manufacturer's standard colour charts for selection by the Consultant.
- .3 Shop Drawings:
 - .1 Indicate partition layout.
 - .2 Show and describe in detail materials, finishes, dimensions, details of connections and fastenings, elevations, plans, sections, thicknesses, metal thickness, hardware and any other pertinent information.
- .4 Samples:
 - .1 Submit duplicate 300 x 300 mm samples of panel showing finish on both sides, two finished edges and core construction.
 - .2 Submit duplicate representative samples of each hardware item, including brackets, fastenings and trim.
 - .3 All samples must be properly identified including name of supplier, and name of manufacturer.
- .5 Quality Control Submittals: submit following in accordance with Section 01 45 00 - Quality Control.
 - .1 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.
- .6 Closeout Submittals:
 - .1 Provide maintenance data for toilet compartments for incorporation into operations and maintenance manual specified in Section 01 78 00 - Closeout Submittals.

1.5 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.

- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Toilet compartments must be delivered to the job site in the manufacturers' original packages and marked to correspond with the approved shop drawings.
- .4 Protect finished surfaces during shipment and installation. Do not remove until immediately prior to final inspection.

1.6 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.7 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of three years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Approved Manufacturers

- .1 Only those manufacturers names and product numbers listed herein, are approved for use on this project. Absolutely no variations from listed and preapproved items will be permitted.
- .2 Approved manufacturer(s):
 - .1 Hadrian Manufacturing Inc.

2.2 Materials

- .1 Construction: Doors, Panels and Pilasters shall be constructed of two sheets of panel flatness zinc-coated steel, Galvanneal ASTM A653 GR33, laminated under pressure to a honeycomb core for sound deadening and rigidity. Formed edges to be welded together and inter-locked under tension with a roll-formed oval crown locking bar, mitred, welded and ground smooth at the corners. Honeycomb shall have a maximum 25mm cell size.
- .2 Doors: Shall be 25mm thick with cover sheets not less than 0.8mm. All doors 1829 mm high.
- .3 Panels: Shall be 25mm thick with cover sheets not less than 0.8mm. All panels 1829 mm high.
- .4 Pilasters: Shall be 32mm thick with cover sheets not less than 0.8mm. Pilaster tops shall be reinforced with a 20-gauge channel to create extra strength and twist-free rigidity along with minimizing damage by handling and/or shipping.
- .5 Headrail: Shall be 25mm by 41mm extruded anodized aluminum with double-ridge anti-grip design. Wall thickness to be 1.5mm and shall be securely attached to wall and pilasters with manufacturer's fittings in such a way as to make a strong and rigid installation. All joints in headrails shall be made at pilaster.

2.3 Hardware

- .1 Hardware and Fittings: All panel-to-pilaster, panel-to-wall and pilaster-to-wall connections shall be made with full height continuous channels. All door hardware shall be chrome plated zinc die

castings. Fasteners are zinc plated 12 x 45 mm and 12 x 16 mm TR-27 6-lobe security screws. Doors shall be equipped with a gravity type hinge mounted on the lower pilaster hinge bracket. Door hinges shall be wrap-around style and adjustable to permit the door to rest at any position when not latched.

- .2 Each door to be fitted with a combined coat hook and bumper and a concealed latch, with face mortised flush with edge strip of door.
- .3 Barrier-free doors shall include thumbturn lever to activate latch without fingertip grip application.
- .4 Both standard and barrier-free latches shall have a turn slot designed to allow emergency access from exterior. The combined full length extruded aluminum door stop and keeper shall have a 6 mm wide continuous rubber bumper locked in place the length of the stop. To cover the sightline gap at door hinge side, full length extruded aluminum filler channel shall be provided. The "no sightline" continuous stop and hinge filler shall be powder coated to match door and pilaster finish. Threaded upper hinge pin shall have a metal core and self-lubricating nylon sleeve to ensure smooth, quiet operation. Pilaster shoes shall be a welded one-piece design made from polished stainless steel. Two-piece shoes that can disassemble when kicked are unacceptable.

2.4 Finish

All sheet metal to be thoroughly cleaned, phosphated and finished with a high performance powder coating, electrostatically applied and oven cured to provide a uniform, smooth protective finish.

- .1 Colours will be selected by the Consultant from the manufacturer's standard range of colours. Up to four colours will be selected.

2.5 Fabrication

- .1 Shop fabricate partitions and screens. Take site measurements for areas where partitions are to be located and fabricate partitions to suit site dimensions.
- .2 Fabricate to reviewed shop drawings and manufacturer's standards.
- .3 Toilet Compartment Doors: 1829 mm high; 610 and 810 mm wide.
- .4 Urinal Screens: 1070 mm high x 456 mm wide.

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 Examination

- .1 Check areas scheduled to receive compartments for correct dimensions, plumbness of walls, and soundness of surfaces that would affect installation of mounting brackets.
- .2 Verify spacing of plumbing fixtures to assure compatibility with installation of compartments.
- .3 Do not begin installation of compartments until conditions are satisfactory.

3.3 Preparation

- .1 Examine all site conditions that would prevent the proper application and installation of toilet compartments. Any defect must be immediately identified and corrected, prior to the installation of the toilet compartments.

3.4 Installation

- .1 All toilet compartments must be mounted according to manufacturers standard locations and those specified on the drawings.
- .2 Toilet compartments shall include the furnishing of all necessary screws, special screws, bolts, special bolts, expansion shields and all other devices necessary for the proper installation and application of the toilet compartments.
- .3 Install products in strict compliance with manufacturer's written instructions and recommendations, including the following:
 - .1 Verify blocking and supports in walls and ceilings have been installed properly at points of attachment.
 - .2 Verify location does not interfere with door swings or use of fixtures.
 - .3 Use fasteners and anchors suitable for substrate and project conditions
 - .4 Install units rigid, straight, plumb, and level.
 - .5 Conceal evidence of drilling, cutting, and fitting to room finish.
 - .6 Test for proper operation.
- .4 Adjust hardware for proper operation after installation. Set hinge cam on in-swinging doors to hold doors open when unlatched. Set hinge cam on out-swinging doors to hold unlatched doors in closed position.
- .5 At final completion, toilet compartments shall be left clean and free from disfigurement. Make all final adjustments. Where toilet compartments are found defective, repair or replace or otherwise correct as directed.
- .6 Upon request, at completion of the project, the toilet compartment supplier shall be required to brief Owner's maintenance staff regarding proper care of toilet compartments, including required lubrications, adjustments, cleaning, etc.

3.5 Field Quality Control

- .1 After installation has been completed, provide for a site inspection of all toilet compartments to determine that all items have been supplied and installed as per the enclosed details. Check the operation and adjustment of all toilet compartments. Any discrepancies, or malfunctioning product, must be reported to the Owner immediately.

3.6 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Touch-up, repair or replace damaged products.
- .3 Clean exposed surfaces of compartments, hardware, and fittings.
- .4 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

- .5 Provide for the proper protection of all toilet compartments until the time of Substantial Performance.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 10 21 13.13 Metal Toilet Partitions

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 ASTM A924/A924M-22a Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
 - .3 ASTM B456-17(2022) Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
 - .4 ASTM C1036-21 Standard Specification for Flat Glass
 - .5 ASTM C1503-18 Standard Specification for Silvered Flat Glass Mirror
 - .6 ASTM D1187/D1187M-97(2018) Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.81-M90 Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
 - .2 CAN/CGSB-1.88-92 Gloss Alkyd Enamel, Air Drying and Baking.
- .3 CSA Group (CSA)
 - .1 CSA/ASC B651:23 Accessible Design for the Built Environment.
 - .2 CSA G164-18(R2023) Hot Dip Galvanizing of Irregularly Shaped Articles.

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop Drawings:
 - .1 Indicate size and description of components, base material, surface finish inside and out, hardware and locks, attachment devices, description of rough-in-frame, building-in details of anchors for grab bars.
- .3 Samples:
 - .1 Submit samples when requested.
 - .2 Samples to be returned for inclusion into work.
- .4 Closeout Submittals:
 - .1 Provide maintenance data for toilet and bath accessories for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.6 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.7 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 00 - Closeout Submittals.
- .2 Deliver special tools to Owner.

PART 2 PRODUCTS

2.1 Materials

- .1 Sheet steel: to ASTM A653 with ZF001 designation zinc coating.
- .2 Stainless steel sheet metal: Type 304, with Brushed finish.
- .3 Stainless steel tubing: Type 304, commercial grade, seamless welded, minimum 1.2 mm wall thickness.
- .4 Fasteners: concealed screws and bolts hot dip galvanized, exposed fasteners to match face of unit. Expansion shields fibre, lead or rubber as recommended by accessory manufacturer for component and its intended use.

2.2 Manufacturers

- .1 Products and components listed are minimum standard of acceptance. Alternative products by recognized manufacturers of toilet and bath accessories may be accepted subject to review by the Consultant of manufacturer's product information and specifications.
- .2 Acceptable manufacturers include:
 - .1 Bobrick
 - .2 Bradley
 - .3 Frost
 - .4 Hafele
 - .5 Richelieu
 - .6 Watrous
 - .7 Or approved equivalent

2.3 Components

- .1 TPD: Toilet Tissue Dispenser:
 - .1 Supplied by Owner, installed by Contractor.
- .2 SD: Soap Dispenser: Liquid wall mounted soap dispenser.
 - .1 Supplied by Owner, installed by Contractor.
- .3 PTD: Paper Towel Dispenser:
 - .1 Supplied by Owner, installed by Contractor.
 - .2 Operated.
- .4 GB1: Grab Bar, 38 mm diameter x 1.6 mm wall tubing of stainless steel, 76 mm diameter wall flanges, concealed 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. 600 mm long.
- .1 Bobrick B-6806.99 x 24
 - .5 GB3: Barrier Free Toilet Grab Bars 2 (L-shaped) 760 x 760 38 mm dia. Peened finish c/w mounting kits.
 - .1 Bobrick B-6898.99, 90° Angle Grab Bar.
 - .6 Framed Mirror: Bobrick B-165 1830.
 - .7 SNV: Sanitary Napkin Vendor: Satin-finish stainless steel surface mounted vending machine.
 - .1 Bobrick B-2706 25 Classic series Surface Mounted napkin/Tampon Vendor.
 - .8 Stainless Steel Shelf: To CSA B651. 455 mm long x 125mm wide, 1.2mm type 304 stainless steel, satin finish. 19mm return edge; front edge hemmed for safety. 1.6mm brackets.
 - .1 Bobrick B295 x 18
 - .9 Surface Mounted Hand Dryers: World Dryer Airmax Model XM5-974, Automatic hand dryer, 115V, 20 Amp, 2300 Watt, cast iron cover, surface mounted, white.
 - .10 Backrest: Bobrick B-5892

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 Brake form sheet metal work with 1.5 mm radius bends.
- .4 Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- .5 Back paint components where contact is made with building finishes, to prevent electrolysis.
- .6 Hot dip galvanize concealed ferrous metal anchors and fastening devices to CSA G164.
- .7 Shop assemble components and package complete with anchors and fittings.
- .8 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.
- .9 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 Baked enamel: condition metal by applying one coat of metal conditioner to ASTM D1187, apply one coat Type 2 primer to CAN/CGSB-1.81 and bake, apply two coats Type 2 enamel to CAN/CGSB-1.88 and bake to hard, durable finish. Sand between final coats. Colour selected from standard range by Consultant.
- .3 Manufacturer's or brand names on face of units not acceptable.

PART 3 EXECUTION

3.1 Installation

- .1 Install toilet and bath accessories in accordance with the Ontario Building Code, CSA B651 and manufacturer's instructions.
- .2 Install and secure accessories rigidly in place as follows:
 - .1 Stud walls: install steel back-plate to stud prior to plaster or drywall finish. Provide plate with threaded studs or plugs.
 - .2 Hollow masonry units or existing plaster/drywall: use toggle bolts drilled into cell/wall cavity.
 - .3 Solid masonry or concrete: use bolt with lead expansion sleeve set into drilled hole.
- .3 Install grab bars on built-in anchors provided by manufacturer.
- .4 Use tamper proof screws/bolts for fasteners.
- .5 Fill units with necessary supplies shortly before final acceptance of building.
- .6 Install products in strict compliance with manufacturer's written instructions and recommendations, including the following:
 - .1 Verify blocking has been installed properly.
 - .2 Verify location does not interfere with door swings or use of fixtures.
 - .3 Comply with manufacturer's recommendations for backing and proper support.
 - .4 Use fasteners and anchors suitable for substrate and project conditions.
 - .5 Install units rigid, straight, plumb, and level, in accordance with manufacturer's installation instructions and approved shop drawings.
 - .6 Conceal evidence of drilling, cutting, and fitting to room finish.
 - .7 Test for proper operation.
- .7 Install electric hand dryers according to manufacturer's instructions. Installation shall be by an electrician and shall be completed in accordance with all relevant standards and Codes.

3.2 Schedule

- .1 Locate accessories where indicated. Exact locations determined by Owner.

3.3 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Clean exposed surfaces of compartments, hardware, and fittings using methods acceptable to the manufacturer.
- .3 Touch-up, repair or replace damaged products until Substantial Performance.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 09 21 16 Gypsum Board

1.3 References

- .1 Society of Motion Picture and Television Engineers (SMPTE)
 - .1 SMPTE RP 94-2000 Gain Determination of Front Projection Screens.
 - .2 CSA Group (CSA)
 - .1 CSA C22.1:21 Canadian Electrical Code

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Submit product data, including manufacturer's technical product data sheet, for each product specified.
- .3 Shop Drawings: Indicate dimensions, fabrication and installation details.
 - .1 Include electric wiring diagrams.
- .4 Samples: Submit 2 samples minimum 150 x 150 mm of screen finish material.
- .5 Quality Assurance:
 - .1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
 - .2 Certificates: Product certificates signed by the manufacturer certifying that materials comply with specified performance characteristics, criteria and physical requirements.
 - .3 Manufacturer's installation instructions.
- .6 Submit operating and maintenance instructions for electrically operated projection screens for inclusion in the Operating and Maintenance Manuals specified in Section 01 78 00. Include the following:
 - .1 Manufacturer's instructions detailing maintenance requirements.
 - .2 Parts catalog that includes complete list of repair and replacement parts, with cuts and identifying numbers.

1.5 Definitions

- .1 Gain: Indication of screen's luminance or brightness, measured perpendicular to screen center and relative to magnesium carbonate block, which serves as standard for 1.0 gain. Higher numbers indicate greater brightness.
- .2 Viewing Angle: Horizontal angle from perpendicular center of screen at which gain, or brightness decreases by 50%.

- .3 Format: Proportion of projection screen viewing area expressed as a ratio of width/height.
 - .1 NTSC or Video Format: 1.33:1.
 - .2 HDTV Format: 1.78:1.
 - .3 16:10 Wide: 1.60:1.
 - .4 Cinemascope: 2.35:1.
 - .5 Letterbox: 1:85:1.
 - .6 Square: 1:1.

1.6 Quality Assurance

- .1 Qualifications:
 - .1 Worker experienced in performing work of this section who has specialized in work similar to that required of this project.
- .2 Regulatory Requirements:
 - .1 Comply with the requirements of the Ontario Building Code.
- .3 Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements and manufacturer's instructions.

1.7 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
- .3 Store electric projection screens in a dry, ventilated area, protected from exposure to harmful weather conditions, at a temperature less than 27 ° C.
- .4 Handling: Handle electrically operated projection screen materials with care in order to prevent damage.
- .5 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

1.8 Project Conditions

- .1 Perform electrically operated projection screen work when temperatures are greater than 4 ° C.

1.9 Sequencing

- .1 Comply with projection screen manufacturer's written recommendations for sequencing construction operations.

1.10 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.11 Warranty

- .1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

- .2 Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and does not limit, other rights Owner may have under Contract Documents.

PART 2 PRODUCTS

2.1 Projection Screens

- .1 Acceptable Manufacturers:
 - .1 Da-Lite Screen Company, Inc.
 - .2 Draper Inc.

2.2 Projection Screen Systems

- .1 Electric Projection Screen:
 - .1 Electrically operated, retractable projection screens with rigid metal roller housing motor as manufactured by Da-Lite Screen Company Inc.
 - .1 Ceiling Mounted: Cosmopolitan Electrol, ceiling mounted with floating brackets.
 - .2 Size: 3660mm H x 3660mm W
 - .3 Viewing surface: Matte White, as specified below.
 - .4 Masking: Black masking borders.
 - .5 Case: Fabricated from 22 gauge steel with steel end caps.
 - .6 Case Finish: White, baked enamel paint coating, standard.
 - .7 Low Voltage Control: Single Motor Low Voltage Control (LCV) built-in.
 - .2 Controls:
 - .1 Electric screen low voltage control:
 - .1 Single motor, low voltage control unit with screw terminal blocks for 115 volt power source input and motor output, input terminals for multiple wall switches, and receivers for radio frequency and infrared transmitters.
 - .2 Housing: 57mm X 114mm X 178mm galvanized steel enclosure.
 - .2 Wall Switches:
 - .1 Provide low voltage control unit with low voltage, 3 position control switch for UP, DOWN and STOP functions.
 - .2 Provide switch with box and hinged, key-locked, stainless steel cover plate.
 - .3 Provide 4 keys to Owner for each screen.
 - .3 Infrared remote control:
 - .1 Hand held. 3 button, infrared transmitter with UP, DOWN and STOP functions.
 - .3 Viewing Surface:
 - .1 Matte White as manufactured by Da-lite Screen Company, Inc.
 - .1 Flame retardant, Mildew resistant, white, vinyl coated fiberglass screen that can be rolled and cleaned with mild soap and water solution.
 - .2 Gain: 1.0
 - .3 Viewing angle: 60 degrees.

- .4 Masking: Black
- .5 Seams: Seamless where possible; screens over 3050mm may have max. 1 seam, flat, horizontal; vertical seams are not permitted.

- .2 Permanently attached screen fabric to roller. Provide bottom of screen with metal rod in pocket.

- .4 Accessories:
 - .1 Installation hardware:
 - .1 Provide attachment hardware, fasteners, and other components of type, size, and spacing recommended by manufacturer for complete function, secure installation of electric screens.
 - .2 Provide threaded metal rods for supporting ceiling recessed screens.

 - .2 Floating mounting bracket:
 - .1 Provide adjustable mounting brackets with white finish to move screen to the left or right for proper centering on wall and alignment to projector.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

- .1 Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions and technical data sheets.

3.2 Examination

- .1 Site Verification of Conditions
 - .1 Verify that conditions of substrates previously installed under other sections or contracts are acceptable with electrically operated projection screen installation.
 - .2 Ensure electrical power supply is installed to meet electric projection screen requirements in accordance with Section 26 05 00 - Common Work Results for Electrical.
 - .1 Verify type and location of power supply.
 - .3 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .4 Proceed with installation only after unacceptable conditions have been corrected.

3.3 Coordination

- .1 Coordinate electric projection screen placement with placement of other ceiling and wall mounted components including by not limited to lighting, stage curtains, A/V equipment or structural framing.
- .2 Coordinate requirements for blocking, construction of recesses, and auxiliary structural supports to ensure adequate means for installation of screens.
- .3 Coordinate requirements for power supply, conduit, and wiring required for electrical screen and controls.
- .4 Coordinate with forces installing projector mounts or (existing projector)
- .5 Prior to installation, verify type and location of power supply.
- .6 Do not commence installation of projection screen until substrates have been properly prepared.

3.4 Installation

- .1 Install electric projection screens in accordance with reviewed shop drawings at locations and heights indicated and in accordance with manufacturer's written instructions.
- .2 Confirm screen location with Consultant prior to installation.
- .3 Provide attachment hardware, fasteners and other components of type, size, and spacing recommended by manufacturer for complete, functional and secure installation of screens.
- .4 Install screen housing and make electrical connections in conjunction with installation of ceiling system.
- .5 Securely install screens plumb and level to supporting substrate.

3.5 Field Quality Control

- .1 Testing and Inspection: Operate each screen 3 times to ensure viewing surfaces extend and retract through full range of motion.
 - .1 Verify controls, limit switches, and other components function as designed and meet project requirements.
 - .2 Ensure viewing surface raising operation fully engages and lifts screen closure door into closed position.
 - .3 Adjust motors, controls and components to allow for smooth, unobstructed screen operation.

3.6 Protection

- .1 Protect electrically operated projection screens from damage during construction.
- .2 Repair damage to adjacent materials caused by electrically operated projection screen work.

3.7 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

- .1 Conform to the requirements of Division 1.

1.2 Related Sections

- .1 Section 05 50 00 Metal Fabrications

1.3 References

- .1 ASTM International (ASTM)
 - .1 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 National Fire Protection Association (NFPA)
 - .1 NFPA 701 Standard Methods of Fire Tests for Flame Propagation of Textiles and Films

1.4 Submittals

- .1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit shop drawings:
 - .1 Indicate layout and connection details. Verify that all component parts and assembly of each item will support the superimposed loads without deflection detrimental to function, appearance and safety.
 - .2 Shop drawings shall be stamped by an Engineer licensed to practice in the Province of Ontario.
- .3 Samples: Submit 150 x 150 mm samples of drapery fabric in manufacturer's complete colour range, for colour selection.
- .4 Operations and Maintenance Data: Provide data for inclusion in the maintenance manuals specified in section 01 78 00. Include instructions for care and cleaning of curtains.

1.5 Shipping, Handling and Storage

- .1 Refer to Section 01 61 00 – Common Product Requirements.
- .2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.6 Waste Management and Disposal

- .1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

- .1 Drapery Track: All tracks and assemblies shall come complete with all necessary components and hardware to provide a fully functioning system complete with floor mounted tension pulleys. Track overlap shall be a minimum of 600 mm at the centre and 600 mm beyond the proscenium opening.

- .2 Steel Track: Fabricate of roll-formed, galvanized, commercial-quality, zinc-coated steel sheet; complying with ASTM A653; G60 coating designation with continuous bottom slot and with each half of track in one continuous piece; black paint finish.
 - .1 Products: Specification is based on H & H Specialties Inc. 400 Series Curtain track. Subject to compliance with specified requirements, curtain track by one if the following will be accepted:
 - .1 QSD Inc.
 - .2 Ash Stevenson Inc.
 - .2 Clamp and Bracket Hangers: Manufacturer's steel clamps and brackets of sufficient strength required to support loads for attaching track to overhead support.
 - .3 Track Lap Clamp: Metal to match track channel for attaching double-sectioned track at center overlap.
 - .4 Fold Guide: Equip carriers with rear-fold or backpack guide and rubber spacers to permit offstage curtain folding; sized for use with operating line if any.
 - .5 Curtain Rails: Provide end stops for track rails.
 - .6 Curtain Carriers: Standard carriers with a quantity of curtain carriers sufficient for track length, to suit curtain fabrication. Include one master carrier for each leading curtain edge.
 - .7 Manual Operation: Provide with cord operating line consisting of manufacturer's standard 10 mm diameter, stretch-resistant operating cord consisting of braided synthetic-fiber jacket over solid, synthetic-fiber, linear filaments.
- .3 Provide all hardware and accessories required for a complete installation.
- .4 Curtains:
 - .1 Conforming to NFPA 701.
 - .2 General: Provide fabrics inherently and permanently flame resistant or chemically flame resistant by immersion treatment to comply with requirements indicated. Provide fabrics of each type and colour from same dye lot.
 - .3 Fabric shall be minimum 25 oz, 100% cotton velour with fire retardant treatment in colour as selected by the Consultant.
 - .4 Manufacturer: QSD Inc., Rose Brand, Northeast Stage, Ash-Stevenson Inc.
 - .5 For stage curtains and valance, fullness shall be 2x. For all other drapes, fullness shall be 1.5x.
 - .6 Label certifying fire retardant treatment and fabric care instructions shall be permanently affixed to the back of each curtain.

2.2 Curtain Fabrication

- .1 General: Affix permanent label, stating compliance with requirements of authorities having jurisdiction, in accessible location on curtain not visible to audience. Provide vertical seams unless otherwise indicated. Arrange vertical seams so they do not fall on faces of pleats. Do not use fabric cuts less than one-half width.
 - .1 Vertical Hems: Provide vertical hems not less than 50 mm wide, and not less than 100 mm wide at borders, valance, teasers, and tormentors, with not less than a 25 mm tuck, and machine sew with no selvage material visible from front of curtain. Sew open ends of hems closed.
 - .2 Top Hems: Reinforce top hems by double-stitching 89 mm wide, heavy jute webbing to top edge on back side of curtain with not less than 50 mm of face fabric turned under.
 - .3 Pleats: Provide 100 percent fullness in curtains, exclusive of turnbacks and hems, by sewing additional material into 150 mm double-stitched box pleats sewn flat and spaced at 300 mm o.c. along top hem reinforcement.
 - .4 Grommets: Brass, No. 3 or No. 4; centered on each box pleat and 25 mm from corner of curtain; for snap hooks or S-hooks.

- .5 Bottom Hems: Provide hems not less than 150 mm deep with weight tape.
- .2 S-Hooks: Track manufacturer's standard heavy-duty plated-wire hooks, not less than 50 mm long.

PART 3 EXECUTION

3.1 Examination

- .1 Examine areas and conditions, with Installer present, for compliance with requirements for supporting members, blocking, installation tolerances, clearances, and other conditions affecting performance of stage-curtain work. Examine inserts, clips, blocking, or other supports required to be installed by others to support tracks and battens.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation

- .1 Install complete and fully functioning rigging system in accordance with manufacturer's instructions and reviewed shop drawings.
- .2 Track shall be supported from building structure using rated beam clamps or threaded anchors with 9 mm threaded rod at maximum 1.8 m centres. Review architectural and structural drawings and provide any additional structural support framing required to safely support tracks and curtains.
- .3 All tracks shall be mounted in a manner to permit leveling and height adjustment.
- .4 Install curtains in accordance with manufacturer's instructions and reviewed shop drawings.

3.3 Demonstration

- .1 Train Owner's maintenance personnel to adjust, operate, and maintain stage curtains and tracks.

3.4 Cleaning

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Clean and adjust curtains and hardware prior to Substantial Performance

End of Section