

RFT 26-035 (the RFX)**School Renovations at
Kilbride Public School**

Issue Date: January 16, 2026

Closing Date and Time: All Submissions are to be submitted electronically via email to chatelaina@hdsb.ca no later than 2:00 p.m. local time, on February 10, 2026.

Questions:

All questions to be submitted in writing through hdsb.bidsandtenders.ca using the “Submit a Question” link associated with this bid request. Questions are required to be received no later than the question deadline outlined in the bid request.

Purchasing Representative:

Name: Amanda Chatelain
Email Address: chatelaina@hdsb.ca

Site Meeting

Date: January 22, 2026
Location: Kilbride Public School, 6611 Panton St, Burlington, ON L7P 0L8.
Time: 10:30 a.m.
Note: Proponents are to meet at the front entrance of the HDSB location.

Communications Notice

To obtain documents online please visit: <https://hdsb.bidsandtenders.ca>

If you subscribe to bids & tenders you can login to your account to download the document(s) without the preview watermark. You may also opt to purchase a one-time download for this opportunity. Documents are not provided in any other manner.

All Suppliers shall be registered as a Plan Taker for this opportunity, which will enable the Supplier to download the RFT without the watermark preview, to receive addenda email notifications, and to download addenda. Failure to register as a Plan Taker may result in disqualification of the submission, at the sole discretion of HDSB.

Should the HDSB receive a Submission that is subsequently found to be from a Supplier that is not registered with bids & tenders and the Supplier did not obtain the RFT document from <https://hdsb.bidsandtenders.ca> the HDSB reserves the right to remove the Submission from further consideration.

The following documents form part of all HDSB competitive proposal documents:

HDSB Procurement Administrative Procedure:

<https://www.hdsb.ca/our-board/Policy/Procurement.pdf>

HDSB Asbestos Management in Facilities Administrative Procedure:

<https://www.hdsb.ca/our-board/Policy/AsbestosManagementInFacilities.pdf>

HDSB Vendor Performance Management Administrative Procedure:

<https://www.hdsb.ca/our-board/Policy/VendorPerformanceManagement.pdf>

Broader Public Sector Procurement Directive

[https://www.doingbusiness.mgs.gov.on.ca/mbs/psb/psb.nsf/Attachments/001-BPS_Procurement_Directive/\\$FILE/BPS_Procurement_Directive.pdf](https://www.doingbusiness.mgs.gov.on.ca/mbs/psb/psb.nsf/Attachments/001-BPS_Procurement_Directive/$FILE/BPS_Procurement_Directive.pdf)

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1. Introduction to the Halton District School Board (HDSB)

The Halton District School Board (HDSB) supports the learning of approximately 67,000 students across the municipalities of Burlington, Halton Hills, Milton, and Oakville within the Halton Region. As one of the largest English-language school boards in Ontario, the HDSB provides high-quality education from Kindergarten through Grade 12, as well as continuing education programs for adults and newcomers.

The HDSB's team of approximately 12,000 staff, including teachers, administrators, support personnel, and senior leadership, work collaboratively to provide a safe, caring, equitable, and inclusive learning environment for all students, while also promoting respect, civility, and academic excellence. The HDSB aims to create a positive school climate where every student, staff member, and member of the school community feels safe, included, and accepted and where students can learn, grow, and thrive within HDSB's 92 Elementary Schools and 18 Secondary Schools (including Gary Allan HS and Syl Apps HS).

Additional information about the HDSB can be found by visiting hdsb.ca.

2. Objective of the RFX

The HDSB is seeking qualified Suppliers to complete School Renovations at Kilbride Public School located at 6611 Panton St, Burlington, ON L7P 0L8.

In order to be considered for this project, the successful Supplier shall have the following attributes/characteristics:

- a. Experience providing Services as described in this RFX;
- b. Have all appropriate licenses, certifications, and operating authorities to provide the Services requested in this RFX;
- c. Knowledge of leading-edge trends in the industry;
- d. Ability to develop and follow detailed project timelines;
- e. Sufficient, competent, trained, and experienced personnel to provide the requested Services;
- f. Appropriate supervision, training, documentation, Information and Technology, and other resources are needed to provide the requested services.
- g. Sufficient labor and equipment to meet timelines without overextension;
- h. Strong coordination between disciplines and with other trades including a clear process for managing subcontractors, scope changes, delays, or issues; and,
- i. Appropriate liability and WSIB insurance documentation.

The deliverables for the School Renovations at Kilbride Public School are set out in the Scope of Work and Deliverables. The HDSB intends to contract by issuance of a Letter of Intent, Award Letter, and/or issuance of a Purchase Order (PO) with one or more primary qualified Supplies to provide the services. This RFX includes the appendices and other supporting documents attached hereto, which form part of the RFX.

Suppliers are encouraged to read each section of the Request for Tender (“RFX”) thoroughly. While sections may appear similar, additional information may be included as applicable within each section. It is the Supplier's responsibility to understand each section's requirements. The procurement timetable represents the HDSB's best estimated schedule. All dates may be subject to change at HDSB's discretion. Awarding of the contract is funding dependent and may be delayed while funding is secured.

Additionally, suppliers must review and acknowledge the attached HDSB Standard Terms and Conditions.

3. Planned Schedule of Events

Event	Date
Release of RFX	January 16, 2026
Mandatory Site Meeting	January 22, 2026
Question Deadline	January 29, 2026
Issuance of Final Addendum	February 2, 2026
RFX Closing	February 9, 2026
Project Timelines	July 1, 2026 - October 31, 2026
All times specified in this timetable are local times in Burlington, Ontario, Canada	

4. RFX Closing Information

All Suppliers shall have an Online Bidding System vendor account and be registered as a plan taker at <https://hdsb.bidsandtenders.ca> for this RFX, which will enable the Supplier to download the RFX, to receive addenda/addendum email notifications and to download addenda.

The HDSB **does not** accept electronic submissions via Bids and Tenders. **All Submissions are to be submitted electronically via email to chatelaina@hdsb.ca no later than 2:00 p.m. local time in Burlington, Ontario, on February 9, 2026** as noted on the front cover of this document. Submissions submitted and/or received by any other method will be rejected unless the HDSB has instructed otherwise.

Submissions will be deemed to be officially received by the time stamp issued by the HDSB's email server. Suppliers are cautioned that the timing of their Submission is based on when the submission is received by the HDSB's email server, not when the

Submission is submitted by the Supplier, as the submission transmission can be delayed in an 'Internet Traffic Jam' due to file transfer size, transmission speed, etc.

All Submissions must be received by the HDSB's designated email address no later than the closing date and time specified in this RFP. Submissions received after the official closing time, as determined by the HDSB's email server timestamp, may be declared non-compliant and not be considered for evaluation, in the sole discretion of the HDSB. It is the sole responsibility of the Supplier to ensure that its Submission is received on time.

By submitting, the Supplier acknowledges and accepts all terms and conditions in this solicitation document and all terms and conditions outlined in the attached HDSB Standard Terms and Conditions.

5. Site Meeting

Suppliers are responsible for conducting any site examination deemed necessary by the Supplier to inform themselves fully as to the existing conditions, limitations, access, surrounding site conditions and all other conditions, and for the proper preparation of the Submission. Failure of Suppliers to familiarize themselves with site conditions will not be an allowable reason for an increase in Contract costs.

A Mandatory Site Meeting will be held on **January 22, 2026, at 10:30 a.m.** at the **main office of Kilbride Public School**, located at **6611 Panton St, Burlington, ON L7P 0L8**.

All Suppliers are required to sign in upon arrival. **Late arrivals will not be permitted to attend the mandatory site meeting** and will be disqualified from further consideration for this project. Suppliers who fail to attend and sign in at the Mandatory Site Meeting will have their submissions disqualified. No exceptions will be made for late arrivals or failure to sign in. Suppliers are responsible for ensuring timely attendance.

Where there is a mandatory site meeting(s), the HDSB, at its sole discretion, reserves the right to re-schedule a second visit, to ensure competitive submissions are received, in the event that no potential Supplier or only one potential Supplier attends the mandatory site meeting(s). Suppliers who fail to attend and register their attendance at the mandatory site meeting(s) will be disqualified from submitting a Submission..

6. Communication Protocol

All communication related to any aspect of this RFX must be conducted exclusively through the Online Bidding System.

Suppliers who fail to adhere to this communication requirement may be disqualified from further participation in this RFX process. Specifically, and without limitation, Suppliers shall not communicate or attempt to communicate regarding this RFX with:

1. Any employee, official, or agent of the Halton District School Board (HDSB), other than the designated RFX Purchasing contact; or
2. Any member of HDSB's governance, including but not limited to Trustees, the Director of Education, Superintendents, officers, or external advisors.

Suppliers are responsible for reviewing all RFX documents, including the HDSB Standard Terms and Conditions, all Appendices, and the Form of Tender. Should a Supplier identify any errors, omissions, or ambiguities, or require further clarification, such inquiries must be submitted to the RFX Purchasing contact via the Online Bidding System by the deadline specified for questions.

It is the sole responsibility of the Supplier to request clarification on any aspect of this RFX that appears unclear. The HDSB shall not be held responsible for any misunderstanding or misinterpretation by the Supplier.

If a Supplier believes there is an error, inconsistency, or ambiguity in the RFX documents, they must notify the RFX Authority via the Online Bidding System prior to submitting a response.

Where appropriate, the HDSB will issue a clarification through the Online Bidding System for the benefit of all Suppliers. Responses to inquiries will include both the question (edited for clarity if necessary and without identifying the Supplier) and the HDSB's response. The HDSB reserves the right to consolidate and respond to similar questions only once.

If a clarification results in a change to the RFX, such change will be communicated through a formal addendum issued via the Online Bidding System.

All addendum or addenda issued shall form part of this document, which forms part of the RFX. The onus is on the Supplier to verify that they have received and reviewed all addenda. Failure to acknowledge receipt of all addenda in the submission may result in disqualification.

7. Issuance of Addenda

Should the HDSB determine, for any reason, that it is necessary to provide additional information or clarification regarding this RFX, such information will be issued to all Suppliers in the form of an addendum, using the same method by which the original RFX was communicated. Each addendum will form an integral part of this RFX and shall be considered incorporated into all related documents.

This RFX may only be amended through the issuance of such addenda in accordance with this section. Amendments or clarifications issued in any other manner will not be considered binding on the HDSB.

All inquiries regarding this RFX must be submitted in writing through the Online Bidding System no later than 2:00 p.m. (local time) on January 29, 2026. Any resulting addenda will be issued no later than February 2, 2026.

It is the sole responsibility of each Supplier to ensure they have received all addenda prior to submitting their Submission.

8. Subcontractors

The General Contractor must select a subcontractor from the HDSB pre-qualified list of subcontractors attached in **Appendix G - HDSB Prequalified Subcontractors**.

The Contractor agrees to preserve and protect the rights of the parties under the contract with respect to work performed under subcontract, and shall:

- enter into contracts or written agreements with their subcontractors to require them to perform their work in accordance with and subject to the terms and conditions of the contract. Further, the Contractor shall be fully responsible to the Owner for acts and omissions of their subcontractors and of any persons directly or indirectly employed by them as for acts and omissions of persons directly employed by them.
- therefore, agree that they will incorporate the terms and conditions of the Contract Documents into all Subcontractor Agreements they enter into with their subcontractors.

The HDSB reserves the right, at its discretion to waive the requirement to utilize the mandatory list of pre-qualified sub-trades at any time during the tendering process based on market conditions.

Proposed subcontractors must be noted on the Form of Tender.

9. Submission of Required Documentation

Suppliers are required to submit all mandatory and supporting documentation as part of their response to this RFX. Failure to provide any required documentation may result in the Submission being deemed non-compliant and disqualified from further consideration. Incomplete submissions may be rejected without further review.

Required documents include, but are not limited to, the following:

- Form of Tender
- Appendix A: Declaration and Signature Sheet
- Appendix B: Supplier Attestation
- Appendix C: Procurement Restriction Policy Compliance Declaration

Suppliers must ensure that all forms are fully completed, signed by an authorized representative, and submitted in the manner and format specified in this RFX.

Optional documents include, but are not limited to, the following:

- Appendix D: Voluntary Declaration of Diverse Supplier Status (if applicable)

It is the sole responsibility of the Supplier to review all RFX documents and instructions to ensure that a complete submission is made. Incomplete submissions may be rejected without further consideration.

10. Notice of Intent Not to Submit a Bid

Suppliers who do not intend to submit a response to this RFX are requested to complete and return **Appendix E - Notice of Intent Not to Submit a Bid** form included in this RFX package.

The purpose of this form is to assist the HDSB in understanding reasons for non-participation and to help improve future procurement opportunities.

Please submit the completed form by email to **chatelaina@hdsb.ca** on or before the closing date and time indicated in this RFX.

11. HDSB Standard Terms and Conditions

All Suppliers must review the attached HDSB Standard Terms and Conditions which form an integral part of this RFX process.

All Suppliers to the HDSB will be bound by the standard terms and conditions set forth, except as specifically qualified in Special Terms and Conditions, issued in connection with any RFSQ, RFQ, RFP, RFI, Tender or any other type of request issued by the HDSB soliciting pricing and/or services, whether communicated formally or informally, including via email, phone, or verbal request.

12. Mandatory Terms for Definitive Agreements

As a condition of award, the Supplier agrees that this RFX and any Letter of Intent, Award Letter, Purchase Order, contract or other definitive agreement issued by HDSB (each, a **"Definitive Agreement"**) will incorporate and be governed by: (i) this RFX and the HDSB Standard Terms and Conditions; and (ii) the mandatory provisions set out in Appendix F (the **"Mandatory Incorporated Provisions"**).

The Mandatory Incorporated Provisions shall be included in or are deemed included in every Definitive Agreement (and prevail in the event of conflict), notwithstanding any Supplier terms, order forms, shrink-wrap/click-wrap or other documents, which are of no force or effect unless expressly accepted in writing by HDSB. Notwithstanding the foregoing, such provisions shall be interpreted and applied with such modifications, adaptations, and conforming changes as may be necessary to ensure consistency with the structure, terminology, and context of the applicable Definitive Agreement and to give full effect to the intent of the HDSB as expressed herein.

The Supplier shall flow down the Mandatory Incorporated Provisions to all permitted subcontractors and remains fully responsible for their compliance.

13. Order of Precedence

In the event of any conflict, inconsistency, ambiguity or discrepancy among the documents forming this RFX and any resulting Definitive Agreement, the documents shall take precedence in the following order, to the extent of the conflict only.

Supplier terms and conditions (including quotations, proposals, order forms, shrink-wrap/click-wrap, websites/portals) are of no force or effect unless expressly accepted by HDSB in writing and identified as prevailing.

During the RFX process (prior to award)

1. Most recent Addendum(da), in reverse chronological order.
2. Any Special Terms and Conditions or Special Instructions to Suppliers included in this RFX.
3. The main body of this RFX.
4. Appendix F – Mandatory Incorporated Provisions (notwithstanding the foregoing, Appendix F prevails over any conflicting RFX term).
5. Other Appendices and Attachments to this RFX (excluding Appendix F), including the Scope of Work/Specifications/Drawings, schedules and forms (as applicable).
6. Questions and answers/clarifications only to the extent formally issued by Addendum.
7. The Supplier's Submission (including any BAFO and any Supplier-written clarifications requested by HDSB and accepted by HDSB in writing).

After award (Definitive Agreements: PO, Letter of Intent/Award Letter, standalone contract)

1. Most recent Amendment/Change Order/Change Directive, in reverse chronological order.
2. The executed Definitive Agreement (including any schedules), or the HDSB Purchase Order (including any PO Terms), or the Letter of Intent/Award Letter (as applicable).
3. Appendix F – Mandatory Incorporated Provisions (these are deemed incorporated into every Definitive Agreement and prevail over any conflicting term).
4. The main body of this RFX (front end).
5. Special Terms and Conditions or Special Instructions to Suppliers included in this RFX (if not already incorporated above).
6. Scope of Work/Specifications/Drawings and all technical requirements.
7. Other RFX Appendices and Attachments (excluding Appendix F).

8. The Supplier's Submission (including any BAFO and any Supplier-written clarifications requested by HDSB and accepted by HDSB in writing).

Additional rules of precedence

Later-dated documents of the same tier prevail over earlier-dated documents.

Addenda prevail over any previously issued portion of the RFX they modify.

Figures govern over scaled measurements on drawings; detailed specifications govern over general; project-specific requirements govern over standard specifications.

In the case of a discrepancy between words and figures, the words govern.

Responses to questions, presentations, demonstrations or site-meeting discussions are not binding unless and only to the extent incorporated by formal Addendum or written amendment executed by HDSB.

Post-award, the executed Definitive Agreement (or PO) prevails over Appendix F except where Appendix F is expressly incorporated as a mandatory, non-variable provision and identified as prevailing in the Definitive Agreement.

Nothing in this Order of Precedence limits HDSB's rights or remedies set out in the HDSB Standard Terms and Conditions.

SCOPE OF WORK AND DELIVERABLES

Includes the following:

- Specifications - Kilbride Elementary School Renovation (685 pages)
- Finishing Hardware Schedule (15 pages)
- Drawings (34 pages)



SPECIFICATIONS

Kilbride Elementary School Renovation

6611 Panton St,
Burlington, ON L7P 0L8

Prepared for



+VG ARCHITECTS

The Ventin Group Limited
50 Dalhousie Street,
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Division	Section Title
0	00000 Cover 00010 List of Contents 00015 List of Drawings
1	GENERAL REQUIREMENTS 01010 General Requirements 01015 General Work - 01016 Products 01020 Cash Allowances 01045 Cutting and Patching 01300 Submittals 01301 Architect's Scheduled Inspections & Approvals 01304 Interference Drawings 01310 Construction Schedules 01410 Inspection and Testing Laboratory Services 01500 Substitutions 01545 Safety Requirements 01560 Environmental Protection 01700 Contract Close Out 01710 Cleaning and Dust Control Measures 01800 Architects Administrative Forms 01805 Architect's Contract Administration System Software 00840 Hazardous Materials 02281 Abatement Specifications
2	SITE WORK 02215 Earthwork – Below Paving, Sidewalks & Landscaping 02225 Selective Demolition 02300 Excavating Trenching Backfilling 02281 Abatement
3	CONCRETE 03100 Concrete Formwork & Accessories 03200 Concrete Reinforcement 03300 Cast-In-Place Concrete 03345 Concrete Finishing 03412 Precast Prestressed Concrete 03450 Architectural Precast
4	MASONRY 04050 Masonry Procedures 04100 Mortar 04120 Masonry Mortar

Division	Section	Title
	04150	Masonry Accessories
	04200	Unit Masonry
	04210	Masonry Supply
	04500	Masonry Procedures
	04510	Masonry Accessories
	04520	Masonry Restoration
	04530	Masonry Cleaning
5	METALS, STRUCTURAL & MISCELLANEOUS	
	05120	Structural Steel
	05300	Steel Deck
	05500	Miscellaneous Metals
	08110	Hollow Metal
6	WOODWORKS	
	06100	Rough Carpentry
	06200	Finish Carpentry
	06400	Architectural Woodworks
7	MOISTURE PROTECTION	
	07195	Air-Vapour Barrier System
	07211	Rigid Insulation
	07213	Mineral Fiber Insulation
	07461	Aluminum Architectural Composite Panel System
	07465	Preformed Metal Siding
	07520	2 Ply Modified Bitumen Roofing
8	DOORS, GLASS AND WINDOWS	
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	08800	Glass and Glazing
	08400	Aluminum Entrance Doors, Frames, & Screens
9	FINISHES	
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	09110	Metal Stud & Ceiling
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Division	Section Title
10	SPECIALTIES 10800 Washroom Accessories
11	EQUIPMENT
12	FURNISHINGS 12522 Manually Operated Rolling Shades
13	SPECIAL CONSTRUCTION – N/A
14	CONVEYING SYSTEMS
20	COMMON REQUIREMENTS FOR MECHANICAL

Division 21 – General/Fire Suppression

21 00 01 Mechanical Drawing List
21 05 01 Common Work Results for Mechanical

Division 22 – Plumbing

22 10 00 Plumbing Piping
22 42 01 Plumbing Specialties
22 42 02 Plumbing Fixtures
22 47 00 Pumps

Division 23 – Heating, Ventilating & Air Conditioning (HVAC)

23 05 16 Piping Expansion Compensation
23 05 19 Gauges & Meters
23 05 29 Supports & Anchors
23 05 48 Vibration Isolation
23 05 53 Mechanical Identification
23 05 93 Testing, Adjusting, & Balancing
23 07 16 Equipment Insulation
23 07 19 Piping Insulation
23 21 00 Hydronic Piping
23 21 16 Hydronic Specialties
23 25 00 Chemical Treatment for New Piping
23 31 00 Duct Work
23 33 00 Duct Work Accessories
23 37 00 Air Outlets & Inlets
23 52 39 Boilers - Condensing

Division 25 – Integrated Automation

Division	Section	Title

	25 90 00	Sequences of Operation

Division 26 – Electrical

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	26 05 19	Low Voltage Cables
	26 05 19_01	Appendix to Low Voltage Cables
	26 05 26	Grounding and Bonding
	26 05 48	Vibration Isolation and Seismic Restraints
	26 05 70	Electrical Work Analysis and Testing
	26 09 00	Lighting Control
	26 27 26	Wiring Devices
	26 28 00	Low Voltage Circuit Protective Devices
	26 50 00	Lighting

Division 27 – Communications

	27 51 25	Emergency Call

Division 28 – Electronic Safety & Security

	28 31 00	Existing Fire Alarm Work

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APPENDIXES

- HAZARDOUS BUILDING MATERIALS ASSESSMENT Kilbride Renovations HDSB April 14 2025
- HARDWARE SCHEDULE Kilbride PS Reno 2025 HDSB

END OF SECTION

ARCHITECTURAL

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D2.1	DEMOLITION FLOOR PLAN
A2.1	FLOOR PLAN
A3.1	DEMOLITION AND RENOVATION SOUTH ELEVATION
A4.1	ENLARGED DETAILS - VESTIBULE DOOR 1
A4.1.1	VESTIBULE DISPLAY CABINET
A4.2	ENLARGED DETAILS - VESTIBULE DOOR 2
A4.3	ENLARGED DETAILS - VESTIBULE DOOR 3
A4.4	ENLARGED DETAILS - VESTIBULE DOOR 11
A4.5	CANOPY DEMOLITION, FLOOR, ROOF, RCP AND BELOW SLAB INSULATION PLANS
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S1.1	STRUCTURAL NOTES
S2.1	CANOPY STRUCTURAL PLAN AND DETAILS

MECHANICAL

M0.0	MECHANICAL LEGEND, DRAWING LIST AND KEY PLAN
M1.0	PARTIAL FLOOR PLAN - UNIVERSAL WASHROOM - DEMOLITION PLAN
M1.1	PARTIAL FLOOR PLAN - BOILER ROOM - MECHANICAL - DEMOLITION PLAN
M2.0	PARTIAL FLOOR PLAN UNIVERSAL WASHROOM NEW PLANS
M2.1	PARTIAL FLOOR PLAN BOILER ROOM MECHANICAL NEW PLAN
M3.0	MECHANICAL SCHEMATICS
M4.0	MECHANICAL CANOPY AND DETAILS
ME1.0	MECHANICAL AND ELECTRICAL SCHEDULES

ELECTRICAL

E0.0	ELECTRICAL LEGEND, DRAWING LIST AND KEY PLAN
E1.0	PARTIAL FLOOR PLAN - UNIVERSAL WASHROOM - DEMOLITION PLAN
E1.1	PARTIAL FLOOR PLAN BOILER ROOM MECHANICAL DEMOLITION PLAN
E2.0	PARTIAL FLOOR PLAN - PARTIAL FLOOR PLAN - UNIVERSAL WASHROOM - NEW PLANS
E2.1	PARTIAL FLOOR PLAN - BOILER ROOM - MECHANICAL- NEW PLAN B
E3.1	DOOR HARDWARE DEMOLITION & PROPOSED PLAN
E4.0	CANOPY LIGHTING PLANS & DETAILS

END OF SECTION

PART 1 GENERAL

1.1 REPORTS

1. Refer to the attached report **Hazardous Building Materials Assessment(Pre-construction) Kilbride Public School 6611 Panton Street, Burlington, Ontario** dated **April 14, 2025** as prepared by **PINCHIN** for the **Halton District School Board**.
2. The information given in this report was obtained for the use of the Owner in the execution of the design. It is presented in good faith to assist the Contractors and their sub-trades.
3. It is incumbent upon the Contractors to make whatever additional materials investigation they feel may be required for the proper execution of the Contract at no additional cost to the Owner.

1.2 SCOPE OF WORK

1. The work of asbestos abatement is part of the Base Contract. Refer to reports referenced herein for scope and procedures.
2. The extent of abatement is limited to only those parts of the building in which the Work of this Contract (renovation) is being done. Coordinate between the drawings and the reports references herein to determine the exact scope.
3. Any areas discovered during construction requiring abatement which are not indicated within the attached report(s) will be completed as part of a cash allowance.
4. The methods and procedures for the Work of this section shall as per the enclosed report(s) and as required by National, Provincial and Local regulations.

1.1 SITE CONDITIONS

1. Examine the conditions on the site, present site conditions. Not all Asbestos or lead containing materials are indicated on the drawings. Always refer to the attached report for confirmation before demolition.

1.2 AWARENESS OF HAZARDOUS MATERIALS

1. Each Contractor shall be constantly aware of the possible discovery of additional unknown hazardous materials. Should the Contractor encounter any hazardous material or suspected hazardous material, the Contractor shall immediately stop work in the area affected and report the condition to the Architect.
2. If the Contractor encounters any additional unknown hazardous material or suspected hazardous material, the Contractor agrees to immediately initiate the required procedures of the Canadian Environmental Protection Act, 1999, and/or federal or provincial agencies having jurisdiction to protect any and all persons exposed to the affected areas

or areas affected thereby.

3. Upon written notification by the Contractor to the Architect, the Contractor will engage an industrial hygienist to sample and test the suspected hazardous material.
 1. Should the test prove negative, and proper clearance obtained from the industrial hygienist, the work will then proceed
 2. Should the test prove positive, the work will be put on hold and the Contractor will conduct corrective measures and/or disposal program in accordance with applicable laws and regulations.
4. The work in affected areas shall not be resumed until the Contractor has separately arranged for the hazardous material to be removed or rendered harmless, and the hazardous material is removed or rendered harmless in accordance with all applicable laws and regulations, and has been certified safe by appropriate authorities.
5. Each Contractor and/or Subcontractor shall be responsible to inform all of its employees on the site of the provisions in these paragraphs. Instruct each employee of the jobsite procedures in reporting any and all suspected materials.
6. Absolutely no material will be allowed on site that does not have a manufacturer's label stating contents.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Related work specified elsewhere:
 - .1 Section 02 82 00.01 Asbestos Abatement – Type 1 Procedures
 - .2 Section 02 82 00.02 Asbestos Abatement – Type 2 Procedures
 - .3 Section 02 82 00.04 Asbestos Abatement – Type 2 Glove Bag Method
 - .4 Section 02 83 10 Lead Abatement – Class 1 Procedures
 - .5 Section 02 83 11 Lead Abatement – Class 2 Procedures
 - .6 Section 02 84 00 Non-Liquid Polychlorinated Biphenyl Abatement
- .3 Site Conditions identifies all known hazardous building materials within the Project Area. The information provided is for general reference only. Each Contractor must confirm existing conditions on site prior to tender close.
 - .1 The specification fulfils the requirements of Section 30 of the Ontario Occupational Health and Safety Act.
 - .2 The specification fulfils the requirements of the Section 10 of Ontario Regulation 278/05.
- .4 The Outline of Work identifies the location, condition and quantities of hazardous building materials to be removed as part of this project.
 - .1 It is the intent that work prescribed this Section will result in the removal of all hazardous materials as outlined and the decontamination of all surfaces or materials which may have been or become contaminated by hazardous materials either during or prior to work of this Contract.

1.2 Site Conditions

- .1 Refer to the report entitled “Hazardous Building Materials Assessment (Pre-construction), 6611 Pantan Street, Burlington, Ontario”, dated April 14, 2025, prepared by Pinchin Ltd., file number 352316.001.

1.3 Outline of Work

- .1 Coordinate the following items with the Owner's Project Manager and the Construction Manager, which are to be included in the Abatement Contractor's scope of work, including but not limited to: electrical isolations, GFI connection, water connections, HVAC and exhaust ventilation system isolation, bin placement, schedule, disconnects, etc.
- .2 Refer to the Contract Drawings for the extent of construction work, Work Areas, phasing and schedule.
- .3 Install Hoarding Walls between Abatement Work Areas and Occupied Areas as required.
- .4 Using Type 1 procedures prescribed in the Section identified in Related Work, perform the following work:
 - .1 Remove and dispose of asbestos-containing vinyl floor tiles, and non asbestos-containing vinyl floor tiles with asbestos-containing mastic where flooring is scheduled to be removed.
 - .1 Include to remove vinyl floor tiles where present under millwork and/or inside radiators where scheduled to be removed.
 - .2 Remove fasteners from partitions, millwork, and other items scheduled for demolition, where they are attached to flooring with asbestos-containing vinyl floor tiles and/or mastic. If removal using hand-held non-powered tools is not feasible, follow Type 2 procedures outlined in Section 02 82 00.02 and use power tools equipped with an effective HEPA dust collection device
 - .1 Clean up vermiculite debris using Type 2 asbestos procedures as prescribed in Section 02 82 00.02 and seal openings where vermiculite is discovered during work.
 - .3 Remove and dispose of asbestos-containing vinyl floor tiles where not scheduled to be removed but may be disturbed by demolition and/or new installation.
 - .2 Remove and dispose of sinks with asbestos-containing gold mastic, where scheduled to be removed.
 - .3 Remove and dispose of doors, door frames, and/or windows with asbestos-containing caulking/putty in the 1984 era of construction where scheduled to be removed.
 - .1 Remove caulking completely from substrate.
 - .2 Dispose of entire door with asbestos-containing putty in windows as asbestos waste where caulking/putty cannot be removed.
 - .4 Remove and dispose of mastic behind chalkboards/tackboards where scheduled to be removed.
 - .1 Remove mastic completely from substrate.

- .5 Remove and dispose of presumed asbestos-containing roofing above Door #1 as required for the new canopy tie-ins, and above the Boiler Room as required for new openings. Removal is to be done using non powered hand tools.
 - .1 Use Type 2 asbestos procedures, as outlined in Section 02 82 00.02, if removal is done using power tools equipped with HEPA filtered dust collection devices.
- .5 Using Type 2 procedures prescribed in the Section identified in Related Work, remove and dispose of asbestos-containing vinyl floor tile mastic using power tools/machines equipped with a HEPA filtered dust collection device. Site isolation is to include visual barrier comprised of rip-proof polyethylene sheeting, where necessary and where occupants are present.
- .6 Using Type 2 procedures prescribed in the Section identified in Related Work, remove/install items affixed to concrete block walls in the 1959 and 1967 eras of construction where asbestos-containing vermiculite is present within block wall cavities using power tools/machines equipped with a HEPA filtered dust collection device. Site isolation is to include visual barrier comprised of rip-proof polyethylene sheeting, where necessary and where occupants are present.
- .7 Using Type 2 procedures (with full enclosure) prescribed in the Section identified in Related Work, perform the following work in the 1959 and 1967 eras of construction:
 - .1 Remove and dispose of concrete block walls where scheduled for removal.
 - .2 Create openings in concrete block walls as required for wall penetrations.
 - .3 Remove canopy supports affixed to exterior walls.
 - .4 Remove and dispose of four courses of exterior brick from the foundation, where scheduled to be removed.
 - .5 Clean-up vermiculite where encountered during removal work. Install roxul insulation and spray paint red all openings to prevent further vermiculite release.
- .8 Using Type 2 procedures prescribed in the Section identified in Related Work (with a full interior and exterior enclosure), perform the following work in the 1959 era of construction:
 - .1 Remove doors, door frames, windows, window frames, spandrel panels etc. with asbestos-containing caulking/putty where scheduled to be removed.
 - .1 Remove caulking completely from substrate.
 - .2 Dispose of doors with asbestos-containing putty as asbestos waste where caulking/putty cannot be removed.
 - .3 Remove transite panels (ex. board/fascia at Door #1) where scheduled to be removed.
 - .4 Clean-up vermiculite where encountered during removal. Install roxul insulation and spray paint red all openings to prevent further vermiculite release.

- .9 Using Type 2 procedures (with a full interior and exterior enclosure), prescribed in the Section identified in Related Work, remove and dispose of asbestos-containing textured plaster soffit at Door #3 in the 1967 era of construction.
 - .1 Remove all overspray on decking, ducts, light fixture openings and junction boxes.
 - .2 Remove all pipe insulation where present above the soffit.
- .10 Using Type 2 procedures prescribed in the Section identified in Related Work (with a full interior and exterior enclosure), and in conjunction with PCB procedures, perform the following work in the 1967 eras of construction:
 - .1 Remove doors and door frames with asbestos and PCB-containing caulking where scheduled to be removed.
 - .1 Remove caulking completely from substrate and dispose of as PCB waste.
 - .2 Dispose of doors with asbestos-containing putty as asbestos waste.
 - .3 Clean-up vermiculite where encountered during removal. Install roxul insulation and spray paint red all openings to prevent further vermiculite release.
- .11 Using Glove-Bag procedures prescribed in the Section identified in Related Work, remove and dispose of asbestos-containing pipe insulation where scheduled to be removed, as required for mechanical tie-ins, and/or where present above vestibule ceilings scheduled for removal. Allow for 50 fittings and 200 linear feet of pipe insulation on straight sections throughout Work Areas where present above ceiling tiles.
 - .1 If for reasons of pipe geometry or access, Glove Bag procedures cannot be used, remove and dispose of asbestos-containing insulations as per Section 02 82 11 for less than 1 square meter, or following Type 3 procedures in accordance with Ontario Regulation 278/05 for greater than 1 square meter.
- .12 Follow lead procedures prescribed in the Sections identified in Related Work, to perform the following work:
 - .1 Disturbance of lead-containing paint on walls, floors, and piping within the Boiler Room.
 - .2 Demolition of block walls with lead-containing paint in the 1967 era of construction.
 - .3 Removal of exterior canopy beams and decking with lead-containing paint.
 - .4 Any other operation that may disturb lead paint.
- .13 Follow silica procedures prescribed in the MOL Silica on Construction Projects Guidelines when disturbing silica-containing materials.

- .14 Refer to Specification Sections identified in the Related Work for specified personnel protective measures for the safe handling, removal, clean-up, enclosure, or repair of hazardous materials in each phase or work area.
- .15 Visit the site prior to tender close to confirm the location and extent of any hazardous building materials or materials contaminated by hazardous materials.
- .16 Protect surfaces, building fabrics and items remaining within the Abatement Work Area.
- .17 Without disturbing hazardous materials, perform removals where required, prior to abatement work.
 - .1 Maximize waste diversion by use of resale of building materials, or recycling.
- .18 Isolate the Abatement Work Area from adjoining Occupied and Non-Occupied Areas whether present at an interior or exterior location.
- .19 Maintain emergency and fire exits from Abatement Work Area, or establish alternative exits satisfactory to Provincial Fire Marshall and local authorities having jurisdiction. Maintain extra routes from occupied areas. Place emergency exit signs at locations to clearly mark exit route. Seal emergency exit doors so as not to impede use of door during emergency evacuation.
- .20 Remove, clean, store and replace at completion of work, non-operating mechanical and electrical equipment, ducts, building components, materials or items removed to accommodate asbestos removal.
- .21 Remove and dispose of as appropriate waste, building components, materials and items contaminated by hazardous materials that cannot be effectively cleaned.
- .22 Encapsulate remaining hazardous materials at locations where removal is deemed impractical by the Abatement Consultant.
- .23 Encapsulation will not be permitted where removal of building materials or structures scheduled for demolition will facilitate access to the asbestos materials in question.
- .24 Final clean work area to remove visible signs of asbestos and other hazardous materials, other debris or settled dust.
- .25 Apply lock-down agent to exposed surfaces throughout the work area and to surfaces from which any hazardous materials have been removed.
 - .1 Do not apply lock-down to materials which would be damaged by its application.
- .26 Unless otherwise specified, the handling, removal, clean-up or repair of hazardous materials or surfaces contaminated with hazardous materials is to be performed following wet removal techniques.

1.4 Schedule

- .1 Provide necessary manpower, supervision, equipment and materials to maintain and complete the project on schedule.
- .2 Work Hours:
 - .1 Coordinate all work, scheduling and phasing with the Owner.
 - .2 Duration for which HVAC systems may remain shutdown to accommodate quiet hours work will vary in accordance with outside weather conditions and internal demand. Duration of quiet hours work will have to be scheduled accordingly and in consultation with the Abatement Consultant and Owner.
- .3 Provide 48 hours written notice to the Abatement Consultant of any request to work outside normal working hours. Obtain written approval before proceeding.

1.5 Definitions

- .1 Abatement Consultant: Owner's Representative providing inspection and air monitoring.
- .2 Abatement Contractor: Contractor or sub-contractor performing work of this section.
- .3 Abatement Work Area: Area where work takes place which will, or may, disturb hazardous materials.
- .4 Amended Water: Water with wetting agent added for the purpose of reducing surface tension to allow thorough wetting of materials.
- .5 Asbestos: Any of the fibrous silicates defined in Regulation 278/05 including: actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite.
- .6 Asbestos-Containing Material (ACM): Material identified under Site Conditions including any debris, overspray, fallen material and settled dust.
- .7 Authorized Visitors: Building Owner, Abatement Consultant, or designated representative, and persons representing regulatory agencies.
- .8 Competent Worker: A worker who is qualified because of knowledge, training and experience to perform the work, is familiar with Regulation 278/05 and the Occupational Health and Safety Act, and has knowledge of the potential or actual danger to health and safety in the work.
- .9 Contaminated Waste: Material identified under Site Conditions, including fallen material, settled dust, other debris and materials or equipment deemed to be contaminated by the Abatement Consultant.
- .10 Curtained Doorway: Doorway consisting of two (2) overlapping flaps of rip-proof polyethylene arranged to permit ingress and egress from one room to another while permitting minimal air movement between rooms.

- .11 DOP Test: A testing method used to determine the integrity of the Negative Pressure unit or vacuum using a Dispersed Oil Particulate (DOP) or Poly Alpha Olefin (PAO) HEPA filter leak test. This test is to be conducted on site where units are to be installed. Refer to the Environmental Abatement Council of Canada (EACC) DOP/PAO Testing Guideline 2013 or ANSI/ASME N510-2007.
- .12 Fitting: Individual segments or pieces of a mechanical service line which may include but is not limited to the hangers, tees, elbows, joints, valves, unions, etc.
- .13 Friable Material: Material that when dry can be crumbled, pulverized or powdered by hand pressure and includes such material that is crumbled, pulverized or powdered.
- .14 HEPA: High Efficiency Particulate Aerosol filter that is at least 99.97 percent efficient in collecting a 0.3 micrometre aerosol.
- .15 Lead-Containing: The Ontario Ministry of Labour (MOL) has not established a lower limit for concentrations of lead in paint, below which precautions do not need to be considered during construction projects. Pinchin follows the recommendations of the Environmental Abatement Council of Canada (EACC) Lead Guideline for Construction, Renovation, Maintenance or Repair. The Guideline suggests that 0.1% (1,000 ppm) lead in paint represents a de minimis concentration of lead in paint for construction hygiene purposes, that is a concentration below which the lead content is not the limiting hazard in any disturbance of leaded paint for non-aggressive disturbance of painted finishes, (hand powered demolition, chipping, scraping, light sanding, etc.).
- .16 Lead Waste: Waste generated from removal of lead-containing materials, or the substrate and paint finish where left intact.
- .17 Milestone Inspection: Inspection of the Abatement Work Area at a defined point in the abatement operation.
- .18 Negative Pressure: A reduced pressure within the Abatement Work Area (> 0.02 inches of water column) established by extracting air directly from Abatement Work Area and discharging it to exterior of building.
- .19 Non-Friable Material: Material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
- .20 Occupied Area: Any area of the building or adjoining space outside the Abatement Work Area.
- .21 Personnel: All Contractor's employees, sub-contractors employees, supervisors.
- .22 PCB Material: means solid material containing PCBs at a concentration of more than fifty milligrams per kilogram (mg/kg) or 50 parts per million (ppm), or liquid with greater than 2 mg/kg or ppm.
- .23 PCB Waste: PCB Equipment, PCB Material, PCB Liquids and materials or items contaminated with PCBs.

- .24 PCM: Phase Contrast Microscopy.
- .25 Remove: Remove means remove and dispose of (as applicable type of waste) unless followed by other instruction (e.g. remove and turn over to Owner).
- .26 TEM: Transmission Electron Microscopy.

1.6 Regulations and Guidelines

- .1 Comply with Provincial, and local requirements, provided that in any case of conflict among those requirements or with these Specifications, the more stringent requirements shall apply. Work shall be performed under regulations in effect at the time work is performed.
- .2 Where regulations are not present, follow accepted industry standards and applicable Guideline documents.
- .3 Regulations include but are not limited to the following:
 - .1 Ministry of Labour, Immigration, Training, and Skills Development R.S.O. 1990, c. O.1 Occupational Health and Safety Act and its regulations, including:
 - .1 Ontario Regulation 278/05 – Asbestos on Construction and in Buildings and Repair Operations
 - .2 Ontario Regulation 213/91 – Construction Projects
 - .2 Waste Management regulation R.R.O. 1990, Reg. 347 as amended under the Environmental Protection Act.
 - .3 PCB Regulations, SOR 2008-273 and R.R.O. 1990, Reg 362.
 - .4 Environmental Abatement Council of Canada (EACC), Lead Guideline For Construction, Renovation, Maintenance or Repair, October 2014.
 - .5 Ministry of Labour, Guideline, Silica on Construction Projects, 2011.

1.7 Quality Assurance

- .1 Removal and handling of hazardous materials is to be performed by persons trained in the methods, procedures and industry practices for Abatement.
- .2 Ensure work proceeds to schedule, meeting all requirements of this Specification.
- .3 Complete work so that at no time airborne dust, visible debris, or water runoff contaminate areas outside the Abatement Work Area.
- .4 Any contamination of surrounding area (indicated by visual inspection or air monitoring) shall necessitate the clean-up of affected area, and in the same manner applicable to an Abatement Work Area at no cost to the Owner.
- .5 All work involving electrical, mechanical, carpentry, glazing, etc., shall be performed by licensed persons experienced and qualified for the work required.

1.8 Supervision

- .1 Provide on site for each work shift, a Shift Superintendent(s), who has authority regarding all aspects related to manpower, equipment and production.
- .2 Supervisory personnel must hold a recognized certificate proving attendance at an asbestos removal training course (2 day minimum duration) and have performed supervisory functions on at least five (5) other asbestos abatement projects of similar size and complexity.
- .3 At all times during work, the Shift Superintendent(s) must be on site. Failure to comply with this requirement will result in a stoppage of all work, at no cost to the Owner.
- .4 Replace supervisory personnel, with approved replacements, within three (3) working days of a written request from the Owner. Owner reserves the right to request replacement of supervisory personnel without explanation.
- .5 Do not replace supervisory personnel without written approval from the Owner.

1.9 Instruction and Training

- .1 Instruction and training must be provided by a competent person.
- .2 All workers completing Type 1, 2 or 3 asbestos abatement must be trained in compliance with Section 19 of O.Reg. 278/05.
 - .1 For Type 3 asbestos abatement, workers must be trained and certified per Section 20 of O.Reg. 278/05.
- .3 All workers completing lead, silica, or PCB work must be trained to perform the work.

1.10 Notification

- .1 Before commencing work, notify orally and in writing, an inspector at the office of the Ontario MLITSD nearest the project site, where required.
- .2 Inform all trades on site of the presence and location of hazardous materials identified in the Contract documents.
- .3 Notify the Owner or Owner's Representative, the Joint Occupational Health and Safety Committee and the Provincial Ministry of Labour, if suspected asbestos-containing materials not identified in the contract documents are discovered during the course of the work. Stop work in these areas immediately.
- .4 Notify Sanitary Landfill site as per O.Reg. 347/90 as amended.

1.11 Submittals

- .1 Submit prior to starting work:
 - .1 Workplace Safety and Insurance Board Clearance Certificate.

- .2 Insurance certificates.
 - .3 Copy of Company Health and Safety Policy and applicable programs.
 - .4 Ontario MLITSD Notice of Project form and/or Notice of Asbestos Removal Work Form.
 - .5 Copy of Certificate of Approval for disposal of asbestos waste.
 - .1 If transporting asbestos waste in bulk, copy of environmental compliance approval for a waste management system authorizing the transportation of asbestos waste in bulk.
 - .6 Pre-removal damage survey of the Abatement Work Area(s), waste transport routes, and bin storage areas.
- .2 Submit the following information regarding personnel prior to starting work:
- .1 Proof in the form of a certificate that supervisory personnel have attended a training course on asbestos removal or are certified as supervisors as an Asbestos Abatement Supervisor (AAS) under the Ministry of Training, Colleges and Universities.
 - .2 Written statement that personnel have had instruction on hazards of exposure to hazardous materials identified within this scope, the use of respirator, protective clothing, worker and waste decontamination procedures, and all aspects of work procedures and protective measures.
 - .3 WHMIS training certificates for all personnel.
 - .4 Certificate proving that each worker on site has been fit tested for the respirator appropriate for the work being performed.
 - .5 Proof of training for the following site-specific hazards or conditions identified:
 - .1 Lead Worker Training
 - .2 PCB Worker Training
- .3 Submit the following information regarding HEPA filtered devices prior to construction of enclosure or asbestos abatement:
- .1 Performance data on HEPA filtered vacuums including DOP tests no more than 3 months old.
 - .2 Performance data on negative air units including DOP tests which must be no more than 3 months old if the unit is vented outdoors or which must be performed on site immediately prior to initial usage and when HEPA filters are changed if the unit is vented indoors.
 - .3 DOP tests to be performed by an independent testing company.
 - .1 DOP testing company is required to submit a detailed technical report of testing protocol, including Introduction, Methodology, Results,

- Conclusions, and Recommendations, including results of the Air-Aerosol Mixing Uniformity test as per ASME N510-1989 (1995).
- .2 DOP testing company must also provide calibration certificates from an independent calibration firm or from the manufacturer of the testing equipment for both the aerosol photometer and the pressure gauge on the aerosol generator dated within 1 calendar year from the on-site testing date.
 - .3 DOP testing company must also provide the National Sanitation Foundation (NSF) certification name and number of the on-site technician performing the testing.
 - .4 Proof of calibration of DOP testing equipment.
 - .4 Submit the following prior to isolating the work area:
 - .1 Safety Data Sheets for chemicals or material used in the course of the Abatement Project.
 - .5 Submit the following upon completion of the work.
 - .1 Manifests, waybills, bills of lading etc. as applicable for each type of waste.

1.12 Insurance

- .1 Maintain a Commercial General Liability Policy with an insurance company acceptable to the Halton District School Board and the General Contractor. The intent of this policy is to hold the Halton District School Board and the General Contractor harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Commercial General Liability insurance shall be provided on an “occurrence” basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period.
- .2 Maintain an Automobile or Fleet Policy, and Non-owned Automobile Policy with an insurance company acceptable to the Halton District School Board and the General Contractor. The intent of these policies is to hold the Halton District School Board and the General Contractor harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract.
- .3 Maintain a Pollution Liability Policy (or asbestos/lead liability policy or specific coverage under the CGL for asbestos/lead abatement) with an insurance company acceptable to the Halton District School Board and the General Contractor. The intent of this policy is to hold the Halton District School Board and the General Contractor harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Pollution Liability shall be provided on an “occurrence” basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period. Without limiting the generality of the foregoing, the policy shall insure the operations of abatement and shall not contain any environmental and/or health hazard exclusions relating to remediation operations.

- .4 Forward all certificates to the Halton District School Board and the General Contractor before work is commenced, showing the Halton District School Board and the General Contractor as additional insured as their interest may appear.
- .5 the Halton District School Board and the General Contractor may request a certified true copy of the policies.
- .6 The limits will not be less than:
 - .1 Commercial General Liability \$5,000,000.00
 - .2 Automobile \$2,000,000.00
 - .3 Pollution Policy \$5,000,000.00

1.13 Inspection

- .1 From commencement of work until completion of clean-up operations, the Abatement Consultant is empowered by the Owner to inspect for compliance with the requirements of governing authorities, adherence to specified procedures and materials, and to inspect for final cleanliness and completion.
- .2 The Abatement Consultant is empowered by the Owner to order a shutdown of work when leakage of asbestos from the controlled work area has occurred or is likely to occur.
- .3 Any deviation from the requirements of the Specifications or governing authorities that is not approved in writing may result in a stoppage of work, at no cost to the Owner.
- .4 Additional labour or materials expended by the Contractor to rectify unsatisfactory conditions and to provide performance to the level specified shall be at no additional cost to the Owner.
- .5 Inspection and air monitoring performed as a result of Contractor's failure to perform satisfactorily regarding quality, safety, or schedule, shall be back-charged to the Contractor.
- .6 Facilitate inspection and provide access as necessary. Make good work disturbed by inspection and testing at no cost to the Owner.
- .7 Refer to the Sections identified in Related Work for specified milestone inspections which are to take place at defined points throughout the abatement operation specific to each phase or work area.
- .8 Provide 24 hours written notice to the Abatement Consultant of any request for scheduling of milestone inspections or transportation of waste through Occupied Areas.
- .9 The following Milestone Inspections may take place, at the Owner's cost, as outlined in each related specification:
 - .1 Milestone Inspection - Clean Site Preparation

- .1 Inspection of preparations and set-up prior to contaminated work in the Abatement Work Area.
- .2 Milestone Inspection – Bulk Removal Inspection
 - .1 Inspection during asbestos removal, monitoring removal methods, site deficiencies, performing occupied air monitoring, etc.
- .3 Milestone Inspection - Visual Clearance
 - .1 Inspection of Abatement Work Area after completion of all abatement, but prior to application of lock-down agents or dismantling of enclosure.
- .10 Refer to the Sections identified in Related Work for specified milestone inspections which are to take place at defined points throughout the abatement operation specific to each phase or work area.
- .11 Do not proceed with next phase of work until written approval of each milestone is received from the Abatement Consultant.

1.14 Air Monitoring - Asbestos

- .1 Air monitoring will be performed using Phase Contrast Microscopy (PCM) following the National Institute for Occupational Safety and Health Method 7400.
- .2 Co-operate in the collection of air samples, including providing workers to wear sample pumps for up to full-shift periods. Contractor will be responsible for the cost of testing equipment repairs or resampling resulting from the actions of the Contractor's forces.
- .3 Results of PCM samples at or exceeding 0.05 fibres per cubic centimeter of air (fibre/cc) or greater, outside an Abatement Work Area, or from within the Abatement Work Area during or following Glove Bag Work, will indicate asbestos contamination of these areas. Respond as follows:
 - .1 Suspend work within the adjoining Abatement Work Area until written authorization to resume work has been received from the Abatement Consultant.
 - .2 Isolate and clean area in the same manner applicable to the Abatement Work Area.
 - .3 Maintain work area isolation, and repeat clean-up operations until visual inspection and air monitoring results are at a level equal to that specified.
 - .4 At the discretion of the Abatement Consultant provide additional negative air units at locations specified in response to elevated fibre levels being detected in the Clean Change Room or Occupied Areas.
- .4 Results of PCM samples at or greater than 0.01 fibres per cubic centimeter of air (fibre/cc), collected within the Abatement Work Area enclosure after the site has passed a visual inspection, and an acceptable coat of lock-down agent has been applied, will indicate asbestos contamination of these areas. Respond as follows:

- .1 Maintain work area isolation and re-clean entire work area. Then apply another acceptable coat of lock-down agent to exposed surfaces throughout the work area.
- .2 Repeat above measures until visually inspected and air monitoring results are at a level equal to that specified
- .3 Alternate to items above, the Asbestos Abatement Contractor can pay for analysis of PCM samples by Transmission Electron Microscopy (TEM) at NVLAP accredited laboratory.
 - .1 Enclosure to remain sealed, with negative pressure maintained, and subject to required daily inspections until TEM results are received.
- .5 Additional labour or materials expended by the Contractor to rectify unsatisfactory conditions and to provide performance to the level specified shall be at no additional cost to the Owner.
- .6 Cost of additional inspection and sampling performed as a result of elevated fibre levels in areas outside the Abatement Work Area or from within the work area following completion of work, will be back-charged to the Contractor.

1.15 Worker Protection

- .1 Instruct workers before allowing entry to the Abatement Work Area. Instruction shall include training in use of respirators, dress, showering, entry and exiting from an Abatement Work Area, and all other aspects of work procedures and protective measures.
- .2 Workers shall not eat, drink, chew gum or tobacco, vape or smoke in the Abatement Work Area.
- .3 Workers shall be fully protected at all times when possibility of disturbance of hazardous materials exists.
- .4 Provide soap, towels and facilities for washing of hands and face, which shall be used by all personnel when leaving the Abatement Work Area.
- .5 Respiratory Protection
 - .1 Refer to each particular Section of the Specification for specified type of respiratory equipment specific to each phase or work area.
 - .2 Respirators shall be:
 - .1 Certified by the National Institute of Occupational Safety and Health (NIOSH) or other testing agency acceptable to the Ministry of Labour.
 - .2 Fitted so that there is an effective seal between the respirator and the worker's face. Ensure that no person required to enter an Abatement Work Area has facial hair which affects the seal between respirator and face.
 - .3 Assigned to a worker for their exclusive use.
 - .4 Maintained in accordance with manufacturer's specifications.
 - .5 Cleaned, disinfected and inspected by a competent person after use on

- each shift, or more often if required.
- .6 Repaired or have damaged or deteriorated parts replaced.
- .7 Stored in a clean and sanitary location.
- .8 Provided with new filters as necessary, according to manufacturer's instructions.
- .9 Worn by personnel who have been fit checked by qualitative or quantitative fit-testing.
- .10 Instruction on proper use of respirators must be provided by a competent person as defined by the Occupational Health and Safety Act.
- .3 Provide protective clothing, to all personnel which:
 - .1 Is made of a material that does not readily retain nor permit penetration of asbestos fibres or lead/silica dust.
 - .2 Consists of head covering and full body covering that fits snugly at the ankles, wrists and neck.
 - .3 Once coveralls are worn, treat and dispose of as contaminated waste.
 - .4 Is replaced or repaired if torn or ripped.
- .4 Use hard hats, safety footwear and other protective equipment and apparel required by applicable construction safety regulations.

1.16 Visitor Protection

- .1 Provide clean protective clothing and equipment to Authorized Visitors.
- .2 Instruct Authorized Visitors in the use of protective clothing and Abatement Work Area entry and exit procedures.
- .3 Authorized visitors are required to be fit tested on respirators, prior to entering Abatement Work Area.
 - .1 Respirator worn must be compliant with Section 13 and Table 2 of O.Reg. 278/05.

1.17 Signage

- .1 Asbestos Abatement Signs: Post signs at access points to the Abatement Work Area, stating at minimum, the following:
 - .1 There is an asbestos dust hazard.
 - .2 Access to the work area is restricted to persons wearing protective clothing and equipment.
- .2 Lead Abatement Signs: Post signs at access points to the Abatement Work Area, stating at minimum, the following:
 - .1 There is a lead dust, fume or mist hazard.
 - .2 Access to the work area is restricted to authorized persons.

- .3 Respirators must be worn in the work area.
- .3 Silica Warning Signs: Post signs at access points to the Abatement Work Area, stating at minimum, the following:
 - .1 There is a silica dust hazard.
 - .2 Access to the work area is restricted to authorized persons.
 - .3 Respirators must be worn in the work area.
- .4 Vehicles, Bins and Asbestos Waste Containers: Post signs on both sides of every vehicle used for the transportation of asbestos waste and on every asbestos waste container. Signs must display thereon in large, easily legible letters that contrast in colour with the background the word “CAUTION” in letters not less than ten centimetres in height and the words:
 - .1 CONTAINS ASBESTOS FIBRES
 - .2 Avoid Creating Dust and Spillage
 - .3 Asbestos May be Harmful To Your Health
 - .4 Wear Approved Protective Equipment.
- .5 Place placards in accordance with Transportation of Dangerous Goods Act.

1.18 Waste and Material Handling

- .1 Waste bins must be placed on grade or in receiving.
- .2 All bins for hazardous materials must be covered and locked when waste transfer is not being performed.
- .3 Ensure redundant non-ACM, rubble, debris, etc. removed during contaminated work are treated, packaged, transported and disposed of as appropriate waste.
- .4 Clean, wash and apply Post Removal Sealant to metal waste prior to removal from Abatement Work Area. Recycle metals.
- .5 Clean, wash and apply Post Removal Sealant to non-porous materials prior to disposal as clean waste. Obtain prior written approval from the Abatement Consultant for each individual type of material.
- .6 Clean and wash equipment prior to removal from Abatement Work Area if removed prior to completion.
- .7 Place all equipment, tools and unused materials that cannot be cleaned in Abatement Waste Containers.

- .8 As work progresses, and at regular intervals, transport the sealed and labelled waste containers from the Abatement Work Area to waste bin.
- .9 Place items in bins according to waste classification. Place asbestos waste, lead waste, metals, non-asbestos waste, etc. in separate bins.
- .10 Removal of waste containers and decontaminated tools and materials from the Abatement Work Area shall be performed as follows:
 - .1 Remove any visible contamination from the surface of non-porous or cleanable waste being removed from the Abatement Work Area. If the item can be cleaned, remove it from the site as clean waste.
 - .2 Place waste or item in Waste Container and seal closed.
 - .3 Wet wipe outside of Waste Container.
 - .4 Within Decontamination Facility, Transfer Room or at the perimeter of the Abatement Work Area, place in second Waste Container. Seal closed.
 - .5 Remove waste containers and transport to appropriate bin.
- .11 Transport waste and materials via the predetermined routes and exits. Arrange waste transfer route with Owner. Use a closed, covered cart to transport through Occupied Areas.
- .12 Provide workers transporting waste with means to access full personal protective equipment and all tools required to properly clean up spilled material in the case of a rupture of a Waste Container.
- .13 Pick-up and drop off of garbage bin shall be at pre-approved times, and must not interfere with the Owners operations.
- .14 Transport hazardous waste to landfill or waste transfer station licensed by the provincial Ministry of the Environment.
- .15 Cooperate with the provincial Ministry of the Environment inspectors and immediately carry out instructions for remedial work at dump to maintain environment, at no additional cost to the Owner.

1.19 Re-establishment of Objects and Systems

- .1 Re-establish objects and items relocated by the Contractor's workforce to facilitate work.
- .2 Re-establish electrical, communication, HVAC and other services previously disconnected or otherwise isolated to accommodate work by this Section.
- .3 Make good at completion of work, all damage not identified in pre-removal survey.

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

- .1 Refer to the Sections identified in Related Work for specified materials, equipment or facilities specific to each phase or work area.
- .2 Materials and equipment must be in good condition and free of debris and fibrous materials. Disposable items must be of new materials only.
- .3 Airless Sprayer: AC powered pressure washer that allows wetting agent to mix with water, uses no air or compressed air, and has a nozzle to regulate power and pressure.
- .4 Amended Water: Water with wetting agent added for purpose of reducing surface tension to allow thorough wetting of materials.
- .5 Asbestos Waste Container: A container acceptable to disposal site, Ministry of the Environment, and Ministry of Labour, comprised of the following:
 - .1 Dust tight.
 - .2 Suitable for the type of waste.
 - .3 Impervious to asbestos.
 - .4 Identified as asbestos waste.
- .6 Discharge Ducting: Polyethylene Tubing. Reinforced with wire. Diameter to equal negative pressure machine discharge. Not to be longer than required, or so long that negative pressure is compromised.
- .7 Ground Fault Panel: Electrical panel as follows:
 - .1 Ground fault circuit interrupters of sufficient capacity to power temporary electrical equipment and lights in Asbestos Work Area.
 - .2 Interrupters to have a 5 mA ground fault protection.
 - .3 Necessary accessories including main switch disconnect, ground fault interrupter lights, test switch to ensure unit is working, and reset switch.
 - .4 Openings sealed to prevent moisture or dust penetration.
 - .5 Inspected by the Electrical Safety Authority.
 - .6 Panel uses CSA approved parts and been constructed, inspected and installed by a licensed electrician.
 - .7 Provide one Ground Fault Panel for each 5,000 square feet (500 square metres) of Abatement Work Area.

- .8 HEPA Filtered Negative Pressure Machine: Portable air handling system which extracts air directly from the Abatement Work Area and discharges the air to the exterior of the building. Equipped as follows:
 - .1 Prefilter and HEPA filter. Air must pass HEPA filter before discharge.
 - .2 Pressure differential gauge to monitor filter loading.
 - .3 Auto shut off and warning system for HEPA filter failure.
 - .4 Separate hold down clamps to retain HEPA filter in place during change of prefilter.
- .9 HEPA Vacuum: Vacuum with necessary fittings, tools and attachments. Discharged air must pass through a HEPA filter.
- .10 Hose: Leak-proof, minimum bursting strength of 500 PSI or greater if required, abrasion resistant covering, reinforcing, and machined-brass couplings. Maintained and tested. Hose to be temperature resistant if it is to carry domestic hot water.
- .11 Lead Waste Container: An impermeable container acceptable to disposal site and Ministry of the Environment, that is:
 - .1 Dust tight.
 - .2 Suitable for the type of waste.
 - .3 Evaluated for leachable lead content, and disposed of in accordance with applicable regulations.
 - .1 Where lead waste exceeds 5.0 mg/L of lead in the TCLP analysis, label as lead waste and dispose of as leachate toxic hazardous waste.
 - .2 Where lead waste is below 5.0 mg/L of lead in the TCLP analysis, disposed of as construction waste.
- .12 OSB: Oriented Strand Board.
- .13 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints.: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints.
- .14 Post Removal Sealant (or Lockdown): Sealant that when applied to surfaces serves the function of trapping residual asbestos fibres or other dust. Product must have flame spread and smoke development ratings both less than 50. Product shall leave no stain when dry. Post Removal Sealant shall be compatible with replacement insulation or fireproofing where required and capable of withstanding service temperature of substrate. Apply to manufacturer's instructions.
- .15 Protective Clothing: Disposable coveralls complete with head covering and full body covering that fits snugly at the ankles, wrists and neck.

- .16 Rip-Proof Polyethylene Sheeting: 8 mil (0.20 mm) fabric made up from 5 mil (0.13 mm) weave and two (2) layers of 1.5 mil (0.05 mm) poly laminate or approved equal. In sheet size to minimize on-site seams and overlaps.
- .17 Sprayer: Garden type portable manual sprayer or water hose with spray attachment if suitable.
- .18 Tape: Duct tape or tape suitable for sealing polyethylene to surfaces under both dry and wet conditions in the presence of Amended Water.
- .19 Wetting Agent: Non-sudsing surfactant added to water to reduce surface tension and increase wetting ability.

PART 3 EXECUTION

- .1 Refer to the Sections identified in Related Work for specified procedures for work area preparation, maintenance, site dismantlement, application of lock-down agent and all other procedures for the safe handling, removal and clean-up of hazardous materials specific to each phase or work area.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.
- .2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of asbestos-containing materials following Type 1 or Low Risk procedures, and Pinchin and Owner specific requirements.

1.3 Personal Protection

- .1 Protect all personnel at all times when possibility of disturbance of ACM exists.
 - .1 Provide non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters when requested by personnel.
 - .2 When requested by personnel, provide protective clothing.
- .2 Provide protective clothing, to all personnel entering the Abatement Work Area.
- .3 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.4 Inspections

- .1 Refer to Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

- .1 Refer to Section 02 81 00.

PART 3 EXECUTION

3.1 Site Preparation

- .1 Remove stored or non-fixed items from the Abatement Work Area including but not limited to equipment, furniture, waste etc. Store in area provided by Owner.
- .2 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.
- .3 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.
- .4 Install one layer of polyethylene sheeting on walls, floors, finishes, millwork, electrical equipment, equipment and furnishings remaining in the Abatement Work Area.

- .5 Install one layer of rip-proofing polyethylene sheeting over one layer of polyethylene sheeting on walls, floors, finishes, millwork, electrical equipment, equipment and furnishings remaining in the Abatement Work Area.
- .6 Install polyethylene drop sheets below areas of work.
- .7 Install polyethylene sheeting on openings in walls and floors (as required) and seal.
- .8 Install signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.
- .9 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.
 - .1 Lock-out/tag-out power at electrical panels.
 - .2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.
- .10 Provide power from ground fault interrupt circuits.
- .11 Shut down HVAC systems serving the Abatement Work Area.
 - .1 Install polyethylene sheeting over openings in ducts and diffusers and seal.
 - .2 HVAC to remaining areas of building must not be disrupted during work of this section.
 - .3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.
 - .4 Perform work at scheduled times after shutting down HVAC systems affecting the Abatement Work Area.
- .12 Provide amended water for wetting ACM, and adequate method of wetting (garden sprayers, airless sprayers, etc).
- .13 Without disturbing asbestos-containing materials, remove and dispose of non-hazardous materials as clean waste prior to asbestos removal work, where possible.

3.2 Maintenance of Abatement Work Area

- .1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.
- .2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.
- .3 Maintain Abatement Work Area in tidy condition.
- .4 Remove any standing water on polyethylene/floor at the end of every shift.
- .5 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.3 Asbestos Removal - General

- .1 Do not use powered tools or non-hand held tools.
- .2 Do not use compressed air to clean or remove dust or debris.
- .3 Do not break, cut, drill, abrade, grind, sand or vibrate ACM if it cannot be wetted. Type 2 procedures would be required if the material cannot be wetted due to hazard or damage.
- .4 Wet ACM prior to work and keep ACM wet throughout the removal process.

- .5 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
- .6 Frequently and at regular intervals, place all waste in asbestos waste containers.
- .7 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.4 Asbestos Removal - Vinyl Asbestos Tile

- .1 Wedge a heavy duty scraper in seam of two adjoining tiles and gradually force edge of one tile up and away from floor. Do not break off pieces of tile, but continue to force balance of tile up.
- .2 Place tile, without breaking into smaller pieces, into Asbestos Waste Container.
- .3 Force scraper through tightly adhered areas by striking scraper handle with a hammer.
- .4 Heat tile thoroughly with a hot air gun until heat penetrates through tile and softens adhesive in areas where scraper will not remove tile.
- .5 Deposit waste into asbestos waste disposal bag.
- .6 HEPA vacuum floor on completion of work in area.

3.5 Asbestos Removal – Doors/Windows and Removal of Caulking and Putty

- .1 Wet all material to be disturbed.
- .2 Undo fasteners if necessary to remove material.
- .3 Break material only if unavoidable, and wet material if broken during work.
- .4 Use only non-powered hand-held tools to remove ACM.
- .5 Scrape to remove material adhered to substrate.
- .6 Place removed ACM directly into an asbestos waste container.

3.6 Asbestos Removal - Sinks

- .1 Wet all material to be disturbed.
- .2 Undo fasteners if necessary to remove material.
- .3 Break material only if unavoidable, and wet material if broken during work.
- .4 Use only non-powered hand-held tools to remove ACM.
- .5 Place removed ACM directly into an asbestos waste container.

3.7 Asbestos Removal – Chalkboards/Tackboards

- .1 Wet all material to be disturbed.
- .2 Undo fasteners if necessary to remove material.
- .3 Break material only if unavoidable, and wet material if broken during work.
- .4 Use only non-powered hand-held tools to remove ACM.
- .5 Scrape to remove material adhered to substrate.
- .6 Place removed ACM directly into an asbestos waste container.

3.8 Asbestos Removal - Removal of Other Non-Friable Asbestos Materials – Roofing Materials and Transit

- .1 Wet all material to be disturbed.
- .2 Undo fasteners if necessary to remove material.
- .3 Break material only if unavoidable, and wet material if broken during work.
- .4 Use only non-powered hand-held tools to remove ACM.
- .5 Scrape to remove material adhered to substrate.
- .6 Place removed ACM directly into an asbestos waste container.

3.9 Abatement Work Area Dismantling

- .1 Wash or HEPA vacuum equipment and tools used in contaminated Abatement Work Area to remove all asbestos contamination, or place in Asbestos Waste Containers prior to being removed from Abatement Work Area.
- .2 Place tools and equipment used in contaminated work site but not cleaned in polyethylene bags prior to removal from Abatement Work Area.
- .3 Clean polyethylene sheeting and drop sheets which with HEPA vacuum or wet cleaning methods at completion of work.
- .4 Wet drop sheets and polyethylene sheeting.
- .5 Carefully roll polyethylene sheeting and drop sheets toward the centre. As polyethylene is rolled away, immediately remove visible debris beneath with a HEPA vacuum.
- .6 Remove remaining polyethylene sheeting and tape.
- .7 Place polyethylene sheeting, drop sheets, tape, disposal clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.

3.10 Waste and Material Handling

- .1 Refer to Section 02 81 00.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.
- .2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of asbestos-containing materials following Type 2 or Moderate Risk procedures, and Pinchin and Owner specific requirements.

1.3 Personal Protection

- .1 Protect all personnel at all times when possibility of disturbance of ACM exists.
- .2 Provide the following minimum respiratory protection to all personnel:
 - .1 Full face respirators with P100 high efficiency (HEPA) cartridge filters, for:
 - .1 Removal of all or part of a ceiling if asbestos is likely lying on the surface.
 - .2 Use of a HEPA filtered power tool on non-friable ACM if the material is not wetted.
 - .2 Non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters.
- .3 Provide protective clothing, to all personnel entering the Abatement Work Area.
- .4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.4 Inspections

- .1 Refer to Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

- .1 Refer to Section 02 81 00.

2.2 Hoarding Walls

- .1 Type A Hoarding Wall: One layer of rip-proof polyethylene sheeting installed floor to ceiling, secured with telescopic poles, clips, or other suitable methods.
- .2 Windows: Install sufficient transparent windows area in hoarding walls to allow observation of entire work area from outside the enclosure where existing solid walls do not make up the perimeter.

2.3 Transfer Room

- .1 Transfer Room to be generally 2000 mm x 2000 mm x 2200 mm high. Increase size accordingly to accommodate number of workers.
- .2 Install walls as follows:
 - .1 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.
 - .2 Install one layer rip-proof polyethylene sheeting on interior walls of Transfer Room.
- .3 Install one layer of rip-proof polyethylene sheeting over one layer of 6 mil polyethylene sheeting beneath entire Transfer Room.
- .4 Install one layer rip-proof polyethylene sheeting over roof.
- .5 Turn 600 mm of polyethylene down the sides over polyethylene on the perimeter walls.
- .6 Install a fire extinguisher, mount to wall.

2.4 Curtained Doorways

- .1 Construct as follows:
 - .1 Install two flap doors, full width and height of door opening at all doors to Abatement Work Area and both ends of Transfer Room.
 - .2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.
 - .3 Install weights attached to bottom edge of each door flap.
 - .4 Provide direction arrows on flaps to indicate opening.

2.5 Platforms

- .1 Install a framework, on top of which the working platform is to be placed by use of metal scaffolding or equivalent. The working platform shall consist of scaffold boards over which plywood (of sufficient thickness to support personnel and equipment as required by provincial Occupational Health and Safety Act) is fastened in place.
- .2 Submit Engineered Shop drawings where required.
- .3 Install platform supports in and around existing fixtures, walls and equipment so as not to interfere with the operating, use, or maintenance of space or equipment.
- .4 Install platform to accommodate door swings and to maintain exit routes.
- .5 Install platform to accommodate removal and installation of windows.
- .6 Install support bases of dimension and strength to protect floors. Repair or replace damage caused by erection, weight or dismantling of platform.
- .7 Install platform to maintain a minimum clear height of 2000 mm.
- .8 Install Hoarding Walls on platform so as to completely isolate Abatement Work Area on platform from Occupied Area.
- .9 Install temporary lighting using fluorescent fixtures at underside of platforms to maintain existing lighting levels.
- .10 Provide emergency exits or escape hatches as require to meet Occupational Health and Safety requirements. Hatches are to be constructed in a water and air tight manner that

can be readily opened in an emergency situation. Provide emergency lighting at each hatch.

PART 3 EXECUTION

3.1 Site Preparation - General

- .1 Remove stored or non-fixed items from the Abatement Work Area including but not limited to equipment, furniture, waste etc. Store in area provided by Owner.
- .2 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.
- .3 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.
- .4 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.
 - .1 Lock-out/tag-out power at electrical panels.
 - .2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.
- .5 Provide power from ground fault interrupt circuits.
- .6 Shut down HVAC systems serving the Abatement Work Area.
 - .1 Install polyethylene sheeting over openings in ducts and diffusers and seal.
 - .2 HVAC to remaining areas of building must not be disrupted during work of this section.
 - .3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.
 - .4 Perform work at scheduled times after shutting down HVAC systems affecting the Abatement Work Area.
- .7 Provide amended water for wetting ACM, and adequate method of wetting (garden sprayers, airless sprayers, etc).

3.2 Site Preparation –Enclosure Required

- .1 Install polyethylene enclosure complete with Windows at Abatement Work Areas for the work identified in Section 02 81 00 – General Provisions.
- .2 Install Transfer Room where duration of work is to last longer than one 8 hour shift.
- .3 Seal openings in floor using tape, polyethylene, etc. Floor openings are to be sealed independently prior to installation of floor polyethylene.
- .4 Install polyethylene sheeting on floors of Abatement Work Area. Use sufficient layers to provide adequate protection for carpeting and equipment.
 - .1 Minimum requirement over carpet is one layer of 6 mil polyethylene under one layer of rip-proof polyethylene.
 - .2 Cover floors first so that polyethylene on walls is overlapped by at least 305 mm.
- .5 Construct Hoarding Walls between Abatement Work Area perimeter and occupied areas.
- .6 Install polyethylene sheeting at openings in walls (as required) and seal.
- .7 Install 6 mil polyethylene sheeting on walls within the Abatement Work Area., including

- existing walls that make up, or are within, the Abatement Work Area.
- .8 Provide a completely sealed polyethylene top for free standing enclosures.
 - .9 Extend to underside of ceiling system, enclosures for access into ceilings. Enclosure may be supported from the ceiling system if ceiling can support the polyethylene.
 - .10 Install Curtained Doorways.
 - .11 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged. Items to remain include but are not limited to:
 - .1 Millwork.
 - .2 Doors.
 - .3 Bulkheads.
 - .4 Toilet Partitions.
 - .5 Plumbing Fixtures.
 - .6 Electrical Equipment.
 - .7 Mechanical Equipment.
 - .12 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.
 - .13 Establish negative pressure in Abatement Work Areas as follows:
 - .1 Provide sufficient HEPA filtered negative pressure machines to exchange a volume of air equivalent to that of the Abatement Work Area a minimum of every 20 minutes.
 - .2 Provide additional HEPA filtered negative pressure machines as required to ensure air flow from Occupied Area into Abatement Work Area.
 - .3 Arrange negative air units to maximize the distance between units and decontamination facilities.
 - .4 Provide weighted flaps in perimeter Hoarding Walls as necessary to provide make-up air.
 - .5 Operate HEPA filtered negative pressure machines continuously from first disturbance of ACM until completion of dismantling.
 - .6 Replace prefilters to maintain specified flow rate.
 - .7 Replace HEPA filter as required to maintain flow rate and integrity of unit.
 - .8 Discharge HEPA filtered negative air machines as follows:
 - .1 To building exterior.
 - .1 Remove existing glazing where necessary and replace with a 19 mm plywood panel.
 - .2 Install panel securely in window frame so that it cannot be pushed into the building and make weather-tight with caulking.
 - .3 For each negative pressure unit, provide a 300 mm diameter, screened, duct opening through panel.
 - .4 Direct discharge away from building access points.
 - .5 Reinstall glazing to match existing upon completion of work.
 - .2 Into Occupied Areas as required.
 - .1 Install and make airtight all negative air discharge ducting.

- .2 Use metal reinforced polyethylene discharge ducting in locations where the ducting must be protected from damage or collapse.

- .14 Place required tools to complete the abatement with the Abatement Work Area.
- .15 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.

3.3 Site Preparation – No Enclosure Required

- .1 Install caution tape around work area where existing walls are not present.
- .2 Site isolation to include a visual barrier comprised of rip-proof polyethylene sheeting, where incessancy and where occupants are present.
- .3 Cover walls, floors, finishes, millwork, equipment and furnishings remaining in the Abatement Work Area with polyethylene sheeting before disturbing ACM to control the spread of dust.
- .4 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged. Items to remain include but are not limited to:
 - .1 Millwork.
 - .2 Doors.
 - .3 Bulkheads.
 - .4 Toilet Partitions.
 - .5 Plumbing fixtures.
 - .6 Electrical Equipment.
 - .7 Mechanical Equipment.
- .5 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.
- .6 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.
- .7 Place HEPA vacuum in Abatement Work Area.
- .8 Place required tools to complete the abatement with the Abatement Work Area.

3.4 Maintenance of Abatement Work Area

- .1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.
- .2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.
- .3 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Inspection must be performed by competent person.
- .4 Maintain Abatement Work Area in tidy condition.
- .5 Remove standing water on polyethylene/floor at the end of every shift.
- .6 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.5 Asbestos Removal - General

- .1 Do not use compressed air to clean or remove dust or debris.
- .2 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
- .3 Frequently and at regular intervals, place all waste in asbestos waste containers.
- .4 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.6 Asbestos Removal – Thermal Systems Insulation (less than 1 Square Metre)

- .1 Construct an enclosure around Abatement Work Area and use the procedures described above under *Site Preparation – Enclosure Required*.
- .2 Adequately wet exterior of the ACM with amended water to suppress dust.
- .3 Remove asbestos-containing mechanical insulations in layers, maintaining all exposed surfaces of insulation in a wet condition.
- .4 Remove wetted ACM directly into waste containers. Do not allow ACM to fall to the floor of the Abatement Work Area.
- .5 Clean all surfaces from which ACM has been removed with scouring pads, vacuuming or wet-sponging to remove all visible material after completion of removal of ACM.
- .6 Remove visible dust and debris.
- .7 Seal exposed ends of asbestos-containing insulation to remain, with canvas and lagging.
- .8 HEPA vacuum or wet clean entire Abatement Work Area, including any surfaces not covered with polyethylene sheeting. Any materials removed to access ACM that are to be re-used, and any abatement equipment, must be wet cleaned or HEPA vacuumed prior to completion.
- .9 Apply Post Removal Sealant to all surfaces within the Abatement Work Area including those from which ACM has been removed.

3.7 Asbestos Removal - Asbestos-Containing Vinyl Floor Tile Mastic with HEPA Filtered Power Tools/Machine

- .1 Use the procedures described above under *Site Preparation – Enclosure Required*.
- .2 Wet all material to be disturbed.
- .3 Turn on HEPA vacuum. Vacuum to remain operation throughout work.
- .4 Grind mastic completely to bare concrete using a grinder with a HEPA filtered dust collection device.
- .5 Place removed ACM directly into an asbestos waste container.
- .6 If power tool can disconnect from HEPA vacuum, remove tool, and HEPA vacuum tool and bit, blade, etc, and shrouds.
- .7 Wet clean or HEPA vacuum the entire Abatement Work Area, including surfaces not covered with polyethylene sheeting. Any materials or equipment removed to access ACM that are to be reused, must be wet cleaned or vacuumed prior to reinstatement.

3.8 Asbestos Disturbance - Removal/Installation of Items Affixed to Block Walls with Asbestos-Containing Vermiculite using HEPA Filtered Power Tools

- .1 Use the procedures described above under *Site Preparation – No Enclosure Required*.
- .2 Site isolation to include a visual barrier comprised of rip-proof polyethylene sheeting, where incessancy and where occupants are present.
- .3 Wet all material to be disturbed.
- .4 Use only power tools with an effective HEPA dust collection device.
- .5 Turn on HEPA dust collection device attached to power tool. HEPA device to remain operational throughout work.
- .6 Remove/install all items affixed to walls as required.
- .7 Place ACM waste directly into an asbestos waste container.
- .8 Wet clean or HEPA vacuum the entire Abatement Work Area, including surfaces not covered with polyethylene sheeting. Any materials or equipment removed to access ACM that are to be reused, must be wet cleaned or vacuumed prior to reinstatement.

3.9 Asbestos Removal – Block Walls with Asbestos-Containing Vermiculite

- .1 Use the procedures described above under *Site Preparation – Enclosure Required*.
- .2 Wet all material to be disturbed.
- .3 Remove block walls for openings/penetrations required for mechanical equipment and where scheduled for demolition.
- .4 Place removed ACM directly into an asbestos waste container.
- .5 Clean-up vermiculite where encountered during removal. Install roxul insulation and spray paint red all openings to prevent further vermiculite release.
- .6 Wet clean or HEPA vacuum the entire Abatement Work Area, including surfaces not covered with polyethylene sheeting. Any materials or equipment removed to access ACM that are to be reused, must be wet cleaned or vacuumed prior to reinstatement.

3.10 Asbestos Removal – Exterior Brick where Asbestos-Containing Vermiculite is Present in Block Walls

- .1 Use the procedures described above under *Site Preparation – Enclosure Required*.
- .2 Wet all material to be disturbed.
- .3 Remove courses of exterior brick on foundation walls to extent noted on contract drawings.
- .4 Place removed ACM directly into an asbestos waste container.
- .5 Clean-up vermiculite where encountered during removal. Install roxul insulation and spray paint red all openings to prevent further vermiculite release.
- .6 Wet clean or HEPA vacuum the entire Abatement Work Area, including surfaces not covered with polyethylene sheeting. Any materials or equipment removed to access ACM that are to be reused, must be wet cleaned or vacuumed prior to reinstatement.

3.11 Removal of Doors, Windows, Spandrel Panels, Transite Panels in the 1959 Era of Construction

- .1 Construct an enclosure on the inside and outside of the Abatement Work Area and use

the procedures described above under *Site Preparation –Enclosure Required*.

- .2 Wet all material to be disturbed.
- .3 Undo fasteners with hand tools if necessary to remove material. If power tools are used, they must be equipped with a HEPA filtered dust collection device.
- .4 Remove doors/window frames and remove caulking completely from substrate.
- .5 Clean-up vermiculite where encountered during removal. Install roxul insulation and spray paint red all openings to prevent further vermiculite release.
- .6 and spray foam openings to prevent vermiculite release.
- .7 Dispose of entire windows/doors with asbestos-containing putty as asbestos waste.
- .8 Remove transite panels.
- .9 Place removed ACM directly into an asbestos waste container.

3.12 Removal of Doors, Windows, Spandrel Panels in the 1967 Era of Construction

- .1 Construct an enclosure on the inside and outside of the Abatement Work Area and use the procedures described above under *Site Preparation –Enclosure Required*.
- .2 Wet all material to be disturbed.
- .3 Undo fasteners with hand tools if necessary to remove material. If power tools are used, they must be equipped with a HEPA filtered dust collection device.
- .4 Remove doors/window frames and remove caulking completely from substrate. Caulking to be disposed of as PCB waste.
- .5 Clean-up vermiculite where encountered during removal. Install roxul insulation and spray paint red all openings to prevent further vermiculite release.
- .6 Dispose of entire windows/doors with asbestos-containing putty as asbestos waste.
- .7 Place removed ACM directly into an asbestos waste container.

3.13 Removal of Asbestos-Containing Textured Plaster Soffit in the 1967 Era of Construction

- .1 Construct an enclosure on the inside and outside of the Abatement Work Area and use the procedures described above under *Site Preparation –Enclosure Required*.
- .2 Wet all material to be disturbed.
- .3 Undo fasteners with hand tools if necessary to remove material. If power tools are used, they must be equipped with a HEPA filtered dust collection device.
- .4 Remove all overspray on decking, ducts, light fixtures and junction boxes.
- .5 Remove vermiculite where accessible within exterior wall cavities and spray foam openings to prevent vermiculite release.
- .6 Remove any pipe insulation present above the soffit.
- .7 Place removed ACM directly into an asbestos waste container.

3.14 Asbestos Removal - Dust and Debris

- .1 Use the procedures described above under *Site Preparation – No Enclosure Required*.
- .2 Remove visible dust and debris from Abatement Work Area using HEPA vacuums or wet cleaning methods.

3.15 Application of Post Removal Sealant

- .1 Apply one coat of Post Removal Sealant with an airless sprayer, in accordance with Manufacturer's Instructions, to cover all surfaces on all items in the Abatement Work Area, including but not limited to polyethylene, ACM substrate, structural steel, and surfaces scheduled for demolition.
- .2 Do not apply post removal sealant to materials that will be damaged by its application.

3.16 Abatement Work Area Dismantling

- .1 Wash or HEPA vacuum equipment and tools used in contaminated Abatement Work Area to remove all asbestos contamination, or place in Asbestos Waste Containers prior to being removed from Abatement Work Area.
- .2 Place tools and equipment used in contaminated work site but not cleaned in polyethylene bags prior to removal from Abatement Work Area.
- .3 Clean polyethylene sheeting and drop sheets which with HEPA vacuum or wet cleaning methods at completion of work.
- .4 Wet drop sheets and polyethylene sheeting.
- .5 Carefully roll polyethylene sheeting and drop sheets toward the centre of enclosure. As polyethylene is rolled away, immediately remove visible debris beneath with a HEPA vacuum.
- .6 Remove remaining polyethylene sheeting and tape, and dispose of as asbestos waste.
- .7 Place polyethylene sheeting, drop sheets, tape, disposal clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.
- .8 Remove remaining site isolation, seals, tape, etc.
- .9 Remove Transfer Room.
- .10 Remove seals, tape, Signage etc.
- .11 Immediately upon shutting down negative air units, seal air inlet grill and exhaust vent with polyethylene and tape.
- .12 Seal openings in HEPA vacuums.
- .13 Remove and dispose of the pre-filters from HEPA filtered negative pressure machines as asbestos waste.
- .14 Remove HEPA filtered negative pressure machines and discharge ducting or HEPA vacuums.
- .15 Remove temporary lights.
- .16 Remove ground fault panels.
- .17 Place contaminated materials including polyethylene sheeting, drop sheets, seals, tape, disposable coveralls, and other contaminated waste in asbestos waste containers.

3.17 Waste and Material Handling

- .1 Refer to Section 02 81 00.

3.18 Re-Establishment of Items

- .1 Upon completion of work:

- .1 Move items that were removed from Abatement Work Area prior to work, back into same location within Abatement Work Area.
- .2 Remove and disconnect Ground fault Panel, tags and locks from electrical panels and re-energize equipment and items.
- .3 Remove hose bibs installed and repair pipe.
- .4 Remove negative air discharge panel and reinstall glazing to match existing.
- .5 Reinstall ducts removed to perform cleaning of ducts or to access ACM.
- .6 Clean, mop and vacuum Abatement Work Area and area beneath any tunnels, platform and Decontamination Facilities.
- .7 Enable building air handling systems.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.
- .2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of asbestos-containing materials following Glove Bag procedures, and Pinchin and Owner specific requirements.
- .3 If for reasons of pipe temperature, geometry or access, Glove Bag procedures cannot be used, remove and dispose of asbestos-containing insulations as per Section 02 82 11 for less than 1 square meter, or following Type 3 procedures in accordance with Ontario Regulation 278/05 for greater than 1 square metre.

1.3 Personal Protection

- .1 Protect all personnel at all times when possibility of disturbance of ACM exists.
- .2 Provide the following minimum respiratory protection to all personnel:
 - .1 Non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters.
- .3 Provide protective clothing, to all personnel entering the Abatement Work Area.
- .4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.4 Inspections

- .1 Refer to Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

- .1 Refer to Section 02 81 00.
- .2 Glove Bag: Prefabricated bag which provides a completely sealed envelope surrounding a given section of piping to permit the removal of asbestos-containing insulation from within the bag while maintaining the integrity of the bag and preventing the spread of airborne asbestos fibres. The glove bag shall be equipped with,
 - .1 sleeves and gloves that are permanently sealed to the body of the bag to allow the worker to access and deal with the insulation and maintain a sealed enclosure

- throughout the work period,
 - .2 valves or openings 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,
 - .3 a tool pouch with a drain,
 - .4 a seamless bottom and a means of sealing off the lower portion of the bag, and
 - .5 a high strength double throw zipper and removable straps, if the bag is to be moved during the removal operation.
- .3 Securing Straps: For some types of Glove Bag, reusable nylon straps at least 25mm wide with metal tightening buckle for sealing ends of bags around pipe and/or insulation.

PART 3 EXECUTION

3.1 Site Preparation - General

- .1 Remove to the extent necessary to access piping, stored or non-fixed items from the Abatement Work Area including but not limited to equipment, furniture, waste etc. Store in area provided by Owner.
- .2 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.
- .3 Shut down HVAC systems serving the Abatement Work Area.
 - .1 Install polyethylene sheeting over openings in ducts and at diffusers and seal.
 - .2 HVAC to remaining areas of building must not be disrupted during work of this section.
 - .3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.
 - .4 Perform work at scheduled times after shutting down HVAC systems affecting the Abatement Work Area.
- .4 Install caution tape around work area where existing walls are not present.
- .5 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.
- .6 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.
- .7 Cover walls, floors, finishes, millwork, equipment and furnishings below the pipe to be worked on in the Abatement Work Area with polyethylene sheets before disturbing ACM. Drop sheets shall extend a minimum of 1,800 mm from pipe.
- .8 Use existing lighting or install temporary lighting to a level that will provide for safe and efficient use of work area - minimum 550 LUX.
- .9 Provide Amended Water for wetting ACM, in garden sprayers. Provide one garden sprayer for each worker.
- .10 Do not use compressed air to clean or remove dust or debris when completing work of this section.
- .11 Place HEPA Vacuum in Abatement Work Area for each worker.
- .12 Place required tools to complete the abatement within the Abatement Work Area.
- .13 Post Notice of Project, where required by O.Reg. 278/05.

3.2 Maintenance of Abatement Work Area

- .1 Maintain Abatement Work Area in tidy condition.

3.3 Glove Bag Removal

- .1 Do not use Glove Bags on hot pipes that may damage Glove Bag. Refer to manufacturer's limitations.
- .2 Prior to use of Glove Bag on damaged orunjacketed insulation:
 - .1 Spray any areas of damaged insulation jacketing with mist of Amended Water.
 - .2 Tape over damaged insulation to provide temporary repair.
 - .3 Mist areas of insulation with no jacketing and wrap with polyethylene sheeting and seal with tape.
- .3 Place any tools necessary to remove insulation in tool pouch built into Glove Bag.
- .4 Inspect the Glove Bag for damage and defects immediately before it is attached to the pipe or duct.
 - .1 If damage or defects are observed, dispose of Glove Bag.
- .5 Install Glove Bag as per manufacturer's instructions.
- .6 Remove metal jacketing or banding carefully. Do not damage the Glove Bag.
- .7 Remove insulation from pipe as per manufacturer's directions.
 - .1 Volume and weight of insulation must not exceed capacity of the Glove Bag or supports.
 - .2 Arrange insulation in the Glove Bag to maximize use of the Glove Bag.
- .8 Only glove bags designed to be moved may be re-used on other sections of pipe or moved down same section of pipe (e.g. Safe-T-Strip).
- .9 At regular intervals during its use, if damage or defects are observed during the use of the Glove Bag, which cannot be readily repaired with tape and not affect the integrity or strength of the glove bag.
 - .1 Discontinue use of Glove Bag.
 - .2 Wash inner surface of Glove Bag.
 - .3 Wet insulation.
 - .4 Pull an Asbestos Waste Container over Glove Bag before removing from pipe.
 - .5 Remove Glove Bag and Asbestos Waste Container, seal with tape.
 - .6 Place in a second Asbestos Waste Container and seal with tape.
 - .7 Clean immediate area with a HEPA Vacuum prior to resuming work.
- .10 If bag is to be moved along pipe for use on adjacent section of insulation:
 - .1 Wash inner surface of Glove Bag.
 - .2 Wash tools and place tools in pouch.
 - .3 Wet surface of insulation in lower section of bag and any exposed end of asbestos insulation remaining on pipe with Amended Water.
 - .4 Insert nozzle of HEPA filtered vacuum cleaner into bag through valve and evacuate air from bag.

- .5 Seal closure strip.
- .6 Loosen securing straps to maintain a loose seal of Glove Bag to insulation or pipe.
- .7 Use double throw zipper as necessary to pass hangers.
- .8 Tighten straps once bag is in new position and continue insulation removal until Glove Bag is full, work is completed on the pipe or an obstruction prevents further movement of the bag.
- .11 If bag is to be removed from a pipe for use on a new section of pipe, perform the following:
 - .1 Wash inner surface of Glove Bag.
 - .2 Wash tools and place tools in pouch.
 - .3 Wet surface of insulation in lower section of bag and any exposed end of asbestos insulation remaining on pipe with Amended Water.
 - .4 Insert nozzle of HEPA filtered vacuum cleaner into bag through valve and evacuate air from bag.
 - .5 Seal valve cover on valve Glove Bags.
 - .6 Seal closure strip.
 - .7 Wash top section of Glove Bag and tool pouch thoroughly.
 - .8 Undo securing straps, unfasten zipper and carefully move bag to new section of pipe.
- .12 To remove bag after completion of insulation removal operation:
 - .1 Wash inner surface of Glove Bag.
 - .2 Wash and place all tools in one hand (glove), pull hand out inverted, twist to create a separate pouch, tape inverted hand at two separate locations 25 mm apart so as to seal pouch.
 - .1 Remove inverted hand and tools by cutting between the two tape seals.
 - .2 Place inverted hand pouch and tools into the next clean Glove Bag to be used or into a water bucket, open pouch underwater and clean tools.
 - .3 Wet surface of insulation in lower section of bag and any exposed end of asbestos insulation remaining on pipe with Amended Water.
 - .4 Insert nozzle of HEPA filtered vacuum cleaner into bag through valve and evacuate air from bag.
 - .5 Seal valve cover on valve Glove Bags.
 - .6 Seal closure strip if equipped with one. Twist bag at tapered point and secure with tape.
 - .7 Pull an Asbestos Waste Container over Glove Bag before removing from pipe.
 - .1 Undo straps and unzipper, or cut upper portion of single-use Glove Bag.
 - .2 Seal Asbestos Waste Container with tape.
 - .8 Ensure pipe is clean of all residue after removal of Glove Bag. If necessary, after removal of each section of asbestos, vacuum all surfaces of pipe, using HEPA vacuum or wipe with wet cloth.
- .13 Seal all surfaces of freshly-exposed pipe with Post Removal Sealer.
- .14 Cover exposed ends of any remaining asbestos insulation with canvas and lagging using

Type 2 Procedures.

3.4 Clean-Up and Dismantling

- .1 Clean and remove from Abatement Work Area:
 - .1 Equipment and tools.
 - .2 Temporary lighting if used.
 - .3 Polyethylene seals from HVAC systems.
- .2 Place polyethylene sheeting, drop sheets, seals, tape, clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.
- .3 Clean Abatement Work Area with HEPA vacuums or wet wiping/mopping.
- .4 Seal openings in HEPA vacuums.
- .5 Proceed with the dismantlement of all barricades, etc. following receipt of authorization to proceed from the Asbestos Abatement Consultant.
- .6 Remove barricades, fencing, caution tape, signs, etc.

3.5 Waste and Material Handling

- .1 Refer to Section 02 81 00.

3.6 Re-Establishment of Items

- .1 Upon completion of work:
 - .1 Move all items that were removed from Abatement Work Area prior to work, back into same location within Abatement Work Area.
 - .2 Remove tags and locks from electrical panels and re-energize equipment and items.
 - .3 Enable building air handling systems.
 - .4 Clean and vacuum Abatement Work Area.

END OF SECTION

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PART 1 GENERAL

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.
- .2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of lead-containing materials following Class 1 or Low Risk procedures, and Pinchin and Owner specific requirements.
- .3 Comply with requirements of this Section when performing following Work:
 - .1 Removal of lead-containing surface coatings with a chemical gel, stripper or paste.
 - .2 Removal of materials coating with lead-containing surface coatings, using non-powered hand tools, where the materials remains primarily intact, and is not crumbled, pulverized or powdered.
 - .3 Operating construction equipment (i.e., excavator, bulldozer) during building demolition or renovation where lead-containing surface coatings are present.
 - .4 Installation or removal of batteries in emergency lighting.

1.3 Instruction and Training

- .1 Provide instruction and training to all workers including the following:
 - .1 Hazards of lead.
 - .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:
 - .1 Limitations of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Proper fitting of equipment.
 - .4 Disinfecting and cleaning of equipment.
 - .3 Personal hygiene to be observed when performing the work.
 - .4 The measures and procedures prescribed by this section including decontamination of the worker.
 - .5 Instruction and training must be provided by a competent person.

1.4 Personal Protection

- .1 Provide non-powered half-face respirators with P100 high efficiency cartridge filters when requested by personnel.
- .2 Provide protective clothing, when requested by personnel, entering the Abatement Work Area, including:

- .1 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.
- .3 Provide protective clothing, to all personnel entering the Abatement Work Area, including:
 - .1 Dust impermeable gloves appropriate for the work being completed.
- .4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.
- .5 Lead-specific soaps and hygiene indicators are recommended to be provided for shower and hand-wash stations.

1.5 Inspections

- .1 Refer to Inspections in Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

- .1 Refer to Section 02 81 00.

PART 3 EXECUTION

3.1 Site Preparation - General

- .1 Provide washing facilities consisting of a wash basin, clean water, soap and towels.
 - .1 Workers are to use washing facilities each time leaving the Abatement Work Area.
- .2 Stored or non-fixed items, including but not limited to equipment, furniture, waste etc., shall be removed from the Abatement Work Area prior to abatement work.
- .3 Remove visible dust from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.
- .4 Provide amended water for wetting materials, and adequate method of wetting (garden sprayers, airless sprayers, etc.).
- .5 Do not use compressed air to clean or remove dust or debris.
- .6 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
- .7 Frequently and at regular intervals, place all waste in waste containers.
- .8 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.2 Site Preparation – No Enclosure Required

- .1 Isolate Abatement Work Area with barrier tape.

- .2 Protect floor surfaces covered from wall to wall with polyethylene sheets.
- .3 Maintain Abatement Work Area in tidy condition.
- .4 Remove waste and debris frequently.
- .5 Remove standing water on polyethylene/floor at the end of every shift.
- .6 Turn off water supply to hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.3 Lead-Containing Paint Abatement

- .1 Removal methods minimizing dust generation should be used wherever possible.
 - .1 Wet methods are to be used to reduce dust generation.
 - .2 Wetting agents should be used where possible.
 - .3 Wet methods are not to be used if it creates a hazard or cause damage to equipment or to project.
- .2 Provide drop sheets below all lead operations that may produce dust, chips or debris containing lead.
- .3 Waste water from cleaning or removal operations must be contained, for treatment or disposal.
- .4 Remove lead-containing paint in small sections and pack as it is being removed in sealable lead waste containers.
- .5 Follow manufacturer's instructions for all use of chemical gels, strippers and pastes.
 - .1 Ensure agent neutralizers, where required, are applied.
 - .2 Do not use chemical gels, strippers or pastes on surfaces where they are scheduled to be repainted, and the material affect the new paint application.
- .6 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.
- .7 After wire brushing and wet sponging to remove visible lead-containing paint, wet clean entire work area, and equipment used in process.
 - .1 Compressed air or dry sweeping not be used to clean up lead-containing dust or waste.
 - .2 Ensure all waste is cleaned and packaged.
- .8 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside.

3.4 Bulk Lead Removal

- .1 Lead-containing batteries should be removed, and recycled in appropriate programs.

3.5 Waste Management and Disposal

- .1 Per Section 02 81 00.

3.6 Final Cleaning

- .1 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.
- .2 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .3 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

END OF SECTION

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PART 1 GENERAL

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.
- .2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of lead-containing materials following Class 2 or Moderate Risk procedures, and Pinchin and Owner specific requirements.
- .3 Comply with requirements of this Section when performing following Work:
 - .1 Removal of lead containing paint using power tools with an effective dust collection system equipped with HEPA filter.
 - .2 Welding, torching or high temperature cutting of lead-containing surface coatings or materials indoors, with use of an effective fume collector or smoke eater.
 - .3 Welding, torching or high temperature cutting of lead-containing surface coatings materials outdoors.
 - .4 Removal of lead-containing surface coatings or materials by scraping or sanding (including wet sanding) using non-powered hand tools.
 - .5 Demolition of plaster or other building components that crumble, pulverize or powder and are covered with lead-containing surface coating.
 - .6 Wet cleaning or HEPA vacuuming of significant amounts of lead-containing dust and debris that can be made easily airborne.

1.3 Instruction and Training

- .1 Provide instruction and training to all workers including the following:
 - .1 Hazards of lead.
 - .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:
 - .1 Limitations of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Proper fitting of equipment.
 - .4 Disinfecting and cleaning of equipment.
 - .3 Personal hygiene to be observed when performing the work.
 - .4 The measures and procedures prescribed by this section including decontamination of the worker.
 - .5 Instruction and training must be provided by a competent person.

1.4 Personal Protection

- .1 Provide the following respiratory protection to all personnel, at minimum:
 - .1 Non-powered half-face respirators with P100 high efficiency cartridge filters.
- .2 Provide protective clothing, to all personnel entering the Abatement Work Area, including:
 - .1 Dust impermeable gloves appropriate for the work being completed.
 - .2 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.
- .3 Provide protective clothing, to all personnel entering the Abatement Work Area.
- .4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.
- .5 Lead-specific soaps and hygiene indicators are recommended to be provided for shower and hand-wash stations.

1.5 Inspections

- .1 Refer to Inspections in Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

- .1 Refer to Section 02 81 00.

2.2 Hoarding Walls

- .1 Type A Hoarding Wall: One layer of rip-proof polyethylene sheeting installed floor to ceiling, secured with telescopic poles, clips, or other suitable methods.

2.3 Transfer Room

- .1 Install vented wood door in wood frame at doorway to Occupied Area. Door must have locking passage set. Provide two keys to Abatement Consultant and one to Owner.
- .2 Transfer Room to be generally 2000 mm x 2000 mm x 2200 mm high. Increase size accordingly to accommodate number of workers.
- .3 Install walls as follows:
 - .1 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.
 - .2 Install one layer rip-proof polyethylene sheeting on interior walls of Transfer Room.
- .4 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting beneath entire Transfer Room.
- .5 Install one layer rip-proof polyethylene sheeting over roof.

- .6 Turn 600 mm of polyethylene down the sides over polyethylene on the perimeter walls.
- .7 Install a fire extinguisher, mount to wall.

2.4 Curtained Doorways

- .1 Construct as follows:
 - .1 Install two flap doors, full width and height of door opening at all doors to Abatement Work Area and both ends of Transfer Room.
 - .2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.
 - .3 Install weights attached to bottom edge of each door flap.
 - .4 Provide direction arrows on flaps to indicate opening.

PART 3 EXECUTION

3.1 Site Preparation - General

- .1 Provide washing facilities consisting of a wash basin, clean water, soap and towels.
 - .1 Workers are to use washing facilities each time leaving the Abatement Work Area.
- .2 Stored or non-fixed items, including but not limited to equipment, furniture, waste etc., shall be removed from the Abatement Work Area prior to abatement work.
- .3 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.
 - .1 Lock-out/tag-out power at electrical panels.
 - .2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.
- .4 Shut down HVAC systems serving the Abatement Work Area.
 - .1 Install polyethylene sheeting over openings in ducts and diffusers and seal.
 - .2 HVAC to remaining areas of building must not be disrupted during work of this section.
 - .3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.
 - .4 Perform work at scheduled times after shutting down HVAC systems affecting the Abatement Work Area.
- .5 Remove visible dust from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.
- .6 Provide amended water for wetting materials, and adequate method of wetting (garden sprayers, airless sprayers, etc.).
- .7 Provide electrical power and shut off for operation of powered tools and equipment. Provide ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard.
 - .1 Ensure safe installation of electrical lines and equipment.

- .8 Do not use compressed air to clean or remove dust or debris.
- .9 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
- .10 Frequently and at regular intervals, place all waste in waste containers.
- .11 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.2 Site Preparation – Enclosure Required

- .1 Install Transfer Room where duration of work is to last longer than one 8 hour shift.
- .2 Install Curtained Doorways.
- .3 Install polyethylene sheeting at openings in walls (as required) and seal.
- .4 Seal openings in floor using tape, caulking, polyethylene, etc. Floor openings are to be sealed independently prior to installation of floor polyethylene.
- .5 Install polyethylene sheeting on floors of Abatement Work Area. Use sufficient layers to provide adequate protection for carpeting and equipment.
 - .1 Cover floors first so that polyethylene on walls is overlapped by at least 305 mm.
- .6 Install 6 mil polyethylene sheeting on walls to remain, within the Abatement Work Area., including existing walls that make up, or are within, the Abatement Work Area.
- .7 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged.
- .8 Place required tools to complete the abatement with the Abatement Work Area.
- .9 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.
- .10 Establish negative pressure in Abatement Work Areas as follows:
 - .1 Provide sufficient HEPA filtered negative pressure machines to exchange a volume of air equivalent to that of the Abatement Work Area a minimum of every 20 minutes.
 - .2 Provide additional HEPA filtered negative pressure machines as required to ensure air flow from Occupied Area into Abatement Work Area.
 - .3 Operate HEPA filtered negative pressure machines continuously from first disturbance of ACM until completion of dismantling.
 - .4 Replace prefilters to maintain specified flow rate.
 - .5 Replace HEPA filter as required to maintain flow rate and integrity of unit.
 - .6 Discharge HEPA filtered negative air machines to building exterior, where possible.
 - .1 Direct discharge away from building access points.
- .11 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of lead hazard, and lead hazard where appropriate.

3.3 Site Preparation – No Enclosure Required

- .1 Cover materials to remain in the Abatement Work Area with polyethylene sheeting before disturbing ACM to control the spread of dust.
- .2 Install caution tape around work area where existing walls are not present.
- .3 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.
- .4 Place HEPA vacuum in Abatement Work Area.
- .5 Place required tools to complete the abatement with the Abatement Work Area.
- .6 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of a lead dust hazard.

3.4 Maintenance of Abatement Work Area

- .1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.
- .2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.
- .3 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Inspection must be performed by competent person.
- .4 Maintain Abatement Work Area in tidy condition.
- .5 Remove standing water on polyethylene/floor at the end of every shift.
- .6 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.5 Lead Abatement

- .1 Use the procedures described above under *Site Preparation – Enclosure Required*.
 - .1 Removal of lead-containing surface coatings or materials by scraping or sanding (including wet sanding) using non-powered hand tools.
 - .2 Demolition of plaster or other building components that crumble, pulverize or powder and are covered with lead-containing surface coating.
- .2 Use the procedures described above under *Site Preparation – No Enclosure Required*.
 - .1 Removal of lead containing paint using power tools with an effective dust collection system equipped with HEPA filter.
 - .2 Welding, torching or high temperature cutting of lead-containing surface coatings or materials indoors, with use of an effective fume collector or smoke eater.
 - .3 Welding, torching or high temperature cutting of lead-containing surface coatings materials outdoors.
- .3 Provide washing facilities consisting of a wash basin, clean water, soap and towels.
 - .1 Workers are to use washing facilities each time leaving the Abatement Work Area.
- .4 Removal methods minimizing dust generation should be used wherever possible.

- .1 Wet methods are to be used to reduce dust generation.
 - .1 Wetting agents should be used where possible.
 - .2 Wet method not be used if it creates a hazard or cause damage to equipment or to project.
- .5 Provide drop sheets below all lead operations that may produce dust, chips or debris containing lead.
- .6 Waste water from cleaning or removal operations must be contained, for treatment or disposal.
- .7 Remove lead containing paint in small sections and pack as it is being removed in sealable waste containers.
- .8 Waste generated should be maintained wet until cleaned and packaged.
- .9 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.
- .10 After wire brushing and wet sponging to remove visible lead containing paint, wet clean entire work area, and equipment used in process.
 - .1 Compressed air or dry sweeping not be used to clean up lead-containing dust or waste.
 - .2 Ensure all waste is cleaned and packaged.
- .11 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside. Ensure containers are removed by workers who have entered from uncontaminated areas dressed in clean coveralls.

3.6 Waste Management and Disposal

- .1 Per Section 02 82 00.

3.7 Final Cleaning

- .1 Following specified cleaning procedures, proceed with final cleanup.
- .2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Clean visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.
- .3 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and seal. Dispose of in accordance with waste materials generated.
- .4 Clean Work areas and Transfer Room, where present.
- .5 Remove sealed waste containers and equipment used in Work and remove from work areas at appropriate time in cleaning sequence.
- .6 Conduct final check to ensure no dust or debris remain on surfaces as result of dismantling operations.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Unless otherwise shown or specified it is the intent that work performed as per this section will result in the removal and destruction of:
 - .1 PCB-containing caulking
- .2 All Work shall be performed in strict accordance with the Project Documents and all governing codes, rules, and regulations. Where conflicts occur between the Project Documents and applicable codes, rules, and regulations, the more stringent shall apply.

1.3 Quality Assurance

- .1 Ensure the removal and handling of PCBs is performed by persons experienced in the methods, procedures and industry practices.
- .2 Complete work so that at no time do PCBs contaminate the building or environment.

1.4 Instruction and Training

- .1 Instruction and training must be provided to all workers and supervisors. Instruction and training includes the following:
 - .1 Hazards of PCBs.
 - .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during work, including:
 - .1 Limitations of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Proper fitting of equipment.
 - .4 Disinfecting and cleaning of equipment.
 - .3 Personal hygiene to be observed when performing the work.
 - .4 The measures and procedures prescribed by this section.
- .2 Instruction and training must be provided by a competent, qualified person.

1.5 Personal Protection

- .1 Workers handling PCB-containing materials are advised to avoid skin and eye contact.
- .2 During removal of PCBs, personnel are to wear personal protective equipment

appropriate to the task.

- .3 During removal of PCB caulking, personnel are to wear, at minimum:
 - .1 Provide workers, at a minimum, with non-powered half-face respirators with P100 high efficiency and Organic Vapour cartridge filters.
 - .2 Provide workers, with protective eye wear.
 - .3 Provide protective clothing, to all personnel entering the Abatement Work Area.
 - .4 Provide disposable gloves (nitrile), to all personnel entering the Abatement Work Area.

1.6 Inspections

- .1 Refer to Inspections in Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS

2.1 Materials

- .1 Containment Drums: new, not used double bung 45 gallon No. 16 gauge cold rolled steel drums with removable steel lid, PCB resistant gasket (nitrile rubber, cork or Teflon), and 12 gauge compression type ring closure with 5/8" bolt and forged lug. Drums shall be newly painted inside and out with bright white rust-resistant enamel. Metal pail of 16 gauge steel with removal steel lid, are also acceptable for smaller quantities of waste.
- .2 Decontamination Area: An established area for the purpose of decontaminating personnel and equipment.
 - .1 Of sufficient size to accommodate cleaning of equipment and removing personal protective equipment.
 - .2 Install PCB warning signs / tape at the entrance to the decontamination area.
 - .3 The floor shall be covered with polyethylene sheeting.
 - .4 Include a hand washing station complete with soap and towels and 6 mil polyethylene bags for disposal of PCB-contaminated items such as gloves, Tyvek suite rags etc.
 - .5 All personnel must enter and exit the Abatement Work Area through the decontamination area.
 - .6 All equipment and surfaces of waste containers must be cleaned prior to removing them from the decontamination room or area.
 - .7 Work clothing must be cleaned with a HEPA vacuum before it is removed.

- .3 Drum liners: clear polyethylene bag, 36" x 60", 6 mil thick. Open one 36" end.
- .4 Label: appropriate PCB Labels and Placards of sufficient size to be clearly legible, for display on waste containers (bags, boxes, rolloffs or drums) which will be used to contain or transport PCB contaminated material, in accordance with TDG regulations.
- .5 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints. New materials only.

PART 3 EXECUTION

3.1 General

- .1 Do not contaminate building surfaces with PCBs.
- .2 Should visible PCB debris be observed outside the Work Area, immediately stop Work notify the Consultant and Owner; institute emergency procedures as directed. All costs incurred in decontaminating such non-Work Areas and the contents thereof shall be borne by the Contractor, at no additional cost to the Owner.
- .3 Notify Owner's Representative of any spills immediately.
 - .1 Any spills of PCBs are to be cleaned to the satisfaction of the Owner's Representative at the contractors cost. This includes removal and replacement of building materials as required.
- .4 Conduct PCB removal operations in a manner that fully protects Contractor's and Subcontractor's employees, the general public, other building occupants and the environment from exposure to PCB.
- .5 Non-PCB items remaining such as windows, doors, masonry, and all other building construction and components from which PCB materials are removed shall be decontaminated by physical or chemical means such that no visible residue remains. The removal of the PCB materials may require the use of scrapers, solvents, mastic removal chemicals, or other methods/procedures to ensure complete removal.
- .6 Use hand tools that generate the least amount of dust and will still complete the PCB caulk removal.
 - .1 Grinding electromechanical tools (e.g. angle grinders, masonry groove cutters, circular saws, and slot mills, etc.) are not allowed to be used for exterior open-air PCB caulk removals.
- .7 Remove accessible caulk that could be disturbed before cutting building components, such as window frames.

3.2 Work Area Preparation - Interior Removal:

- .1 Isolate all HVAC equipment, including installing polyethylene sheeting on all air returns and exhausts. Turn off all HVAC systems serving work area when feasible.
- .2 All floor areas adjacent to the work area shall have a layer of polyethylene sheeting, attached to the interior wall and laid down on the surfaces below the abatement work

area, at least 5 feet wide or to the furthest point of gravity fall for dislodged debris by methods used, whichever is further.

- .3 All movable objects shall be removed from the immediate work area. All non-movable objects shall be covered with one layer of polyethylene sheeting and sealed at the edges.
- .4 Temporary dust barriers consisting of a minimum of polyethylene sheeting shall be at installed at hallways, corridors, doorways, and other openings to the work area not used for passage during removals to establish work area containment enclosure.
- .5 Polyethylene sheeting overlapping curtained doorway shall be installed at the entrance to the work area.

3.3 Equipment and Area Decontamination

- .1 When removal of PCB materials is completed, the decontamination process shall consist of HEPA vacuuming, wet wiping/mopping and a repeated HEPA vacuuming of the entire work area. All surfaces in and around the work area must be free of dust generated during the work.
- .2 Decontaminate all tools and equipment before removal from the work area.
- .3 If dust or debris has migrated to areas of the building other than the immediate work area, those areas shall be incorporated into the work area and thoroughly decontaminated to ensure all visible dust generated by the activity is eliminated.
- .4 Uncontaminated dust barriers and other protective sheeting shall be placed in disposable construction bags and disposed of as normal trash.
- .5 Visually inspect the area for any remaining dust or debris. HEPA vacuum and wet wipe until space is clean. Dispose of vacuum contents as PCB waste.
- .6 Upon completion of decontamination and removing temporary dust barriers, a final inspection shall be performed by the Contractor.
- .7 Failure of any visual inspection by the Consultant, the Contractor will clean the affected areas at no additional expense to the Owner.

3.4 Transportation and Reporting

- .1 All waste containers shall be fully enclosed and lockable (i.e. enclosed dumpster, trailer, etc.).
 - .1 While on-site, the container shall be labelled with PCB Warning Labels and as required by Federal and Provincial regulations.
- .2 All waste generated as part of the PCB project shall be removed from the site within ten (10) calendar days after successful completion of all PCB abatement work.
- .3 The Hauler, with the Abatement Contractor and the Abatement Consultant, shall inspect the transport container prior to the Hauler taking possession and signing the Hazardous Waste Manifests.

- .4 A Hazardous Waste Manifest shall be utilized solely as the waste Manifest for transportation. A hauler billing form or bill of lading may be used if the hauler needs an independent record, but shall not be used as a shipping document.
 - .1 The Manifest shall be completed by the Contractor and verified by the Consultant that all the information and amounts are accurate and the proper signatures are in place.
 - .2 The Manifest shall have the appropriate signatures of the Owner's Representative (the Generator) and the Hauler representative prior to any waste being removed from the site.
 - .3 Upon arrival at the Disposal Site, the Manifest shall be signed by the Disposal Facility operator to certify receipt of PCB materials covered by the manifest.
 - .4 The Disposal Facility operator shall return the original Manifest to the Owner's Representative (the Generator) as required by the Ministry of Environment, Conservation and Parks.
 - .5 Provide a copy of the completed waste manifest proving receipt of the PCB waste by the Disposal Facility.
- .5 Transport materials following Transportation of Dangerous Goods Act.
 - .1 Transport PCBs to approved incineration site for destruction and ensure materials are destroyed.
- .6 The facility used to process the PCBs shall be approved by the Ministry of the Environment and shall have valid Certificates of Approval to carry out the work outlined herein.
 - .1 The facility must issue a Certificate of Destruction identifying types and quantities of PCBs generated from the project.

END OF SECTION

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PART 1 GENERAL

1.1 INSTRUCTIONS

1. Unless specified otherwise, the following instructions shall apply to all sections of the work.
2. Conform to The latest Ontario Building Code, CEC CSA C22, CAN3-B44 and CSA W59.1 - latest amendments, where applicable, to the Canadian Code for Construction Safety, as currently amended, and to the Construction Safety Act, Ont. as currently amended, and to all other applicable codes and Building By-Laws hereinafter referred to as Codes; and to the requirements of the authorities having jurisdiction, including public utilities, referred to in the Contract Documents as the authorities.
3. Conform to regulations of Municipality having jurisdiction regarding clean up of tracking on streets and protection of sidewalks and curbs, and all other applicable laws, By-laws and Regulations.
4. Read General Work - Section 01015, for instructions and requirements regarding General Work and Services, Miscellaneous Work and Services and Temporary Work and Services. Trades requiring own offices, sheds, etc. shall provide, maintain, relocate and remove same in a manner satisfactory to Contractor.
5. Establish rates of wages, hours and conditions of work, in accordance with Provincial Codes and as generally recognized and accepted in locality. Wherever possible, give preference to use of local labour, building mechanics, suppliers and subcontractors.
6. Install and arrange ducts, piping, tubing, conduit, equipment and fixtures in such a way as to conserve head room and space as much as possible, to provide minimum interference and to be neat, orderly and tidy. Unless otherwise noted, run pipes, ducts, tubing and conduit vertical, horizontal and square with building grid. Conceal pipes, ducts, tubing and conduit above ceilings, behind furrings, in walls, except in mechanical rooms, equipment rooms and unfinished spaces, unless indicated or specified otherwise.
7. In all cases where a device or part of the equipment is herein referred to in the singular number, it is intended that such reference shall apply to as many such devices as are required to complete the installation.
8. Definitions
 1. Wherever the words 'approved', 'satisfactory', 'directed', 'permitted', 'inspected', 'instructed', 'required', 'submit', 'ordered', or similar words or phrases are used in the Contract Documents, it shall be understood, unless the context provides otherwise, that the words 'by (to) the Architect' follow.

2. The words 'by others' when used in the Specifications or on the Drawings shall not mean by someone other than the Trade Contractor. The only means by which something shown or specified shall be indicated as not being in the Contract is by the use of the initials 'NIC' or the words 'not in (the) Contract', 'by Client', or by another Contractor.
3. Exposed: means when visible by the occupants at completion of the work, unless scheduled or specified otherwise.
4. The use of scope, related work, or similar articles in the specifications shall not relieve the contractor from their responsibility to assign the various parts of the work to the appropriate subcontractors and forces and shall not impose upon the Architect or Client the duty to arbitrate disputes between the Contractor and the Subcontractor, nor shall it relieve the subcontractors from their responsibility for carefully examining all the Drawings and Specifications and coordinating their work with each other and the Contractor.
5. Wherever the words 'Construction Manager' are used, this shall also be read as 'General Contractor'.

1.2 CO-OPERATION

1. Co-operate and co-ordinate with other trades as required, for satisfactory and expeditious completion of work. Take field dimensions relative to work. Fabricate and erect work to suit field dimensions and field conditions. Provide forms, templates, anchors, sleeves, inserts and accessories required to be fixed to, or inserted in work, and set in place or instruct related trades as to their location. Pay cost of extra work caused by and make up time lost, as a result of failure to provide in adequate time, the necessary co-operative information of items to be fixed to, or built in.

1.3 MATERIALS

1. Reject material damaged in transit. Store packaged materials in original undamaged containers with manufacturer's labels and seals intact. Handle and store materials in accordance with manufacturers' and suppliers' recommendations. Prevent damage. Remove from site and replace damaged materials.
2. Conform to the Products, tables and standards in Section 01016 for the following:
 1. Metals
 2. Gauges & Equivalent Thickness
 3. Glass

4. Concrete, Masonry, Paving
5. Finish for Aluminum, Baked on Coatings
6. Pencil Hardness Test
7. Finish for Aluminum, Hard Anodizing

1.4 EXAMINATION

1. The Contractor affirms that before tendering, they did examine the site and ascertain the extent and nature of all conditions affecting the performance of the work including the existing conditions; and including the location of all buried services which may have to be protected, removed or relocated. No extras will be allowed for anything which would have been revealed in the course of such an examination.
2. The Contractor affirms that before tendering they did examine the Specifications, Drawings, and other tender documents thoroughly. It shall be assumed that the Contractor thoroughly understands these documents, including those particular items about which questions have been asked and written instructions given.
3. Examine work upon which your work depends. Application of your work or any part of it shall be deemed acceptance of work upon which your work, or that part of it which has been applied, depends.
3. Drawings are in part, diagrammatic and incomplete, and are intended to convey scope of work and indicate general and approximate location, arrangement and size of fixtures, equipment, ducts, piping, conduit and outlets. Obtain more accurate information about locations, arrangement and sizes, from study and coordination of construction drawings, including architectural, structural, mechanical and electrical and become familiar with conditions and spaces affecting these matters before proceeding with work.
4. Where job conditions require reasonable changes in indicated location and arrangements, make changes at no extra cost to Client. Install and arrange ducts, piping, conduit, equipment and fixtures in such a way as to conserve head room and space as much as possible.

1.5 SCAFFOLDING

1. The Contractor shall provide at their own expense all manner of materials, labour, scaffolding, ladders, hand tools, and appliances necessary for the due execution and proper completion of work described herein, unless otherwise specified in tender specifications.
2. Erect scaffolding independent of walls. Use scaffolding so as to interfere as little as possible with other trades. When not in use, move scaffolding as necessary to permit installation of other work. Construct and maintain scaffolding in rigid,

secure and safe manner. Remove scaffolding promptly when no longer required. Scaffolding must comply to Occupational Health and Safety Act.

1.6 FLOOR SURFACES

1. Adequately protect existing and new floors and finishes from damage. Take special measures when moving heavy loads or equipment on them.
2. Keep floors free of oils, grease, or other material likely to damage them, discolour them, or affect bond of applied finishes.
3. Once building is enclosed, keep floors as dry as possible after curing.

1.7 PROTECTION AND MAKING GOOD

1. Protect existing property, adjacent public and private property and work of other sections from damage while doing work.
2. Damaged work and property shall be made good (includes replacing, fixing, re-finishing) wherever possible by those performing work originally, but at expense of those causing damage.
3. Attach and fasten fixtures and fittings in place in safe, sturdy, secure manner so that they cannot work loose or fall or shift out of position during occupancy of building as a result of vibration or other causes in normal use of building.
4. If, during work, any buildings, curbs, walks, roads or landscaping are damaged, repair or replace them to the satisfaction of Architect and the local jurisdiction.
5. Protect glass and other finishes against heat, slag and weld spatter, by erecting sturdy plywood or other heavy shield.
5. If tape or strippable coatings are used to protect finished metal surfaces, do not allow them to become baked on or to thermoset.

1.8 IMPACT DRIVEN FASTENINGS

1. Do not use impact driven (explosive, hammer, etc., but not twist driven) fastening devices without written approval. Properly size holes in concrete and drill cleanly to avoid oversizing for expansion anchors. When drilling upward, use jig to hold drill steady and plumb.

1.9 ALTERATIONS AND MAKING GOOD

1. Wherever it becomes necessary to cut or interfere in any manner with existing services and apparatus, do so at such times as approved by the Architect. Give minimum advance notice of one week and provide sufficient information of such requirements.

2. Take into account existing installations to ensure best arrangement of pipes, conduit, ducts and mechanical, electrical and other equipment in available space. For critical locations, prepare interference and installation drawings showing work of various sections as well as existing installations, for approval, before commencing work.
3. Comply with Section 01045 Cutting and Patching for additional information

1.10 STANDARDS

1. Where initials of an organization are used, followed by number or combination of numerals and letters, this designates a standard produced by the organization. Conform to issue of standard so designated, as amended and revised to date of contract. When designation does not indicate particular edition of standard edition current at date of Contract shall apply.
2. Wherever a standard confers upon a person, a body politic or a body corporate the right to approve, to select, to exercise authority or to interpret the standard, and refers to that person, body politic or body corporate as the Authority having jurisdiction, the Authority, the Engineer, the Department, the Purchaser, the Contracting Officer (e.g. U.S. Fed. Spec.) or by some other such designation, the Architect shall have the right to exercise the powers of any such person, body politic, or body corporate.
3. Where standards and manufacturer's instructions conflict with the Contract Documents, the Contract Documents shall govern.

1.11 FINISHED DIMENSIONS AND ELEVATIONS

1. See Article on Setting Out, in Section 01015. Give particular attention to finished dimensions and elevations of the work. Make finished work fit indicated spaces accurately. Make finished work flush, plumb, true to lines and levels and accurate in all respects

1.12 NON-PAYMENT

2. All those doing work or supplying materials shall notify the Architect in writing if the Contractor fails to make payment when due. Failing such notice, the Architect will assume that payments have been duly made.

1.13 CLEANING AND CONTRACT CLOSE-OUT

1. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
2. Store volatile wastes in covered metal containers and remove from premises daily.

3. Prevent accumulation of wastes which create hazardous conditions.
4. Provide adequate ventilation during use of volatile or noxious substances.
5. Use only cleaning materials recommended by manufacturer on surface to be cleaned, and as recommended by cleaning material manufacturer.
6. See G.C. 3 of the General Conditions of the Contract.
7. Refer also to Section 01710 Cleaning and Dust Control Measures.
8. Refer also to Section 01700 Contract Close Out.
9. Final Inspection and Closeout
 1. Submit proposed closeout procedures and schedule of inspection to Architect for approval before final inspections commence.
 2. Arrange for, conduct and document final inspections, closeout and take-over at completion of work of this specification in accordance with procedures described in OAA/OGCA TAKE-OVER PROCEDURES, OAA/OCGA Document No. 100, December 2007.
 3. Substantial completion cannot be applied for until the building is approved for occupancy by the local Building Authority, maintenance manuals and as-builts have been submitted, operating instructions to the Client have been completed and percentage of completion as per the Construction Lien Act has been obtained.
 4. Comply with Section 01700.

1.14 TRADEMARKS AND LABELS

1. Trademarks and labels shall not be visible in the finished work except for labels of ULC and other similar authorities and except where necessary to identify mechanical and electrical equipment, for maintenance and replacement and except where specified otherwise.
2. Except as provided in the foregoing paragraph, locate trademarks and labels on concealed or inconspicuous surfaces or remove by grinding if necessary or paint out where surface painted, if located conspicuously.

1.15 BURIED SERVICES

1. The Contractor shall be responsible for keeping records of all buried services. The subcontractors concerned shall provide the Contractor with all necessary dimensions required to accurately locate those services.

1.16 EXISTING SERVICES

1. Where work involves breaking into or connecting existing services, carry out work at times directed by governing authorities, with minimum of disturbance to the operation of the facility, pedestrian and vehicular traffic.
2. Before commencing work, establish location and extent of service lines in area of work and notify Architect of findings.
3. Where unknown services are encountered, immediately advise Architect and confirm findings in writing.
4. Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
5. Remove abandoned service lines to distance of six feet from foundations. Cap or otherwise seal lines at cut-off points, in manner approved by authorities having jurisdiction over service.
6. Record locations of maintained, re-routed and abandoned service lines. The sub-contractors concerned shall provide the General Contractor with all necessary dimensions required to accurately locate those services.
7. The appropriate Sub-contractor shall assume full responsibility for the locations and protection of all under and above ground utilities, such as water, sewer and gas mains and building connections, hydro and telephone poles, wires and conduits, etc. when excavating or digging below grade whether they are shown on the plans or not.
8. Where the location of any of these utilities has been shown on the plans, such information is not guaranteed. It is the appropriate Sub-contractor's responsibility to verify locations, invert elevations, etc., immediately after moving on the site. If for any reason the information obtained necessitates changes in procedures or design, advise the Architect at once. If this verification of existing conditions is not done at the outset and any problems arise, the responsibility for same will be entirely the Contractor's.
9. Contractor to provide temporary support of existing service lines and pipes where work requires excavation below existing lines for construction of new footings, foundations, etc.

1.17 EMBEDDED CONDUIT, PIPE AND SLEEVES

1. Concrete Slabs
 1. All pipes and conduits shall be depressed to pass under concrete slabs on grade.
 2. Sleeves, conduits and pipes which pass through suspended slabs, beams or walls, shall be in approved locations which do not impair the strength of

the construction. Space them all not less than three diameters o.c.

1.18 SOUND ATTENUATING PARTITIONS

1. Avoid "short circuiting" sound attenuating partitions by the careful location and treatment of ducts, grilles, diffusers, etc., and of electrical outlets and boxes, etc. Where electrical boxes are back to back, serving each side, locate them at least 10 inches (250 mm) apart laterally and if interconnected, use flexible connections.

1.19 SAFETY

1. The General Contractor will be responsible for submitting their safety program used in the ongoing operation of their company and any safety recommendations specifically relating to the tendered project.
2. Safety measures or procedures taken by the General Contractor i.e. site safety meetings, site construction fences, etc., will not relieve the Contractor of their responsibilities for the safety of persons and property, and for compliance with the federal, provincial and local statutes, rules, regulations and orders applicable to the conduct of the work.
3. Submit copies of all Safety Meeting Minutes to Architect and Client.
4. Comply with Section 01545.

1.20 OMISSIONS AND DISCREPANCIES

1. Notify Architect at once of discrepancies found in, or omissions from the drawings, specifications or other documents or if in doubt as to their meaning; Architect will send a written instruction to all Bidders. If a discrepancy exists, the Architect will issue an addendum to all Bidders to clarify or correct such discrepancies.
2. Neither Client nor Architect will be responsible for any verbal instructions.
3. Should any discrepancies or omissions go unreported to the Architect during tendering period, the proper interpretation shall be at the discretion of the Architect.

1.21 EXAMINATION

1. The site shall be accepted by the Contractor in their present condition. The Contractor will be held to have visited the site and to have carefully examined all conditions affecting the site, the work to be done there on, including the location of all services which may have to be protected, removed or relocated. The Contractor shall accept sole responsibility for any error or neglect on their part in this respect. Submission of Tender shall be deemed confirmation that tenderer has inspected site and is thoroughly conversant with existing conditions. No claims for extra payment will be considered for extra work, expense or difficulties

encountered due to conditions on the site which were visible upon or reasonably inferable from an examination of the said site prior to the closing of tenders.

2. Examine the specifications, drawings and soils report thoroughly. Report to Architect all ambiguities, discrepancies, omissions, errors, departures from Building By Laws, or from good practice, discovered during examination as early in the tender period as possible to allow clarification by addenda to be issued to all bidders. No claims for extra payment will be considered for work, expense or difficulties which are reasonably inferable from an examination of the documents prior to the closing of tenders.
3. The drawings and specifications complement each other and neither is to be considered alone. Hence, any item omitted in one, but mentioned or implied in the other, must be provided.
4. All changes to the contract documents which result in an extra or a credit to the contract amount are not to be executed until written instructions have been received and the extra or credit agreed to in writing by all parties to the contract.
5. The Contractor shall execute variations, alterations and substitutions which do not affect the contract amount as instructed by the Owner or its representatives.
6. Bidders finding discrepancies or omissions in the drawings or specifications shall at once notify the Architect who shall send written instructions to all bidders. Bidders may, during the tender period, be advised by addenda of any additions, alterations or deletions to the specifications and drawings. All such changes shall be covered by the tender and become part of the contract documents.
7. If any person submitting a bid on this project is in doubt as to the true meaning and intent of any part of the specifications or other documents, he must request an interpretation from the Architect. If such interpretation is not requested, the bids will be presumed to be based on the interpretation or directions that may be subsequently given by the Architect after award of the Contract, in accordance with the provisions of the Contract.
8. Prior to the closing date of tenders, any and all necessary clarifications of the specifications or other Tender documents will be in the form of written Addenda. The Architect will NOT be responsible for verbal instructions or any explanations or interpretation of Drawings and Specifications.
9. No questions concerning this project will be accepted by the Architect during the day of the tender closing date for 48 hours prior to the tender closing date.

1.22 UNIT PRICES

1. At time of submission include in the tender form all the unit prices in accordance with the Tender Form. These unit prices will be included in the agreement.
2. Unit prices shall include labour, material, overhead and profit, supervision, and

other relative charges, but shall be exclusive of all value added taxes, and HST. Any work done on the basis of unit prices shall be carried out generally in accordance with the specifications for similar work and shall be to the Architect's approval.

3. The Client reserves the right to accept or reject any or all of the Unit Prices proposed prior to entering in the construction contract. The Client reserves the right to negotiate these unit prices rejected or proposed

1.23 PROCEDURES AND SUPPLY OF CRITICAL MATERIALS

1. Submission of a tender shall constitute the Tenderer's agreement that they will commence work immediately upon award of the Contract, and that they will execute the same without interruption until completion, including the furnishing of all necessary supplies and equipment for winter operations. Contractor shall assure themselves before submitting a tender that they are in a position to furnish adequate supplies of all materials, critical or otherwise, at such times necessary to ensure immediate commencement of the work and continuous operation without delays on the project. The Contractor shall include in their tender amount, sufficient sums for the purchase of critical materials from any source available. After award of the contract, the Client will not grant increases to the tender amount to obtain critical materials at premium prices, nor will delays or interruption of the work be tolerated.

1.24 LAWS, CODES AND REGULATIONS

1. The tenderer is assumed to have made themselves familiar with and abide by the Federal National Authorities, Provincial, Municipal and local laws, rules and regulations which in any manner affect those engaged or employed in the work, or in any way affect the work, and no plea of misunderstanding will be considered on account of ignorance thereof. If the Bidder shall discover any provisions in the drawings, specifications or contract which are contrary to or inconsistent with any law, rule of regulation, Contractor shall at once report it to the architect in writing.

1.25 SITE ACCESS

1. Contractor to remove all debris from site daily.
2. Location of all trailers, storage units, and construction fences by contractor shall be reviewed and approved by the Client and Architect at a preliminary site meeting prior to contractor moving on to site.
3. Parking for construction workers shall be on site as directed by the General Contractor, only when parking spaces are available.
4. Site access for construction to be confirmed at first site meeting.

1.26 CONSTRUCTION SAFETY

1. Safety measures or procedures taken by the Contractor, i.e. site safety meetings, protective street hoarding, site construction fences, etc. will not relieve the contractor of their responsibilities for the safety of persons and property, and for compliance with the federal, provincial and local statutes, rules, regulations and orders applicable to the conduct of the work.
2. The Contractor shall be liable for any costs, fines, penalties, etc. levelled against the Client or Consultant due to violation of the Construction Safety Act by this Contractor or any Subcontractors on this project.
3. The Contractor shall be responsible for submitting to the Client their safety program used in ongoing operation of their company and any safety recommendations specifically relating to the tendered project.

1.27 PROJECT SCHEDULE

1. The successful bidder will be required within one (1) week after award of a Letter of Intent to forward to the Architect, a schedule indicating construction sequences, manpower and equipment required in order to complete the work. This schedule is to be posted on site at all times. Schedule is to be updated on a weekly basis.
2. When the Architect deems that the Contractor's work has fallen behind schedule, the contractor will provide the necessary manpower and work the necessary overtime to bring the work back on schedule at no cost to the Client.
3. Contractor shall commence shop drawings immediately once acceptance of tender has been given by the Client. A complete shop drawing and sample submission schedule is to be provided within seven days of tender award. This will be reviewed by Architect.
4. Commence construction on the Project as soon as Building Permit is obtained.
5. Refer also to Section 01310 Construction Schedules.

1.28 PROTECTION AND MAKING GOOD

1. Protect existing property, adjacent public and private property and work of other sections from damage while doing work.
2. Damaged work and property shall be made good wherever possible by those performing work originally, but at expense of those causing damage. The General Contractor is solely responsible for all subtrades and any damage.
3. Attach and fasten fixtures and fittings in place in safe, sturdy secure manner so that they cannot work loose or fall or shift out of position during occupancy of building as a result of vibration or other causes in normal use of building.
4. If, during performance of the work, any buildings, curbs, walks, roads or

landscaping are damaged, repair or replace them to the satisfaction of Architect and the local jurisdiction at no additional cost to the Client.

1.29 MATERIALS AND EQUIPMENT

1. All materials and equipment supplied for the work shall be new, of the best quality, and in accordance with the latest applicable specifications of the Canadian Standards Association.
2. The particular method, material, procedure or equipment specified in this tender shall be used as a standard.
3. M.S.P.S. (Material Safety Data Sheets) for all materials being used on this project are to be kept on site and made available for use by all concerned.
4. Controlled substances: the use of any controlled substance of any kind must be reviewed by Client and written acceptance of its use obtained.
5. A bidder may submit an alternative method, material, procedure or equipment to that specified in the tender specifications. All alternatives shall be equal or superior to the standard specified in these tender documents and all unit prices along with overall product quantity cost is to be submitted. Alternates may not necessarily be accepted by the Architect.

Where particular products are specified and approved alternate manufacturers are listed, it is the responsibility of the contractor to ensure that any products carried in their tender from one of the approved manufacturer's meets or exceeds the original specified product.

Upon the alternate product shop drawing submission to the architect for review, all product data sheets (for specified and alternates) comparing the two products are to be submitted.

6. The bidder who furnishes an alternative method, material, procedure or equipment in place of the standard item specified shall furnish complete documented data including such information as chemical content and performance under laboratory tests which proves the quality and equality of the proposed alternative. This information shall accompany the bid. Note that the bidder who furnishes an alternative method, material, procedure or equipment in place of the standard item specified is responsible that the alternative will work with the Architectural layout, equipment will fit in the provided space and any revisions that will be required will be at the bidder's cost.
7. In all cases where alternative methods, materials, procedures or equipment are offered in response to this tender, the Owner shall make the final ruling on their acceptability.

8. During and upon completion of the work, the Contractor shall remove from the premises all surplus materials, equipment and debris.

1.30 ACCESS TO INFORMATION

1. All tenders, quotes and proposals are subject to the Municipal Freedom of Information and Protection of Privacy Act and will be disclosed where the Owner is required to do so for the purposes of complying with an Order of the Information and Privacy Commissioner.

1.31 GENERAL NOTES TO CONTRACTOR

1. The contractor will be required to keep and maintain a set of as-built drawings for each project. These drawings will be used for no other purpose than recording the exact location of buried or covered services and all changes to the contract documents. The as-built drawings will be submitted to the Architect along with guarantees, maintenance data, extra supplies, etc. at the substantial completion of the contract.
2. The contractor will turn over to the Architect at the completion of the contract all projects' close out documents, material, etc. These documents, material, etc. including occupancy permit, will be accepted only with a transmittal and at no other time than when submitting a written request for substantial performance of the contract. For purposes of determining a value of this work it will be considered as **\$20,000**.
3. The contractor is not to act on verbal instruction from the Client, Consultants, or Architect on work they consider to be extra to their contract scope. Extra work can only be authorized by the Architect and in a written form only. The written form must also include that this work is an extra to the contract scope, and the method by which extra costs will be tabulated.
4. Ensure the building is maintained weather tight, safe and secure. Furnish all temporary protection as may be required.
5. Remove and dispose of all resultant debris.
6. Work shall be done in accordance with best standard practice, unless special methods or performance standards are specified or given in writing by the Client. Only skilled mechanics shall be used where such are required to produce a first class job. Where required by code or other by-laws and regulations, trades people shall be licensed in their trades.
7. Use, install and handle manufactured materials in accordance with manufacturer's instructions.

8. Conform to the latest Ontario Building Code, CEC CSA C22, (latest Edition as currently amended) CAN3-B44, and CSA W59.1, where applicable, to the Canadian Code for Construction Safety, as currently amended, and to the Construction Safety Act, Ont. as currently amended, and to all other applicable codes and Building By-Laws hereinafter referred to as Codes; and to the requirements of the authorities having jurisdiction, including public utilities, referred to in the Contract Documents as the authorities.
9. Conform to regulations of Municipality having jurisdiction regarding clean-up of tracking on streets and protection of sidewalks and curbs, and all other applicable laws, By-laws and Regulations.
10. Any work not acceptable to the Architect or Client or local authorities shall be removed and replaced when and as directed by them. The cost of re-executing such work shall be borne by the Contractor.
11. All mechanical maintenance pads and penetrations to be by Mechanical Sections, and all electrical maintenance pads and penetrations to be by Electrical Sections.
12. The contractor shall have internet service on the jobsite for transfer of documents and drawings and shall maintain this service until the date of substantial performance of the contract.
13. The contractor shall maintain access to the buildings and portable buildings on site and shall restrict access to construction areas.
14. The contractor shall provide temporary drainage as required at construction access points to prevent the build-up of dirt and mud and the migration of this onto municipal streets. Periodic cleaning of municipal streets is to be provided when required and whenever specifically requested by the municipality.

PART 2 – PRODUCTS Not Used

PART 3 – EXECUTION Not Used

END OF SECTION

PART 1 GENERAL

1. EXAMINATION

1. Throughout the project, examine the work of all trades and promptly notify the Architect if any conditions do not or will not comply with the drawings and specifications.

2. SETTING OUT

1. Lay out work from control bench marks and indicated verified reference points. The General Contractor shall have a qualified land surveyor, registered to practice in Province of Ontario and approved by Architect, verify accuracy of layout and certify that building foundations and finish grade levels and locations are in accordance with the contract documents. File certification with Building Department and Architect immediately after foundations are completed. Payment for the Land Surveyor will be carried out by the General Contractor not under the Cash Allowance.
2. The Land Surveyor shall provide four lines and one benchmark for the General Contractor to layout their work to. The General Contractor will provide these layout lines and benchmarks for work on all other areas once they begin work on the site.
3. Protect and preserve bench marks and reference points. Inform Consultant immediately if bench marks or reference points are disturbed or damaged by any work and pay for their repair and/or replacement.
4. Locate and fix grid lines and locations of walls, partitions, shafts and all parts of the construction as work proceeds.
5. Verify grades, lines, levels and dimensions indicated, particularly with road and sidewalk elevation, and report any errors or inconsistencies to the Architect before commencing work. Confirm job dimensions at once to allow prompt checking of shop and other drawings.
6. As work progresses, provide and maintain bench marks at each floor, giving exact elevation of finished floor.

3. PROTECTION

1. Conform to Ontario Building Code, latest amendments, and The Construction Health and Safety Act, all as currently amended.
2. Provide spare safety helmets for and enforce their use by Owner, Architect, their representatives and any authorized visitors to site.
3. Protect excavation, trenches, and buildings from damage by rain, water, ground water, backing up of drains or sewers and other water, frost and all other weather conditions. Do not allow footings or slabs to be placed on frozen ground. Do not permit excavations to reach full depth indicated when freezing temperature may be expected unless footings or slabs can be placed immediately after

excavation has been completed. Protect excavations from frost by placing of suitable approved insulating material to adequate depth, if placing of concrete is delayed and after placing of concrete until backfilling occurs or freezing conditions terminate. Provide necessary pumps (including spare pumps) and temporary drainage for keeping project free of water throughout construction period. Pump water to public sewers or ditches by approved means. Refer to soils report for details. Control grading around excavations to prevent surface water from draining into excavation and from damaging adjoining property.

4. Protect building from movement and damage, especially during filling and compaction and until elements are securely anchored and cannot be damaged or moved by filling or compaction. Obtain approval of authorities having jurisdiction for such work and make changes as required by them.
5. Provide temporary 6'-0" (1800 mm) high construction fence to enclose construction area, and pavement protection as required for protection of public, and of public and private property and as required by law and by authorities having jurisdiction. Erect sturdy railings around shafts, stair wells and the like to protect workers and public from injury. Equip foregoing protection with warning lights and signs. Alter, remove and relocate or replace hoardings, barriers, and entrances therein as required by authorities having jurisdiction and by the work. Hazards requiring such protection shall be eliminated as soon as possible and protection devices removed. Maintain fences, gates until construction is complete. Keep free from unauthorized signs.
6. Provide and maintain in working order, adequate, temporary Canadian Underwriters labelled, chemical solution (soda acid) Class A.1, fire extinguishers and locate in prominent positions to approval of authorities having jurisdiction.
7. Utilities and Services - Before starting the work contact the Public Utilities for location of underground services.

4. AS BUILT DRAWINGS

1. Maintain as work progresses, accurate records of changes to the Drawings and concealed services. Accurate locations, depth, size, and type of underground utilities shall be included in these as built drawings. The General Contractor will be supplied with clear prints of the floor plans for making these recordings. As built drawings will be reviewed at each site meeting and must be properly maintained to receive Architect's approval before the monthly certificate draw will be approved.
2. Keep a daily record showing progress of the work and all factors affecting the work, i.e., weather, strikes, accidents, shipping delay, etc.
3. The General Contractor shall also supply as built drawings in AutoCad 2016 (or later) by a professional drafting service.
4. Completed as built drawings and instruction and warranty manuals shall be submitted prior to requesting substantial completion.

5. FIELD OFFICE

1. Field Office: General Contractor to provide field office at site for Contractor's and Consultants' use. Provide janitor service for periodic dusting, cleaning, and removal of rubbish. Include construction and operating hardware, with security locks, as required. Locate office where directed by Architect.
2. Storage Area: General Contractor to provide storage area at site for products and tools. Include construction and operating hardware, with security locks, as required. Separate storage for painter's materials and tools from other storage areas. Locate storage area where directed by Architect and provide security.

6. WASHROOM CONVENIENCES

1. General Contractor to provide washroom facilities as per the Construction Health and Safety Act updated as required for Covid -19. for use of subcontractors and employees. Facilities shall be provided with a screen and contents shall be removed regularly during construction. Maintain it without offense to neighbourhood. At completion of building, washroom facilities and contents shall be removed, and the ground carefully levelled and cleared. Employees on work must avail themselves of this convenience. It shall be to the satisfaction of local Health Authority.
2. Use of permanent toilets is forbidden.

7. TEMPORARY DRAINS

1. Excavations and building site shall be kept free from water at all times by means of trenches to sewers or pits from which it shall be pumped away and disposed from the site.

8. TEMPORARY WATER SERVICE

1. The General Contractor shall provide and pay for all temporary water and connections for water used for construction operations until the building is complete and turned over to the Owner. The Contractor will pay for the supply cost from the local municipality. Water for compaction and watering of sod shall be trucked to the site and paid by for the General Contractor.

9. TEMPORARY TELEPHONE

1. The General Contractor shall provide and pay for a private telephone until their work is complete.

10. TEMPORARY ELECTRICAL SERVICE

1. The General Contractor shall pay all temporary light and power necessary to the operations under this contract, including all connections necessary to supply to the Trade Contractors on site. The Contractor will pay for the cost of electrical power supply from the local P.U.C. utility only.

11. TEMPORARY HEATING

1. Provide temporary heat, heating equipment, and shelter, to keep that work which requires protection from cold, adequately warm and sheltered from elements and to allow it to be done safely and well, maintaining minimum temperature of 16 degrees Celsius (60 degrees F.) when finishing is being done and when building is closed in, until completion of work. Provide heating for materials affected by cold, both in storage and during construction. Construction requiring heat shall be suitably enclosed.
2. Do not use salamanders. Use temporary heaters of forced warm air type, operated in well-ventilated location and vented to exterior, or radiant panel type. If used in areas of completed building, provide protection on floors and adjacent surfaces to prevent damage to floors and adjacent surfaces, particularly when re-fuelling.
3. Provide temporary heat for interior spaces to maintain a minimum temperature of 16 degrees Celsius (60 degrees F.) throughout the building at all times once the building is enclosed.

12. TEMPORARY USE OF PERMANENT HEATING SYSTEM

1. Permanent heating and ventilation system may be used for temporary heating and ventilation only if the Architect gives their approval to do so in writing, and when piping is complete, all units are connected, all pumps and valves are installed and operating properly, all strainers are installed and permanent or temporary filters are installed, and entire system has been tested and is safe operating condition, and when no further shut-down of system will be necessary for future conditions.
2. Do not use air distribution system until permanent or temporary filters are in place. Filter air distribution system to prevent dirt and dust from entering units via return air. Keep unused ducts sealed to prevent entry of air. Replace or clean filters frequently during construction to minimize entry of dirt. Clean (if cleanable) or replace filters before turning over system to Owner.
3. Put system in charge of fully trained and experienced operator at all times. If required, operators shall be selected jointly by Owner and Contractor with a view to permanent employment by Owner upon completion. Operators shall qualify as set out in Operating Engineers Act, if applicable.
4. Clean, maintain and repair heating and ventilation system as require throughout its use during construction. Notify manufacturer and Architect immediately before turning over new heating equipment to Owner so that heating items may be checked for possible damage during temporary heating period. Make good damage to heating and air distribution equipment. Replace all worn parts and turn over system to Owner in clean, new condition, operating with circulating water properly treated chemically.

5. Permission might be given by the Architect in writing only upon 100% operation completeness of the systems. Neither the Owner nor the Architect are under any obligation to grant permission to use permanent heating system during construction period.

13. TEMPORARY SERVICE ROADS

1. The Contractor work closely with the subdivision developers to shall construct and maintain in good condition, such temporary service roads, culverts that may be necessary to provide safe, convenient and adequate access for materials, and other supplies at all times while the General Contractor is working on site, all to the approval of the Architect. NOTE: The Contractor shall protect existing roads, sidewalks, curbs and provide mud mats to the satisfaction of the Local Authorities and the Subdivision developers and replace any that become damaged due to any operations under this contract.

14. STORAGE SHED

1. Provide and erect where directed, weathertight shed of suitable size, with loose plank floor at least 12" off ground for storage of cement and lime. Contractors and subcontractors shall provide their own workshops and storage sheds for entire length of construction. At no time may existing buildings or new additions be used for storage of materials.

15. DELIVERY AND STORAGE OF MATERIALS

1. Arrange for early deliveries necessary for execution of work without delay and have materials on job well in advance of the time it is needed.
2. Deliver, store and handle materials to exclude foreign material and prevent damage, soiling or breakage.
3. Materials to be stored on site, which need to be protected from weather shall be so protected.
4. Packaged materials shall be delivered in packages with manufacturer's seals and all labels intact.

16. BUILDING AND PREMISES

1. Owner reserves right to take over any completed portion prior to specified completion date, provided it does not affect completion of remaining work.
2. If Owner is forced to occupy building or parts thereof prior to completion, but after date of Substantial Performance, Contractor shall not be entitled to indemnity for interference with the performance of the work.

17. OWNERSHIP OF MATERIALS

1. All work or material delivered on the site or premises to form part of the works shall be considered the property of the Owner and shall not be removed without the consent of the Architect, but the Contractor shall have the right to and shall

remove the surplus materials after he has completed the work. If so directed by the Architect, such surplus materials shall be removed at any time prior to the completion of the work.

2. All materials which are to be removed from the existing site and are not called for to be re-used or specifically called for in the specifications to be turned over to the Owner, shall become the property of the General Contractor and shall be removed from the site.

18. DETAILS AND MEASUREMENTS

1. Ensure that necessary job dimensions are taken and trades are coordinated for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of such dimensions, and for co-ordination.
2. Verify that work, as it proceeds, is executed in accordance with dimensions and positions indicated which maintain levels and clearances to adjacent work, as set out by requirements of the drawings, and ensure that work installed in error is rectified before construction continues.
3. Check and verify dimensions referring to work and interfacing of services. Dimensions, when pertaining to work of other trades, shall be verified with trade concerned.
4. Do not scale directly from the drawings. If there is ambiguity or lack of information, immediately inform the Consultant and await his instructions before proceeding. Be fully responsible for rectifying, altering or redoing any work resulting from disregarding this clause.
5. All details and measurements of any work which is to fit or to conform with work installed shall be taken at the site.
6. Should revised drawings be issued after work has commenced, Contractor shall immediately return to Architect previous drawings which refer to said work. The Contractor will be held responsible for work being carried out in accordance with said revised drawings.

19. WORKMANSHIP

1. Work shall be done in accordance with best standard practice. Only skilled mechanics shall be used where such are required to produce a first class job.
2. Use, install and handle manufactured materials, equipment and appliances in strict accordance with manufacturer's directions and instructions, unless specified otherwise.

20. FROST PROTECTION

1. Provide proper frost protection, including heating for materials to ensure scheduling of work without delay.
2. Similar protection shall be given to work done.

3. Work or materials damaged by frost shall be replaced by Contractor.
4. Snow and ice shall not be allowed to remain on any part of structure, except finished roofs, and shall be removed by Contractor.

21. PROJECT MEETINGS

1. Arrange regular meetings at two week intervals and notify the representatives of the Owner, Architect, Engineer and each subcontractor concerned with the current progress.
2. Make all necessary provisions to enable team members to join meetings virtually, including wifi, camera, microphone, large format screen.
3. Contact all subcontractors concerned at least 24 hours in advance and request their presence at job meeting.
4. Review approved progress schedule for rapid and efficient completion of work according to Contract requirements, with suppliers of materials and sub-contractors.
5. Post and forward copies of progress schedule for advice of interested parties.
6. Record the minutes of each meeting and send copies to all attending and interested parties not later than two days after the meeting. In addition, send copies to the Architect, Consultants and Owner. Contractor to provide updated change order register and shop drawing register attached to each record of minutes to indicate exactly what has been issued and the status of approvals and/or distribution.
7. Keep Architect informed of progress, delays and of potential delays during all stages of work to avoid delays.

22. BROKEN GLASS

1. Replace all broken, damaged or scratched glass and mirrors. Glass which has been broken, scratched or damaged in installation shall be replaced by installer.

23. TREE PROTECTION

1. Protect tops, trunks and roots of existing trees on project site that are to remain. Box, fence or otherwise protect trunks of existing trees which may be subject to construction damage before any work is started. Do not permit heavy equipment or stockpiles within branch spread. When approved, remove interfering branches without injury to trunks and cover scars with tree paint.
2. Wherever excavating is required within branch spread of trees that are to remain, do not cut tree roots, but tunnel or trench under or around roots by careful hand digging and without injury to roots.

24. PROGRESS SCHEDULE

1. Further to GC.2 of the General Conditions of the Contract, carefully prepare full progress schedules of the work in form to be mutually agreed upon by Contractor and Architect.
2. Prepare schedule immediately upon award of Contract and present three (3) copies to the Architect within a maximum of one week from Contract awarding date.
3. Update Project Schedule as directed whenever the progress of work is not as per Schedule and keep Construction Schedule updated to reflect current conditions.

25. MAINTENANCE MANUALS

1. As soon as possible and in no event later than request for substantial completion check and assemble in two ring binder, all shop drawings, all warranties and guarantees submitted by manufacturers, suppliers and subcontractors and as called for throughout Specifications. Assemble two copies of recommended operation and maintenance procedures (such as flooring, equipment, roofing). Present two matching binders to Architect for submission to Owner. Furnish a complete index in each binder listing its contents in detail and stamp and sign the cover page of each and every manual. Also ensure that the manuals are stamped and signed on the cover page by subcontractor submitting them. Note: A **\$10,000.00** holdback will only be released when all documents approved by the Consultants have been turned over to the Owner. Note this amount is in addition to the values identified in Mechanical/Electrical Sections.
2. Recommended maintenance procedures shall contain warnings concerning the use of maintenance materials or practices which might injure the product covered by the recommended maintenance procedure. Should any product be injured or damaged by faulty maintenance or practices not warned against in the maintenance manual, then the Contractor shall rectify such damage or injury.
3. Complete maintenance manuals shall be submitted prior to requesting release of Holdback.
4. One (1) USB digital memory is to be provided with all relevant and required O&M manuals, materials and As-built drawings.

26. CHECK FLOOR DRAINS

1. Just before acceptance of building by Owner, check floor drains and see that they are clean, clear and functioning properly.

27. FIRE PROTECTION AND ACCESS TO EQUIPMENT AND EXITS

1. Take necessary precautions to eliminate fire hazards and to prevent damage to work, equipment and other property both public and private having to do with the work. Inspect work of this contract at least once a week for this purpose.
2. Provide and maintain in working order suitable Underwriters' labelled fire extinguishers and locate in prominent positions, to approval of authorities.

3. When welding, brazing and performing any operation with an open flame, a portable fire extinguisher shall be kept within 10 feet (3000 mm) of the operator at all times.
4. Store and locate materials and equipment packed in cardboard cartons, wood crates and other combustible containers in orderly and accessible manner. Place approved types of firefighting equipment in vicinity of materials or equipment packed in this type of crate or carton until permanent fire protection and equipment are available.
5. Store all rags and waste containing oil, grease or other flammable materials in an approved metal container and remove from the site at the end of each working day.
6. Only fire resistant tarpaulins are permitted on site.
7. Locate temporary buildings and storage areas in relation to their hazards and probability of damage to existing buildings under construction. Unless constructed of non-combustible materials, wherever possible locate them at least 33 feet (10 m) away from buildings. If constructed of combustible materials separate these structures into small, detached units.
8. Provide and maintain free access at all times from the street to fire hydrants and to outside connections for standpipes or other fire extinguishing equipment whether permanent or temporary. Do not place material or construction equipment within 10 feet (3 m) of hydrants or connection, nor between them and centre line of the street.

Maintain free access at all times to control valves and hose on fire lines within building and to all portable extinguishers.
9. Install fire doors and put into operating condition at the earliest possible time.
10. Comply with requirements of 01545 Safety Requirements.

28. **SAFETY**

1. Take all precautions necessary to protect and safeguard workers from dangerous conditions including the recommended Covid -19 precautions as well as protection from fumes; lead paints, etc.; asbestos; and silica hazardous to health.
2. Comply with requirements of 01545 Safety Requirements.
3. Ensure all necessary precautions are taken to protect the safety of staff and students in the occupied building during recess and school hours throughout the entire duration of construction. All construction materials, equipment, and debris must be properly secured and removed daily, ensuring a safe and hazard-free environment.
4. Erect physical barriers, signage, and fencing to clearly demarcate construction areas and prevent unauthorized access by staff, students, and visitors. Ensure

pathways and evacuation routes remain clear and safe at all times, and coordinate any temporary changes with the school administration.

5. Implement noise, dust, and vibration control measures to minimize disruption to the school environment. Regularly inspect air quality, especially in confined spaces or adjacent classrooms, to ensure the health and well-being of occupants is not compromised.
6. Schedule potentially disruptive activities, such as loud or vibration-heavy tasks, outside of regular school hours where possible, ensuring minimal impact on the learning environment.
7. Ensure all construction personnel are properly trained and aware of their responsibilities regarding school safety, including adherence to designated working hours, school policies, and emergency procedures. Appoint a safety officer responsible for overseeing compliance with these guidelines on-site.
8. Establish a communication plan with the school administration to provide advance notice of any activities that may temporarily impact the school environment, including utility interruptions, access restrictions, or any safety concerns. Ensure all necessary precautions are taken to protect the safety of staff and students in the occupied building during recess and school hours throughout the entire duration of construction.
9. All construction materials, equipment, and debris must be properly secured and removed daily, ensuring a safe and hazard-free environment.

29. ADJACENT/EXISTING BUILDING AND COMPLETED WORK

1. Particular attention shall be paid to prevention of fire and elimination of fire hazards which would endanger new work or existing property.
2. No existing footings, foundations, pipe lines, electrical conduit and wiring shall be undermined or otherwise damaged or endangered by digging, butting of any other operation in the performance of the work of this Contract. Any existing or completed work so affected shall be immediately repaired and made good to the Architect's satisfaction at the Contractor's expense.
3. Active services to the adjacent buildings shall be protected.
4. In case of damage to active services, notify Architect, Utilities and Authorities immediately and make all required repairs under direction of appropriate utility. Carry out repairs during off hours if required.

30. NOTES TO GENERAL CONTRACTOR

1. Ensure that the building is maintained weathertight and secure. The General Contractor shall furnish all temporary protection, enclosures, tarpaulins, etc., as may be required to weatherproof openings in the work.
2. Demolish and clean up all existing trees, scrub and debris and any other items found on the site not indicated to remain.

3. The General Contractor shall carry out all removal and disposal of all resultant debris.
4. In case of damage to active services, notify Architect, Utilities and authorities immediately and make all required repairs under direction of appropriate utility. Carry out repairs during off hours if required. In absence of specific requirements or direction, plug or cap unused or abandoned utility lines at least 3 feet (1000 mm) outside of new building walls, or as required by utilities, codes and authorities.
5. The location of construction shacks and trailers to be approved by the Architect and Owner.
6. Take all precautions necessary to protect and safeguard workers from dangerous conditions including fumes, lead and silica products that may be present during the construction that are hazardous to health.
7. Restore disturbed areas to original condition unless shown otherwise on drawings or stated in specifications.

31. CONSTRUCTION PARKING

1. Parking will be permitted on site provided it does not disrupt the performance of Work nor safety and operation of the occupied school.
2. A limited number of parking spots will be allocated for construction personnel on-site. Construction teams are advised to utilize off-site parking.
3. The allocated parking spaces should not interfere with regular school operations, staff, or visitor parking.
4. Large construction vehicles or deliveries should be scheduled in advance to avoid peak school hours, ensuring minimal disruption to school traffic flow.

32. PROTECTION FOR OFF-SITE & PUBLIC PROPERTY

1. Protect surrounding private and public property from damage during performance of work.
2. Be responsible for damage incurred.

33. SIGN AND ADVERTISEMENTS

1. Construction sign to be supplied and installed by Contractor. Locate as directed by Architect. All costs for the installation of the sign to be included in Base Tender Sum (not part of Signage Allowance). The Board to approve sign layout prior to sign production.
2. Erect no other signs, except those signs which are necessary to give direction or for safety, or warning signs, without the Architect's permission. Where other signs are required or wanted, obtain Architect's approval.

34. PROTECTION OF BUILDING FINISHES & EQUIPMENT

1. Provide protection for finished and partially finished building finishes and equipment during performance of work.
2. Provide necessary screens, covers, hoardings as required.
3. Be responsible for damage incurred due to lack of or improper protection. Replace or repair finishes or equipment so damaged.

35. SECURITY

1. When work at site has progressed as to become attractive for vandalism or theft, engage a recognized security guard agency to provide security service at times when tradesmen are not present in substantial numbers. Continue service until after time of Substantial Performance and the Owner has occupied the building.
2. Extent of security services shall be at the discretion of the Contractor. Note that the fit, finish and new appearance of the finished building will not be comprised. Materials, products, finishes, etc. damaged due to vandalism are to be restored and/or replaced to an as-new condition.

PART 2 – PRODUCTS Not Used

PART 3 – EXECUTION Not Used

END OF SECTION

PART 1 GENERAL

1.1 DESCRIPTION

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

1.2 SUMMARY

1. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard, warranties on products; special warranties; and comparable products.
2. Related Requirements:
 1. Section 01500 – Substitutions (for requests for substitutions).

1.3 DEFINITIONS

1. **Products:** Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
2. **Named Products:** Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
3. **New Products:** Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
4. **Comparable Product:** Product that is demonstrated and approved by Architect through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
5. **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.

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.

6. **Subject to Compliance with Requirements:** Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. Submit a comparable product request, if applicable.

1.4 REFERENCE STANDARDS

1. The Standards listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.
2. Aluminum Association (AA)
 1. AA ADM (2010) Aluminum Design Manual
 2. AA ASM-35 (2000) Specifications for Aluminum Sheet Metal Work in Building Construction Manual Series Section 5
 3. AA DAF-45 (2003; Reaffirmed 2009) Designation System for Aluminum Finishes
 4. AA PK-1 (2009) Pink Sheets: Designations and Chemical Composition Limits for Aluminum Alloys in the Form of Castings & Ingot
3. American National Standards Institute (ANSI)
 1. ANSI H35.1/H35.1M – Standard Specification for Aluminum-Alloy 6061-T6
4. American Standard for Testing and Materials (ASTM)
 1. ASTM A653/A653M-18: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 2. ASTM B221M-14: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire Profiles and Tubes
 3. ASTM B308/B308M-10: Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.

4. ASTM B361-16: Standard Specification for Factory-Made Wrought Aluminum and Aluminum-Alloy Welding Fittings.
5. Canadian Standards Association
 1. SA Standard CAN3-S157-M83: Strength Design in Aluminum.
 2. CSA Standard S190-1969: Design of Light Gauge Aluminum Products.
 3. CSA Standard S244-1969 "Welded Aluminum Design and Workmanship".

1.5 ACTION SUBMITTALS

1. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) days of receipt of a comparable product request. Architect will notify Contractor through Construction Manager of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 1. Form of Architect's Approval of Submittal: As specified in Section 01300 – Submittals.
 2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
3. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01300 submittals. Show compliance with requirements.

1.6 QUALITY ASSURANCE

1. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

1. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
2. Delivery and Handling:
 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
3. Storage:
 1. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 2. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 3. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 4. Protect stored products from damage and liquids from freezing.
 5. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.8 PRODUCT WARRANTIES

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

requirements of the Contract Documents.

2. **Manufacturer's Warranty:** Written warranty furnished by individual manufacturer for a product and specifically endorsed by manufacturer to Owner.
3. **Special Warranty:** Written warranty required by the Contract Documents to provide specific rights for Owner.
4. **Special Warranties:** Prepare a written document that contains appropriate terms and identification, ready for execution.
 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. See other Sections for specific content requirements and requirements for submitting special warranties.
 3. Submittal Time: Comply with requirements in Section 01700 – Contract Closeout.

PART 2 PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

1. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply

with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

7. Submit additional documentation required by Architect through Construction Manager in order to establish equivalency of proposed products. Evaluation of "or equal" product status is by the Architect; whose determination is final.

2. Product Selection Procedures:

1. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.

1. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: ..."

2. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.

1. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: ..."

3. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

1. For approval of products by unnamed manufacturers, comply with requirements in Section 01500 - Substitutions for convenience.

2.2 COMPARABLE PRODUCTS

1. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied.

2. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
 1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
 2. Evidence that proposed product provides specified warranty.
 3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 4. Samples, if requested.
3. Submittal Requirements: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

2.3 METAL

1. Where a product is named in the Specifications by one of the following names or by any name followed by the number of one of the following articles, the product shall conform to the standard named in the corresponding article, except as specified or indicated otherwise.
2. Aluminum (A1)
 1. Bar, rod, wire, extruded shapes; architectural: CSA HA. Series (AA/AnS1 6063) (Alcan 50S) condition T5.
 2. Bar, rod, wire, extruded shapes; Structural: CSA HA Series (AA/ANS1 6061) (Alcan 65S) Condition T6.
 3. Plate, sheet, coil; utility: CSA HA Series Alloy MC10, (AA/ANS1 3003) (Alcan D3S); condition H14 (sheet, coil), F (plate).
 4. Plate, sheet, coil; anodizing: CSA HA Series Alloy 990C, (AA/ANS1 1100) (Alcan D2S); condition H14.
 5. Specially anodized aluminum (hard anodized): (AA-M21 or M12C22A42) conform to Finishes, Aluminum, Hard Anodized (FA.HA)

attached to Section 01016.

6. Painted aluminum: conform to Finishes, Aluminum, Baked on Coatings FABC attached to Section 01016.
 7. Anodized Aluminum: AA-M21 or M12C22A31.
 8. Aluminum for elevated floor plates: (Bruce EDP) US Fed. Spec. QQ-A-591c, Ty A380 (mil-HDBK-H1C code 20087).
 9. Aluminum sand casting: (signs, etc.) AA 443.0.
3. Sheet Gauges
 1. Gauges and equivalent thicknesses of sheet, plate, coil and strip shall conform to the table of gauges and equivalent thicknesses (GET) attached to Section 01016. See 1.3.4 and 1.3.6 special application of gauges to structural sheet.
 4. Galvanized Sheet Steel
 1. ASTM A525 and 526, commercial quality sheets, plain commercial galvanized, stretcher levelled, or temper rolled to stretcher levelled standard of flatness if specified.
 2. Same as 1.3.1 except wipe coated instead of plain commercial galvanized.
 3. Same as 1.3.1 except mill phosphatized instead of plain commercial.
 4. ASTM A446 structural quality, Grades A or B, max. permissible working stress: Grade A, 20,000 psi; Grade B, 22,400 psi. plain commercial galvanized. Gauges shall apply to core sheet and shall be msg. Coating thickness shall be added to core thickness to determine thickness of coated sheet (see 1.2.1).
 5. Same as 1.3.4 except wiped coated instead of plain commercial, with a coating not less than .050 oz. per sq. ft. (see 1.1.4).
 6. Same as 1.3.4 except wiped coated instead of plain commercial galvanized (see 1.2.1).
 7. Preparation for painting, in ship, ASTM D2092-68.
 5. Copper Metals
 1. Nickel Silver (white bronze): Anaconda American Brass Alloy 796 (leaded nickel silver) (has higher zinc content than any of the nickel

silvers in ASTM B122-71a):

Copper	45%
Zinc	42%
Nickel	10%
Lead	1%
Manganese	2%

2. Sheet copper and strip copper for roofing, flashing and building construction: ASTM B370, cold rolled temper, 16 oz. or as specified otherwise.
3. Monel: (nickel 63-70%, approx. 5% other metals, remainder copper) plate, sheet, strip, hot rolled, annealed and pickled, ASTM B127; (Inco Monel 400).
4. All applicable copper metals: ASTM B248.
5. Architectural Bronze (Red Brass), ASTM B36, No. 3 (85% CU + 15% NI).
6. Stainless Steel
 1. Plate, sheet and strip: CSA G110.6-1968, Type 302 or 304 as specified, or as specified otherwise; finish: No. 4 unless specified otherwise.
 2. Structural shapes and bars, CSA G110, 4-1968, Type 302, 304 or 316 as specified; No. 4 finish unless specified otherwise.
7. Sheet Steel
 1. Sheets, cold-rolled carbon steel, commercial quality, ASTM A366 stretcher levelled or temper rolled to stretcher levelled standard of flatness if specified.
 2. Porcelain enamelling steel, ASTM A424, Commercial Quality, Type 1 or 2.
 1. Same as 1.6.1 except special quality for electro deposited coatings.
 2. Same as 1.3.4. except un-galvanized.
 3. Hot-rolled, carbon steel sheets and strip, structural quality ASTM A570-70, 5 grades (stair treads, risers, etc.).
 4. Hot-rolled carbon steel sheet and strip, commercial quality ASTM A569-66T.

5. Prepainted:

1. CSSB1 Technical Bulletin No. 5, as currently amended (modified silicone alkyd, 2000).
2. CSSB1 Technical Bulletin No. 5, as currently amended, except humidity resistance 5000 hours; salt spray resistance 400 hours; resistance to accelerated weathering 2500 hours (fluoropolymer, 10,000).
3. CSSB1 Technical Bulletin No. 5, as currently amended, except humidity resistance 3000 hours (silicone alkyd, 5000).

2. Sheet Steel (Cold Rolled)/Structural Steel (Hot Rolled)

1. When steel thickness is indicated by gauge or by decimal fractions of inches, it is sheet steel (1.6) or galvanized sheet steel (1.3) or stainless steel (1.5). When steel thickness is indicated by common fractions of inches, it is structural steel (1.8). However, some sheet steels are structural quality, (i.e. having guaranteed strength).

3. Structural Steel

1. CAN/CSA G40.21-M87, 38W or 44.

4. Soldering Materials

1. Solder: Solder for Div. 15 to conform to Div. 15 specifications. Under no circumstances shall any lead containing solder be used on any potable water piping systems throughout the project.
2. Flux: on stainless steel:
 1. Muriatic acid killed by the addition of zinc until all effervescence stops and no excess of zinc remains; improved by the addition of a small amount of ammonium chloride, plus 10% acetic acid; or
 2. muriatic acid: ferric chloride: nitric acid 90:50:3, by weight; or
 3. Approved commercial flux designed especially for use with stainless steel, such as EutecSol 682, or approved equal.
3. Flux: on copper and galvanized steel:
 1. killed muriatic acid as specified in 1.9 b.1; or
 2. suitable rosin type.

5. Galvanizing

1. All steel except (1.3), CSA G164 Hot Dip Galvanizing of irregular Shaped Articles. Must be done after all welding complete. No welding of galvanized products allowed.

6. Welding Materials

1. CSA W59, CSA W 55.2; for stainless steel, ASTM A371; for aluminum, ASTM B285.

7. Metal Filler

1. Epoxy: Hysol 6C epoxy adhesive kit (or 4297 in bulk) manufactured by Hysol (Canada) Limited or approved equal.

8. Plating (Electrodeposited Coatings)

1. Cadmium (on steel): ASTM A165, Type NS (13 mu), OS (7.6 mu), TS (3.8 mu).
2. Chrome (on steel): ASTM B.456, Fe Ni20b Cr r unless specified otherwise, bright unless dull specified.
3. Chrome (on copper and copper-base alloys): ASTM B456, Type FC unless KC or QC specified; bright unless dull specified. (In this case FC is thick and QC is thin.)
4. Weight of zinc coating and thickness to be added to base metal to determine thickness of coated material.

(Source: ASTM A-446, Tables 2 and 4)

Coating Class oz. Per sq. ft.	Triple-Spot Test, Minimum Check Limited oz. per sq. ft.	Thickness in
2.75	2.35	0.0041
2.5	2.1	0.0037
2.25	1.85	0.0033
2	1.65	0.003
1.75	1.4	0.0026
1.5	1.15	0.0022
1.25 commercial	0.9	0.0019

Wipe Coated (Colourbond or Satin coat in Canada only)	0.25	0.0005

NOTE: Light Commercial not available in Canada.

1. Paint

1. Shop primer on steel: CAN/CGSB 1-GP-40d.
2. Bituminous paint: CAN/CGSB 1-GP-108c.
3. Baked enamel on steel: primer, CA/CGSB 1-GP-81e, Type 2; finish CANCGSB 1-GP-88e, baking alkyd enamel.
4. Baked enamel on aluminum: FA.BTAE, attached to Section 01016.

PART 3 EXECUTION - Not Used

END OF SECTION

PART 1 GENERAL

1.1 CASH ALLOWANCES

1. Comply with General Requirements of CCDC-2 2020 for Cash Allowances.
2. Include the following Cash Allowances in the Contract Price. These allowances shall be expended in whole or in part, when authorized by the Architect in writing. The unused portion of the Allowances shall be credited to the Owner.
3. The Contract Price and not the cash allowance, includes the Contractor's overhead and profit in connection with such cash allowance.

No refund of overhead and profit will be expected on any unspent portion of Cash Allowances. Likewise, no overhead and profit will be allowed on total amount by which all Cash Allowances are exceeded.

4. Expend cash allowance as directed by the Consultant in writing. Allowance will be adjusted to actual cost, but no adjustment will be made to Contractor's charges including overhead and profit which are included in the Contract Price.
5. Cash allowances are designed for work and services deemed to be necessary by the Owner, from time to time, throughout the execution of the Work. Where a cash allowance refers to an item or category of work already included in the Contract Documents, it shall be assumed to cover work or services in addition to that included, unless specifically indicated otherwise.
6. Contractor may be required from time to time, to assist in tendering of certain items of work or services covered by allowance, as directed by Consultant.
7. Material Supply Items:
 1. Scope for material supply items covered by Cash Allowance includes:
 1. Net cost of material.
 2. Applicable taxes and duties.
 3. Delivery to site.
 2. In addition to above scope covered by Cash Allowance, include in Contract Price costs for:
 1. Handling at site, including unloading, uncrating, storage and hoisting.
 2. Protection from elements, from damage.
 3. Labour, installation, and finishing.

4. Other expenses required to do cash allowance work (i.e., contract co-ordination).
 5. Overhead and Profit.
 8. Material and Installation Items:
 1. Scope of each material and installation item covered by Cash Allowance includes:
 1. Net cost of material.
 2. Applicable taxes and duties.
 3. Delivery to site.
 4. Handling at site, including unloading, uncrating, storage and hoisting.
 5. Labour, installation, and finishing.
 2. In addition to above scope covered by Cash Allowance include in Contract Price costs for:
 1. Protection from elements, from damage.
 2. Overhead and Profit.
 3. Other expenses required to do cash allowance work (i.e., contract co-ordination).
 9. Inspection and Testing Work:
 1. Scope for inspecting and testing covered by Cash Allowance includes:
 1. Net cost of testing laboratory services and field inspection.
 2. In addition to above scope covered by Cash Allowance include in Contract Prices for:
 1. Overhead and Profit.
 2. Supply of material tested, patching and completion of work tested.
 3. Other testing on re-testing work specified in Section 01400.
 4. Other expenses required to do cash allowance work (i.e., contract co-ordination)
 10. The following is a breakdown of the Cash Allowance Items **to be included** in the Contract Price:

	ITEM	VALUE +HST
	Inspection and Testing • Testing of topsoil • Testing of compacted fill • Other soils compaction testing • concrete testing • structural steel inspection/testing • mortar testing • asphalt testing • building envelope - air barrier, curtain wall, windows • waterproofing • sprayed fireproofing	\$10,000.00
	Designated Substance Removal (Additional removal not already identified in the ACM Summary report)	\$5,000.00
	Window covering for new windows in library (Additional window covering not else addressed in the specifications)	\$20,000
	Interior Signage (supply and install) • door signage • bulkhead signage • Vision Strips • Updates to the existing school	\$5,000.00
	Exterior Signage (Supply and Install) • New School Sing • Door signage	\$10,000
	Low-voltage systems work by Hamilton Video and Sound. • including supply and installation of the new PA system head end, device removal in washroom, and the wiring and systems testing for removal/reinstallation of access controls/door operators and intercom devices at vestibule doors.	\$35,000
	TELEPHONE INSTALLATION Upgrade Telephone System	\$,7000.00
	SUMMARY OF CASH ALLOWANCE	\$92,000+ HST

This total amount is to be included in the Base Bid Amount.

11. Progress payments on accounts of work authorized under cash allowances shall be included in the Consultant's monthly certificate for payment. Copies of invoices are to be submitted to substantiate claims.

PART 2 – PRODUCTS Not Used

PART 3 – EXECUTION Not Used

END OF SECTION

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

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

1.2 RELATED SECTIONS

1. General Requirements - Section 01010
2. General Work - Section 01015
3. Individual Sections - Cutting and patching incidental work of the section. Advance notification to other sections required.

1.3 SUBMITTALS

1. Submit written request in advance of cutting or alteration which affects:
 1. Structural integrity of any element of Project.
 2. Integrity of weather-exposed or moisture-resistant elements.
 3. Efficiency, maintenance, or safety of any operational element.
 4. Visual qualities of sight-exposed elements.
 5. Work of the Owner or separate contractor.
2. 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 the Owner or separate contractor.
 7. Written permission of affected separate contractor.
 8. Date and time work will be executed.

1.4 GENERAL

1. Execute cutting, fitting, and patching including excavation and fill, to complete the Work.
2. Fit the several parts together, to integrate with other work.

3. Uncover work to install ill-timed work.
4. Remove and replace defective and non-conforming work.
5. Remove samples of installed work for testing if requested by Consultant.
6. Provide openings in non-structural elements of Work for penetrations of mechanical and electrical work.

1.5 INSPECTION

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.

1.6 PREPARATION

1. Provide supports to assure structural integrity of surroundings; devices and methods to protect other portions of project from damage.
2. Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

1.7 PERFORMANCE

1. Execute work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing.
2. Use material to match existing.
3. For a change in material submit request for substitution under provisions of Section 01500 – Substitutions.
4. Employ qualified trade contractor to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight exposed surfaces.
5. Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed without prior approval.
6. Restore work with new products in accordance with requirements of Contract Documents.
7. Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
8. Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection.

END OF SECTION

PART1- GENERAL

1.1 SUMMARY

1. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
2. All submittals listed in this section shall also be provided as part of the closeout documents.
3. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

1.2 SUBMITTAL PROCEDURE

1. Provide submittals electronically in Portable Document Format (PDF) as per Architect's Contract Administration System Software 01805, in accordance with GC 3.10 of CCDC Document 2, 2020 and as revised in the Supplementary General Conditions, as required in various sections of these specifications and on the drawings.
2. Submissions must be clear, to scale, complete, specific and correctly transmitted.
3. Submittals are to be numbered in the sequence which they are submitted. Submittal numbering to be as follows 001, 002, 003 etc.
4. Processing: To avoid the need to delay installation as a result of the time required to process submittals such as samples and shop drawings , allow enough time for submittal review, including time for resubmittals.
 1. Allow Consultant five (5) working days to respond to Request for Information (RFI).
 2. Allow ten (10) days for initial review of shop drawings and samples. Allow additional time if the Consultant must delay processing to permit coordination with subsequent submittals.
 3. The Consultant will return to the Contractor indicating that, the items been:
 1. Reviewed (no re-submittal required).
 2. Reviewed as indicated (no submittal required).

3. Revise and resubmit (re-submittal required).
4. Review by the Consultant is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that the Consultant approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Subcontractor, and such review shall not relieve the Subcontractor of his responsibility for errors / omissions in the shop drawings or of his Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to the processes or techniques of construction and installation and for co-ordination of all sub-trades.
5. The Contractor will advise all Trades, Subcontractors and suppliers of the limits of the Consultant's responsibility with respect to Shop Drawings and other submittals.
6. If an intermediate submittal is necessary, process the same as the initial submittal.
7. No extension of contract time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing

1.3 SHOP DRAWINGS

1. Review submittals prior to submission. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated by the General Contractor and identified as to specific project will be returned without being examined and considered rejected.
2. Notify, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
3. Verify field measurements and affected adjacent work are coordinated.
4. Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.
5. Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.
6. Keep one reviewed copy of each submission on site.
8. Submit Shop Drawings as per following list:

LIST SHOP DRAWINGS

<u>Section</u>	<u>Title</u>
03200	Concrete Reinforcement
04200	Unit Masonry
05120	Structural Steel
05300	Steel Deck
05500	Miscellaneous Metals
07461	Aluminum Architectural Composite Panel System
07465	Preformed Metal Cladding
08110	Hollow Metal Doors, Frames & Screens
08800	Glass and Glazing
09250	Gypsum Wallboard
09300	Porcelain & Ceramic Tile
10800	Washroom Accessories
10955	Classroom Control Panels

Mechanical Items: Refer to Mechanical Specifications

Electrical Items: Refer to Electrical Specifications

1.4 **SAMPLES**

1. Submit samples as listed in List of Samples below.
2. Samples of materials, both manufactured and otherwise, proposed for the use on the work shall be submitted to the Architect for approval as required by the Contract Document and/or reasonably required by the Architect. The work shall be in accordance with approved samples. All samples shall be supplied and delivered to the Architect free of charge. The approval of samples shall not be construed as an acceptance of work subsequently carried out.
3. Samples shall be labelled indicating date of submission, name of project, names of contractor and manufacturer, and complete identification of locations at which materials are to be installed.

LIST OF SAMPLES

<u>Section</u>	<u>Title</u>
31 00 00.01 & 31 23 33.01	Granular "A" and "B"
32 12 16.01	Paving

04100	Mortar
04200	Unit Masonry
06100	Rough Carpentry
07195	Air/Vapour Barrier System
07211	Rigid Insulation
07461	Aluminum Architectural Panel System
07465	Prefinished Metal Siding
07520	Modified Bitumen Membrane Roofing
07900	Caulking and Sealants
08800	Glass & Glazing
09300	Porcelain & Ceramic Tile
09500	Acoustical Treatment
09900	Painting and Finishing
10800	Washroom Accessories

1.5 EXTENDED WARRANTIES

1. In addition to the warranty requirements of GC 12.3 of CCDC Document 2, 2020, and as revised in the Supplementary General Conditions, the Contractor shall note that the following extended warranty periods are required by the Contract Documents for the individual items under respective Sections.

LIST OF WARRANTIES

<u>Section</u>	<u>Title</u>
32 16 15	Concrete Walks and Curbs - 2 years
07195	Air/Vapour Barrier - 5 years
07214	Sprayed-On Insulation Air Barrier - 10 years
07461	Aluminum Arch Composite Panel Systems – 5 years
07465	Preformed Metal Siding – 5 years
07900	Caulking and Sealants - 5 years
08800	Glass & Glazing - 5 years
08900	Aluminum Curtain Wall – 5 years, Glass – 10 Years
Division 21,22,23,25	Refer to Mechanical Sections
Division 26,27,28	Refer to Electrical Sections

1.6 MAINTENANCE MANUALS

LIST OF MAINTENANCE MANUALS

<u>Section</u>	<u>Title</u>
04100	Mortar (colour formulae)
08700	Finishing Hardware
09300	Porcelain & Ceramic Tile
09900	Painting
Division 21,22,23,25	Refer to Mechanical Sections
Division 26,27,28	Refer to Electrical Sections

1.7 **EXTRA MATERIAL**

1. Submit extra material as specified in the following Sections:

<u>Section</u>	<u>Title</u>
04200	Unit Masonry - See Section 04200
09300	Porcelain & Ceramic Tile - 2% of total area of each colour and type
09500	Acoustical Tile - 1% of each type
09650	Resilient Flooring - 2% of total of each colours
09900	Painting - See Section
Division 21,22,23,25	All items indicated in these sections
Division 26,27,28	All items indicated in these sections

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

CERTIFICATE OF PAYMENT APPLICATION FORM

NOTE: HST TO BE INCLUDED IN EACH OF THE FOLLOWING VALUES:

Contractor: _____

Application No. _____

Work: _____

Date: _____

Period Covered: _____

Description	Contract Amount	% To Date	Value Performed To Date	Value Previously Performed	Value Current Period	Balance to Complete
This Section to show breakdown of Contract such details as:						
General Conditions	\$	\$	\$		\$	\$
Excavation						
Concrete Footings						
Concrete Walls, Cash Allowances, Hardware, etc.						
SUB-TOTAL						
Change Orders No. 1 No. 2 No. 3						
TOTAL CONTRACT						

SUMMARY (HST to be included in all items)

Value of Work Completed to date \$ _____

Less Holdback of 10% \$ _____

Holdback Released \$ _____

Current Holdback (Net Retained) \$ _____

Sub-Total \$ _____

Less Previous Certificates \$ _____

Amount of this Claim \$ _____

Total of H.S.T. included above (\$ _____)

GENERAL CONTRACTOR'S H.S.T. NO. _____

PART 1 GENERAL

1.1 DESCRIPTION

1. See Individual Specifications Sections for full listing of inspections and approvals.
2. Architect, consultant or testing inspector's approvals required:
 1. Consultant's approval before interfering with existing services and apparatus. One week notice to be given. Section 01010.
 2. Architect's approval before installing flooring - 01010.
 3. Architect's approval of work schedule (Progress Schedule) - 01310.
 4. Architect's approval of construction signs and locations - 01015.
 5. Architect's approval of temporary fence and layout - 01015.
 6. Architect's and Consultant's approval of substitutions - 01500.
 7. Consultant's approval of footing bearing soil compaction - 02200.
 8. Consultant's approval of compaction - 02200
 9. Architect's and Consultant's approval of cast-in-place concrete materials, sandblasting, tint, admixtures and tests - 03300.
 10. Architect's approval of Masonry Sample Wall - 04200.
 11. Architect's approval of waterproofing - 07110 and 07120
 12. Architect's approval of caulking joint samples - 07900.
 13. Architect's approval of sealant samples - 07900.
3. Notify Architect:
 1. Notify Architect for Deficiency Inspection upon agreed Substantial Completion.
 2. Notify Architect for One-Year Holdback Inspection.
 3. Notify Client for Two-Year Roofing Inspection for Extended Warranties
 4. Notify Client for Two Year Inspection of Extended Warranties
 5. Notify Client for Three Year Inspection of Extended Warranties.

6. Notify Client for Five Year Inspection for Extended Warranties.
7. Notify Client for Ten Year Inspection for Extended Warranties.
4. Submit samples for approval.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION Not Used

END OF SECTION

PART 1 GENERAL

1.1 DESCRIPTION

1. Before commencing any work, the General Contractor, along with their trade contractors, are to prepare working / interference drawings, to ensure that all components are to be properly accommodated within the spaces provided, ensuring all clearances required by jurisdictional authorities and for proper maintenance are indicated and maintained.
2. Schedule meetings on site with all associated trades to review all interference areas until all issues have been coordinated and required interference drawings issued.
3. Prepare drawings to indicate coordination and method of installation of a mechanical system with sprinkler, electrical, structural and other systems where their relationship is critical. Ensure all details of equipment, apparatus and connections are coordinated.
4. The General Contractor shall provide interference drawings prepared by their Mechanical, Sprinkler and Electrical subtrades. Drawings are to be red-line markups scanned to PDF Format and shall indicate any perceived interference between mechanical, sprinkler, structural, and electrical work and the work of all other Divisions along with proposed solution to such interference.
5. Failure to coordinate with all other trades could result in reworking of installed equipment, piping or ducting at the discretion of the Consultant. Any reworking to accommodate the installation of other trades is to be performed at no extra cost.
6. All interference drawings shall be submitted and approved prior to the second Certificate of Payment being released.

1.2 COOPERATION AND COORDINATION

1. Cooperate and coordinate with other trades as required, for satisfactory and expeditious completion of work. Take field dimensions relative to work. Fabricate and erect work to suit field dimensions and field conditions. Provide forms, templates, anchors, sleeves, inserts and accessories required to be fixed to, or inserted in work, and set in place or instruct related trades as to their location. Pay cost of extra work caused by and make up time lost, as a result of failure to provide inadequate time, the necessary cooperative information of items to be fixed to, or built in.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION Not Used

END OF SECTION

PART 1 GENERAL

1.1 GENERAL

1. This section details General Contractor's responsibilities in preparation, submission and maintenance of construction schedules with form and requirements for periodic revisions. The Sub-Contractors shall provide the General Contractor with their schedule of work and co-ordinate the work with General Contractor and the Work Progress of other trades on site.

1.2 REQUIREMENTS INCLUDE

1. Schedule, form, content.
 1. Stages/Phased Construction.
 2. Schedule Revisions.
 3. Weekly schedule updating.

1.3 SCHEDULES REQUIRED

1. Submit the following schedules:
 1. Construction Progress Schedule.
 2. Weekly Schedule and Manpower Loading.
 3. Submittal Schedule for Shop Drawings and Product Data and Shades.
 4. Product Delivery Schedule. Include required decision dates for finishes and colours.
 5. Sub-schedule showing submittals, review times, procurement schedules, and delivery dates.
 6. Sub-schedules to define critical portions of overall schedule.

1.4 FORMS OF SCHEDULES

1. Prepare schedules in form of horizontal bar chart (GANTT, or C.P.M. network). Provide separate horizontal bar column for each trade or operation, or separate activity for each operation that can be completed independently of other operations or trades. Provide as follows:
 1. Order: Chronological order of beginning of each item of work.
 1. Identification: Identify each column by distinct graphic delineation.
 2. Horizontal Time Scale: Identify first workday of each week.
 3. Scale and Spacing: To allow space for updating.

4. Minimum Sheet Size: 11" x 17" for electronic submission.

1.5 SUBMITTALS SCHEDULE

1. Include schedule for submitting shop drawings, product data, and samples. Coordinate with section 01300 requirements. Incorporate into Preliminary Progress Schedule and Weekly Schedule updates.
2. Indicate dates for submitting, review time, resubmission time, float time, and last date for meeting fabrication schedule.
3. Include dates when SUBMITTALS and delivery will be required for the Owner-furnished products if applicable.
4. Include dates when reviewed submittals will be required from the Consultant.

1.6 PRODUCT DELIVERY SCHEDULE

1. Include dates for delivery of products specified in Section 01020 - Allowances, if applicable.
2. Include dates for products furnished by Owner, if applicable.
3. Submit a schedule of required equipment order dates and delivery dates for products and/or assemblies which involve insignificant production time or fabrication time and/or will significantly affect the project schedule if not available when needed.

1.7 CONSTRUCTION PROGRESS SCHEDULE

1. Submit a preliminary construction schedule and phasing plan within ten working days of notification of bid acceptance, for approval.
2. Incorporate approved preliminary schedule in construction schedule specified in
3. Submit a bar-chart progress schedule a minimum of seven (7) days before first progress application for payment. Prepare schedule in sufficient detail to indicate timing of major activities during phased progress of the Work and which will ensure completion of the Work on or before schedule.
4. On schedule indicate a time bar for each major construction activity to be performed at the site, properly sequenced and co-ordinate with other activities of work. Itemize activities in sufficient detail that no one bar exceeds two months in duration (separate long running trades such as Masonry into Logical Sub-Sections). Allow sufficient space below planned time bar for another time bar to record actual progress.
5. Show dates for commencement and completion of all activities. Estimate duration period and float (contingency) time for each activity.
6. Show projected percentage of completion for each activity as of the date of submission of monthly progress payment applications and/or to the date of

submission of schedule when requested.

7. Indicate actual progress of each activity to date of submission of schedule. Indicate current status of all activities to date of submissions of schedule by showing where behind, on or ahead of planned schedule.
8. Show changes occurring since previous submission of schedules:
 1. Major changes to scope
 2. Activities modified since previous submission
 3. Revised projections of progress and completion
 4. Other identifiable changes.
 5. Confirm commencement, duration and completion dates of all activities with subcontractors, subtrades and suppliers.
 6. Deliver to Consultant, at the end of each calendar month with progress application a project status report derived from evaluation of Schedule.
 7. Include in this report updated schedule together with such supporting narrative and such graphical presentations necessary to clearly outline the progress of Work, areas of current and anticipated problems, effect of changes on schedules of major trade subcontractors and proposed corrective action.
 8. Be aware that the nature and day-to-day functioning of the Owner will have precedence over any phasing and arranged schedule, and stoppage of the work with good reason, and changes to the schedule may be made by the Owner on an as needed basis without prior notice and at no extra cost to the contract. The Contractor shall take this into account and shall co-ordinate and co-operate with the Owner and reschedule the work to accommodate the Owner's requirements.
 9. Lengthy shutdowns and disruptions of services will not be tolerated, and strict attention shall be paid to minimizing any disruption.
 10. Schedule required work in occupied areas in co-ordination with the Owner and such schedule be approved by the Owner prior to start of the work. Provide two weeks minimum notice when work in existing area is required

1.8 STAGED/PHASE CONSTRUCTION

1. Prepare and submit sub-schedules for each separate stage of Work when pertinent to the project.
2. Provide sub-schedules to define critical portions of prime concern to master schedule.

3. Describe start and stop, float time and affected other work.

1.9 WEEKLY SCHEDULE UPDATE AND MANPOWER LOADING

1. Use the Construction Progress Schedule as a basis for reporting on a weekly basis the complete status of construction progress, scheduled activities and manpower loading on the project.
2. There will be an Owner/A/Consultant/ General Contractor /Trade Contractor meeting every second week to review the project status. Provide a detailed 2-week work schedule (based upon the Construction Progress Schedule) outlining work activities and manpower requirements planned for that period.
3. Identify current and anticipated problems and delays with respect to the past work period the effects of said problems on the overall schedule and proposed corrective measures.
4. Submit to Consultant two days prior to site meetings (every second week) the following:
 1. Updated Construction Progress Schedule.
 2. Outline of anticipated work activities for the forthcoming period.
 3. Outline of required and/or anticipated manpower levels (by trade) for the forthcoming period.
 4. Problems or delays experienced and/or anticipated.
 5. Proposed corrective measures to react to problems or delays.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION Not Used

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One - General Requirements is a part of this Section and shall apply as if repeated here.

1.2 APPOINTMENT AND PAYMENT OF INSPECTION COMPANIES

1. Inspection and Testing Companies for various trades will be appointed by the Consultant where specifically stated or required. Where not specifically stated, the Contractor shall tender inspection and testing services to three (3) qualified companies and provide recommendation of award to the Consultant.
2. The cost of inspection and testing will be paid out of an allowance provided under Section 01020, except where tests or inspections reveal work not in accordance with the Contract, the General Contractor shall bear the cost of such tests and additional tests as the Consultant requires to verify the acceptability of corrected work.

1.3 RESPONSIBILITIES

1. The Consultant will supply drawings and specifications as required for the use of the respective inspection and testing authorities.
2. The General Contractor shall advise the Consultant and the respective Inspection and Testing authority not less than five (5) working days prior to the commencement of any work to be inspected or tested and ensure that proper facilities and co-operation is provided and that no work is carried out without the required inspection and testing.
3. Proper storage shall be provided for storing concrete specimens at the job site at the required temperature and free from vibration or injury.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION Not Used

END OF SECTION

PART 1 GENERAL

1.1 ACCEPTABLE PRODUCTS

1. First item named or specified by catalogue number meets specifications in all respects regarding performance, quality of material and workmanship, and is acceptable to the Consultant.
2. Items, other than first named, meeting specifications regarding quality of materials and workmanship only, are acceptable to the Consultant, if they also meet performance, match the first named product in colour and texture, etc. and/or capacities specified and can be accommodated within the space allotted.
3. General approval indicated by inclusion of other manufacturers named is subject to final review of submitted samples of shop drawings, performance data and test reports.
4. Where the General Contractor uses equivalent products other than that first named, on which design is based, the General Contractor shall be responsible for all details of installation including product size, arrangement, fit, colour, etc. and maintenance of all required clearances. General Contractor shall prepare and submit revised layouts to indicate arrangement of all affected Work including but not limited to piping, ductwork, conduit, lighting, equipment, etc. Failure by General Contractor to provide such drawings may be considered indication that additional costs associated with equivalent products such as revisions to surrounding architectural finishes, structural components, or the need for larger motor starters, larger power feeders, space revisions to associated product equipment, controls, etc. shall be included in Bid price.

1.2 APPROVAL REQUIRED

1. The Contract is based on the materials, equipment, and methods described in the Contract Documents.
2. The Consultant will consider proposals for substitution of materials, equipment, and methods only when such proposals are accompanied by full and complete technical data and all other information required by the Consultant to evaluate the proposed substitution.
5. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved for this work by the Consultant, in writing.

1.3 "OR EQUAL"

1. Where the phrase "or equal", "approved equal", or "equal as approved by the Consultant" occurs in the Contract Documents, do not assume that materials, equipment, or methods will be approved by the Consultant.
2. The decision of the Consultant shall be final.

1.4 AVAILABILITY OF SPECIFIED ITEMS

1. Verify prior to bidding that all specified items will be available in time for installation during orderly and timely progress of the work.
2. In the event specified items will not be so available, notify the Consultant prior to tender closing.
3. Costs of delays because of non-availability of specified items, when such delays could have been avoided by the General Contractor, will be back-charged as necessary and shall not be borne by the Owner.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION Not Used

END OF SECTION

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

1. Safety measures
2. Fire protection
3. Overloading precautions
4. Falsework
5. Scaffolding

1.2 CONSTRUCTION SAFETY MEASURES

1. Observe and enforce construction safety measures required by National Building Code (Part 8) and Ontario Building Code (latest edition as currently amended), Provincial Government, Workplace Safety & Insurance Board and municipal statutes and authorities.
 1. In particular, the Ontario Construction Safety Act, the regulations of the Ontario Department of Labour and Ontario Hydro Safety Requirements shall be strictly enforced.
 2. In the event of conflict between any provisions of above authorities the most stringent provisions will apply.

1.3 MATERIAL SAFETY DATA SHEETS

1. Submit Material Safety Data Sheets (MSDS) for any product to be used, installed or applied inside of the building if said product may emit toxic fumes and/or noxious odours.
2. Submit Material Safety Data Sheets for any product which is known to or suspected of creating a health hazard or discomfort when used in confined spaces, including but not limited to the following:
 1. Adhesives
 2. Solvents
 3. Sealants (Caulking, etc.)
 4. Other products which may give off air borne particles after installation
 1. Any other product as direct by Consultant/Consultants.
5. The required Material Safety Data Sheets to be submitted prior to ordering

material or product for use as a part of the Work

3. The Owner may withhold payment for work of a subtrade or section until MSD Sheets for products supplied by that subtrade or section have been submitted, reviewed by Consultant and found to be acceptable.
4. Refer to Section 01700 - Project Close-Out for requirements regarding Certificates of Compliance.

1.4 MATERIALS SPECIFICALLY EXCLUDED

1. Asbestos and/or asbestos - containing products are not permitted. Submit Material Safety Data Sheets for any product suspected of containing asbestos if so requested by Consultant. Examples of some materials requiring close scrutiny and/or confirmation include:
2. Transite drainage pipe - whether buried or above grade - not permitted.
 1. Insulation and/or jacketting for pipes, ducts, motors, pumps, etc. - not permitted if any asbestos is present.
3. Solder for all piping is to be lead-free. "Lead Free" shall mean solder which contains less than 0.030% of lead when dissolved in fluoroboric and nitric acids and tested by inductively coupled argon plasma atomic emission spectroscopy. Steelbond 281 and Silverbrite are acceptable solder products.
4. The mechanical General Contractor shall provide an affidavit signed by the principal of the company, on company letterhead, that all of the solder used on the project was either one of the two acceptable products or that the solder used (identified by brand name) meets or exceeds the testing criteria.
5. The Owner shall undertake random testing of the soldered joints. Should testing provide that the solder used was not as specified, the Owner shall take legal action against the General Contractor as appropriate.
6. All paint and finish coatings are to be lead and mercury-free. Submit Material Safety Data Sheets confirming that these products are free of all lead and/or mercury compounds.

1.5 FIRE SAFETY REQUIREMENTS

1. Comply with requirements of the local municipal fire department with respect to continuous fire safety on the job site.
2. Comply with fire safety requirements of other construction related authorities (Workplace Safety & Insurance Board, Ministry of Labour, construction trade unions, etc.). If more than one authority issues similar requirements, the more stringent shall govern.
3. The appropriate clauses of the Ontario Building Code relating to fire protection

shall be strictly followed.

4. Provide and maintain free access to temporary or permanent fire hydrants and other fire protection equipment during performance of work required by insurance companies having jurisdiction and governing codes, regulations and by-laws.

1.6 OVERLOADING

1. Ensure no part of Work is subjected to a load which will endanger its safety or cause permanent deformation.

1.7 FALSEWORK

1. Design and construct falsework in accordance with latest issue of CSA S269.1-.

1.8 SCAFFOLDING

1. Design and construct scaffolding in accordance with latest issue of CSA-S269.2.

1.9 LIST OF MINIMUM SAFETY

1. Include all provisions for construction safety such as fences, hoarding along streets, storage provisions facilities, sanitation facilities, fire protection, electrical supply, temporary heat, ventilation, construction equipment with its supports and guards, stairs, platforms, ladders, scaffolds, guardrails, walkway lighting and morality lighting, work around asbestos lead, silica and fumes, all as required by the Construction Safety Act and Regulation, latest edition of the Province of Ontario, as well as all other applicable regulations of Jurisdictional Authorities.

1.10 OWNER SAFETY REQUIREMENTS

1. The General Contractor will take all necessary steps to protect personnel (workers, visitors, general public, etc.) and property from any harm during the course of the contract.
2. All work procedures will be in accordance with Owner legislated standards.
3. All equipment shall be in safe operating condition and appropriate to the task.
4. The General Contractor shall ensure that only competent personnel are permitted work on site. The owner will throughout the term of the contract also remove from the site any persons not observing or complying with safety requirements.
5. The General Contractor shall provide competent personnel to implement their safety programs and ensure that the owner's standards and those of the Ontario Health and Safety Act are being complied with.

6. Plant Services or the Consultant will monitor every week to ensure that safety requirements are met and that safety records are properly kept and maintained. Continued disregard for safety standards can cause the contract to be cancelled and the General Contractor or subcontractors removed from site.
7. The General Contractor will report to the Owner, Consultant and jurisdictional authorities any accident or incident involving General Contractor, owner or public personnel and/or property arising from the General Contractor's execution of the work.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION Not Used

END OF SECTION

PART 1 GENERAL

1.1 FIRES

1. Open fires and burning of rubbish are not permitted on the site.

1.2 DISPOSAL OF WASTES

1. Do not bury rubbish and waste materials on site.
2. Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.
3. All removal of waste products and debris resulting from the work must be audited and source-separated to comply with the most current version O.Reg 102 103 Industrial, Commercial and Institutional Source Separation Programs under the Environmental Protection Act and the 3 R's Regulation.

1.3 DRAINAGE

1. Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
2. Do not pump water containing suspended materials into waterways, sewer or drainage systems.
3. Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.4 SITE CLEARING AND PLANT PROTECTION

1. Refer to Division 2.

1.5 POLLUTION CONTROL

1. Provide and maintain temporary erosion and pollution control features including mud mats and siltation fences as per the Bruce County- Town of Mildmay and Ontario provincial standard details and requirements installed under this contract or previously installed.
2. Control emissions from equipment and plant to local authorities' emission requirements.
3. Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
4. Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.6 NOISE CONTROL

1. Adhere to local noise bylaws.
2. Equip vehicles and equipment with efficient noise attenuation devices (mufflers) to minimize noise levels in vicinity of Site
3. Where necessary place noise attenuation devices (barriers) around stationery pumps and compressors.

1.7 WASTE MANAGEMENT CONTROL

1. Prepare Waste Audit and Waste Reduction Plans in accordance with O.Reg. 102/94 made under the environmental Protection Act for Waste Audits and Waste Reduction Work Plans. Ensure these plans are prepared prior to construction or demolition work proceeds on Site.
2. Prepare and implement a Source Separation Program in accordance with Ont. Reg. 103/94 made under the environmental Protection Act for Industrial Commercial source Separation Programs. Ensure program is implemented prior to construction or demolition work proceeds on Site.
3. Post plans on Site where most workers will see them and allow any worker to view plans who makes such a request.
4. The following set of definitions are intended to augment terms provided within this Article:

1.8 3 R: REDUCE (REDUCTION), REUSE, RECYCLE

1. REDUCE (REDUCTION) - Reduction involves actions to minimize quantity of waste at source and consequently, assumes highest priority in hierarchy of 3R activities.
2. REUSE - Direct reuse of products which otherwise would become waste, provides another means of diverting quantity of waste destined for landfill.
3. RECYCLE - Recycling involves collection of materials for use as feedstock in manufacturing of new products. Recycling can be most effectively accomplished if recyclable materials have been source separated at point of generation.
4. SOURCE SEPARATION - Purposeful segregation of materials from designated solid waste stream into specific material types at point of generation to facilitate recycling.
5. SOURCE SEPARATED MATERIALS - Specific types of materials that have been purposefully segregated from municipal waste into specific material types at point of generation.
6. CONSTRUCTION BUSINESS - Business enterprise employing more than 50 persons out of 1 office involved in building, renovation and repair of immobile structures, including soil excavation and landscaping.
7. DEMOLITION BUSINESS - Business enterprise employing more than 50 persons out of

-
- 1 office involved in dismantling any immobile structure, facility or dwelling.
8. Apply waste management activities of reduction, reuse and recycling of waste materials during construction and/or renovation of this Contract.
 9. Construction/Demolition Businesses shall be required to source separate in accordance with Ont. Reg. 103/94, for purposes of recycling, following materials:
 1. corrugated cardboard
 2. wood waste (i.e., non-treated dimensional lumber, manufactured wood) non-painted gypsum board
 3. ferrous metals
 4. Brick and Portland cement concrete
 10. Submit agreement as requested to include source separation of above identified materials and other waste diversion activities during construction phase.
 11. Requirements: During construction phase, Construction Manager shall be required to comply with following program requirements:
 1. Identify sorting, storage and disposal requirements anticipated during construction to maximize waste diversion.
 2. Establish reduction, reuse and on-site source separation activities during construction.
 12. Identify haulers and recycling companies that have entered into agreement with or have expressed willingness to enter into such agreement with Construction Manager.
 13. Identify person responsible for source separation program.
 14. Establish effective education and information program for on-site employees, including training sessions, use of signs, and designated waste diversion program.
 15. Establish cooperative agreements with Sub-Construction Managers/trades to abide by waste diversion program.
 16. Construction Manager shall be willing to allow monthly on-site visits by Consultant to review waste management/recycling program.
 17. Immediately upon notification of award of Contract, and before starting work on Site, submit fully completed "Subcontractor Participation Form" appended to this Section to the Consultant.
 18. Construction Managers shall provide evidence that they can and shall implement required waste diversion program. Provision of evidence includes, but is not limited to following:

1. Written agreements with Sub-Construction Managers that they will participate in waste diversion program.
2. Letters from reuse/recycling markets that they are in position to accept designed materials.
3. Action plan prepared by Construction Manager for meeting objectives of waste diversion program; and
4. Contract Sum shall include costs for implementing waste diversion program.

1.9 HAZARDOUS MATERIALS

1. See Section 00840 Hazardous Materials.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

For source separation program to be effective, it is important for Subcontractor Managers/trades to work cooperatively with your company. To ensure this cooperative arrangement will be carried out, you may wish to ask Subcontractor Managers/trades companies to sign this agreement.

1.	Company Name	
	Address	
	Signature	
2.	Company Name	
	Address	
	Signature	
3.	Company Name	
	Address	
	Signature	
4.	Company Name	
	Address	
	Signature	

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

1. Systems demonstration
2. Document submission
3. Project commissioning
4. Inspection and takeover procedures

1.2 SYSTEM DEMONSTRATION

1. Prior to final inspection, demonstrate operation of each system to the Owner and Consultant. Provide and coordinate dates & times for as many demonstration sessions as may be required.

1.3 DOCUMENTS

1. Collect reviewed submittals in Section 01010 and 01300 and assemble documents executed by subcontractors, suppliers, and manufacturers. Submit as per requirements in Section 01010 - General Requirements.
 1. Provide bonds fully executed and notarized.
 2. Submit a final statement of accounting giving total adjusted Contract Sum, previous payments, and monies remaining due.
 3. Architect will issue a final change order reflecting approved adjustments to Contract Sum not previously made.

1.4 PROJECT COMMISSIONING

1. Expedite and complete deficiencies and defects identified by the Consultant.
2. Review record "as-built" drawings for completeness and then have "as-built" AutoCad 2016 or later drawings completed by a professional drafting service and provide "as-builts" on computer disks.
3. Review Cash and Contingency Allowances in relation to Contract Price, change orders, hold-backs and other Contract Price adjustments.
4. Submit required documentation such as statutory declarations, Workplace Safety & Insurance Board Certificates, certificates of approval or acceptance from regulating bodies.
5. Schedule, coordinate and attend "end-of-work" testing and break-in or start-up demonstrations.

6. Review inspection and testing reports to verify conformance to the intent of the documents and that changes, repairs or replacements have been completed.
7. Meet with Mechanical, Electrical and Structural consultants and inspection and testing company to co-ordinate completion, testing approvals.

1.5 INSPECTION/TAKEOVER PROCEDURES

1. The requirements of OAA/OGCA Document No. 100 "Take-Over Procedures" also govern applicable take-over procedures for this Contract.
2. Prior to application for certificate of Substantial Performance, carefully inspect the Work and ensure it is complete, that major and minor construction deficiencies are complete and/or corrected and the building is clean and in condition for occupancy. Notify the Architect, in writing, of satisfactory completion of the Work and request an inspection.
3. During the Consultant inspections, lists of deficiencies and defects will be tabulated. Correct same.
4. When the Consultants consider deficiencies and defects have been corrected and it appears requirements of the Contract have been performed, make application for certificate of Substantial Performance. Refer to CCDC General Conditions for specifics to application.
5. All utility meters to be read and transferred into the Owner's name.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION Not Used

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

1. Environmental Protection – Section 01560

1.2 DUST AND CLEANING REQUIREMENTS

1. Standards:

1. Maintain project in accordance with the latest edition of the Occupational Health and Safety Act.

2. Hazards and Dust Control:

- .1 Provide adequate ventilation during use of volatile or noxious substances.
- .2 Prevent spread of dust beyond the construction site by wetting, or by other means suitable for conditions, as it accumulates.
- .3 Provide Tack Mats at entrances to prevent dust and dirt from being traced through the project as required. Dispose of mats and replace on regular basis with new mat.

3. Floors:

- .1 Keep troweled concrete floors free from oils, grease or other materials likely to damage them, discolour them or affect bond of applied finishes. Once building is enclosed, keep floors as dry as possible after curing.
- .2 To prevent soiling or damage to finish flooring where pedestrian traffic occurs after the flooring has been installed, install and maintain reinforced kraft paper temporary protection, secured in place and with joints sealed by reinforced pressure sensitive tape.
- .3 Install plywood panels of minimum 1/4" thickness over completed finish flooring materials on which further construction work is performed or delivery of products is made, or both. Seal joints between panels with reinforced pressure sensitive tape.

1.3 MATERIALS

1. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
2. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION

3.1 DURING CONSTRUCTION

1. Execute cleaning to ensure that building, grounds, and public properties are maintained free from accumulations of waste materials and rubbish. Keep site clear of snow, mud and pooling of water due to severe rain. Ensure that work is not stopped because of failure to provide access to site.
2. Wet down dry materials and rubbish to prevent blowing dust.
3. At reasonable intervals during progress of Work, clean site and public properties and dispose of waste materials, debris and rubbish.
4. Unless otherwise specified, salvaged material resulting from construction, and surplus materials and construction debris shall become property of Contractor, who shall dispose of it away from site.
5. Vacuum clean interior building areas when ready to receive finish painting and continue vacuum cleaning on an as-needed basis until building is ready for Substantial Performance or occupancy.
6. Obtain from each Subcontractor, instructions which designate proper methods and materials to be used in final cleaning and submit such instructions to the Consultant. Include Instructions in Manufacturer's Data Book specified in Section 01300.
7. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.
8. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

3.2 FINAL CLEANING

1. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all surfaces exposed to view; leave project clean and ready for occupancy.
2. Employ experienced workers, or professional cleaners, for final cleaning.
3. In preparation for Substantial Performance or occupancy, conduct final inspection of interior and exterior surfaces exposed to view, and of concealed spaces.
4. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from all sight-exposed interior and exterior finished surfaces; polish resilient and ceramic surfaces so designated to shine finish. Vacuum carpet.

5. Clean and polish glass and mirrors.
6. Repair, patch and touch up marred surfaces to specified finish, to match adjacent surfaces.
7. Broom-clean paved surfaces; rake clean other surfaces of grounds.
8. Clean filters, exposed ductwork, and structure.
9. Clean bulbs and lamps and replace those burned out.
10. Clean diffusers and grilles.
11. Clean sinks, faucets, and water closets and controls.
12. Remove snow and ice from access to building.
13. Maintain cleaning until project, or portion thereof, is occupied by Owner.

3.3 REMOVAL OF TEMPORARY FACILITIES

1. Completely remove temporary facilities from site, making good any damage when no longer required.

END OF SECTION

PART 1 GENERAL

1.1 DESCRIPTION

1. The forms outlined below shall form the basis of communication between the Consultant and the Construction Manager. Copies of forms unrelated to the issuance of monies, shall be kept on the site; neatly filed and readily accessible to the parties concerned.

1.2 TRANSMITTAL RECORD

1. A record of material issued by the Consultant or Construction Manager.

1.3 GENERAL REVIEW REPORT

1. A progress report completed by the Consultant or Consultant on a regular basis.

1.4 PROPOSED CHANGE

1. A description of contemplated changes to the Contract.

1.5 CASH ALLOWANCE CHANGE ORDER

1. Assignment of money for work executed under the Cash Allowance Section.

1.6 CHANGE ORDER

1. Assignment of money for work executed beyond the financial limits of the Contract.

1.7 CHANGE DIRECTIVE

1. A description of a change in the work when the Owner requires the Contractor to proceed with a change in the work prior to the Owner and the Contractor agreeing upon the adjustment in Contract Price and Contract Time.

1.8 CERTIFICATE FOR PAYMENT

1. For release of contract money based on monthly progress draws.

1.9 SUPPLEMENTAL INSTRUCTIONS

1. A description and/or clarification for the purpose of recording a clarification or interpretation of the contract documents or giving directions on problems resulting from field conditions.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION Not Used

END OF SECTION

PART 1 GENERAL

1.1 NEWFORMA SOFTWARE SYSTEM

1. This project will be administered through the Consultant using the NEWFORMA software system.
2. The General Contractor is required to use this internet-based software for ALL project communications, RFIs, quotations, project schedule, shop drawing log, change log, RFI log, etc., including all administrative forms as outlined in Section 01800 and construction schedules as outlined in Section 01310. All shop drawings, interference drawings and as-built drawings shall be submitted electronically through the Newforma Info Exchange in PDF format and shall be numbered in the order which they are submitted. Numbering shall be in the following format; 001, 002, 003, etc. Submittals will not be deemed as received unless delivered through Newforma Info Exchange.
3. Utilization of this system does not require the purchase or download of the Newforma software. The Consultant will send an email notification which will automatically provide online access to the Newforma Info Exchange specific to this project.

1.2 NEWFORMA INSTRUCTIONS

1. You will receive an email instructing you how to get into the system (click on link). The system is self-explanatory as to the "use" for Submittals (Shop Drawings) and RFIs. Refer to attached screen shots.
2. Shop Drawings are to be issued as "Submittals". There is a place on the Submittal section to put in the General Contractor's "expected response date" – please ensure that is filled in. Submittals are to be numbered in the sequence which they are submitted. Numbering to be as follows; 001, 002, 003, etc. (NOTE: as per the contract, the Consultant has 10 working days to respond).
3. RFIs: There is a place on the RFI section to put in the General Contractor's "expected response date" – please ensure that is filled in. RFI's are to be numbered in the sequence which they are submitted. Numbering to be as follows; 001, 002, 003, etc. (NOTE: as per the contract, the Consultant has 5 working days to respond)
4. RFCs: (all General Contractor quotations to be submitted as an RFC) RFC's are to be numbered in the sequence which they are submitted. Numbering to be as follows; 001, 002, 003, etc.
5. Submittals and RFI's requiring consultant review other than the Consultant shall be sent via Newforma directly to the respective consultant. The +VG Project Manager as well as the persons noted above shall be copied on all submittals and RFI's.

6. All shop drawings, interference drawings and as-built drawings shall be submitted electronically through the Newforma Info Exchange in PDF format. Submittals will not be deemed as received unless delivered through Newforma Info Exchange.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION Not Used

END OF SECTION

1. GENERAL

1. GENERAL REQUIREMENTS

1. Conform to Sections of Division 1 as applicable.

2. REFERENCE STANDARDS

1. All reference standards to be latest issue, including amendments
2. ASTM D698-91
3. CAN3-A23.1-M90
4. OPSS 1010-93 "Materials Specifications for Aggregates".

3. REQUIREMENTS OF REGULATORY AGENCIES

1. All Standards to be latest issue with amendments.
2. Ontario Building Code, as currently amended.
3. The Construction Safety Act and all other regulations of the Ontario Ministry of Labour or local by-laws as currently amended relating to the work of this Section.

4. PROJECT CONDITIONS

1. Protection

1. Underground Services: Notify Public Utilities in advance of planned excavations adjacent to their services. Take care not to damage or displace encountered services. When such services are encountered notify Architect immediately and protect, brace and support them. Advise Architect which services require adjustment, relocation or abandonment. Where work on these services become necessary use following procedure:

1. Essential Services: Make necessary repairs only to maintain essential services satisfactory to Architect and authorities having jurisdiction.
2. Known Services: Repair promptly at no expense to Owner.
3. Unknown Services: Repair promptly on Architect's instruction. Submit complete breakdown of cost of such work. Amount approved will be added to Contract Sum.

2. Shoring and trench timbering, in addition to requirements of local authorities shall be carried out in accordance with requirements of The Latest Occupational Health and Safety Act, as currently amended and Regulations for Construction Projects, and all other applicable regulations of Ontario Ministry of Labour. In addition, follow the recommendations of the Construction Safety Association "Shoring and Timbering in Trenches", as currently amended, wherever applicable.

3. Shoring and Bracing

1. Provide necessary shoring and bracing for excavations to existing premises including fences. Submit method of shoring and bracing for review before installing. Maintain shoring and bracing during work. Remove when no longer required and when notified.
2. Shoring and bracing shall properly retain the banks of excavations and prevent caving-in or displacement or damage to surrounding or adjacent buildings or other property.
3. Retain shoring and bracing until all other work affected thereby is carried out.
4. Erect shoring and bracing free of footings, foundations, walls or other such work so it may be removed entirely or in sections when it is no longer required and when directed, without causing damage or injury to the Work or adjacent property.
5. Submit drawings showing the methods of shoring and bracing to be used. Drawings shall be engineered and stamped by a Certified Engineer from the Province of Ontario. Submit calculations if requested by the consultant.

2. Sub-Surface Conditions

1. A copy of the Sub-Surface Investigation Report is included in the Soil Report - Section 02010 in this specification for your review.
2. The information given in this report was obtained for the use of the Owner in the execution of the design. It is presented in good faith to assist the Contractor. No guarantee is made or implied as to its detailed accuracy for every site location. It is incumbent upon the Sub-Contractor to make any additional tests to obtain any additional information deemed necessary for the proper execution of the work, at no additional cost to the Owner.

5. SCOPE

1. To perform all the work not done or included in Excavation, Trenching & Backfilling (Building Area)- Section 02300. In general, the work of this section shall include the clearing, grubbing, excavating, engineered fill, backfilling and rough grading for all the asphalt, sidewalk, landscaping, which are indicated on the drawings (at all site areas beyond building walls).

6. UNIT PRICES

1. Not applicable

7. DRAWINGS

1. Site Plans

1. Coordinate Architectural Site Plan
2. Final contours are to be maintained as closely as possible with due allowance for "blending" of grades for drainage away from the building.

8. ENVIRONMENTAL REQUIREMENTS

1. Comply with the requirements of the following Federal and Provincial Legislation related to the transportation use and disposal of all existing contaminated fill materials being excavated from site.
 1. Federal Transportation of Dangerous Goods Act.
 2. Ontario Regulation number 309: Liquid industrial and hazardous waste regulation.
 3. All such waste shall be carried by an approved Ministry of the Environment Haulage carrier and disposed of at a Ministry of the Environment approved receiving facility.

9. CO-ORDINATION & CO-OPERATION

1. Co-ordinate the work of this Section with the work of all other Sections in accordance with the General Instructions.
2. Co-ordination and co-operation is particularly important with the following Sections: Landscaping, Site Servicing, Concrete Walks and Curbs, Asphalt Paving, Cast-In-Place Concrete, and Mechanical Excavation.
3. Particular care shall be taken in coordinating the work of this Section with the Trade Contractors performing related work.

10. EXAMINATION

1. Examine the site for the purpose of determining the conditions prevailing there, which may affect the work of this Section, including available access to the site, site contours, etc.
2. Determine the nature and location of all existing services below and above ground, which may affect the work of this Section.

2. PRODUCTS

1. MATERIALS

1. Class "B" Granular: imported granular material in accordance with O.P.S.S. Specification Form 1010 for Granular 'B' specification form 1010
2. Class "A" Granular: imported in accordance with current O.P.S.S. Form 1010 for Granular 'A' Specification Form 1010.
3. Granular material shall be free draining and not susceptible to frost action as determined by current O.P.P.S. Methods.
4. Clear crushed aggregate: clear, clean, screened stone, in size between 10 mm and 25 mm.
5. Topsoil: Use from site topsoil stockpile and import additional topsoil as required to meet finish grades as indicated on drawings. Provide topsoil depth specified minimum 12" (300mm) at all seed and sodded areas and 24" (600mm) depth at all planting beds. Refer to specifications on seeding sodding and plantings. Additional topsoil shall be fertile, friable natural loam containing 4% minimum organic matter for clay loams and 2% minimum organic matter for sandy loams with acidity range of 5.5 PH to 7.5 PH and capable of sustaining vigorous growth.
6. Submit representative samples of the proposed materials to the inspection company for testing and approval for use on this project two weeks prior to using.
7. Supply only those materials approved for use on this project by the inspection company.
8. NOTE: Slag content in any imported granular material is not acceptable

2. SOURCE QUALITY CONTROL

1. All materials shall be subject to test and inspection by a testing and

inspection company appointed by the General Contractor.

2. Cost of testing will be paid for by the Owner in accordance with the General Conditions.
3. Provide access to pits in quarries for the personnel of the inspection company.
4. Provide representative samples of materials as may be required by the inspection company at no cost to the Owner.

3. EXECUTION

1. EXAMINATION

1. Examine the site for the purpose of determining the conditions prevailing there which may affect the work of this Section, including available access to the site, and existing ground water conditions.
2. Determine the nature and location of all existing services above and below ground which may require protection during the construction operation, or otherwise affect the work of this Section.

2. PREPARATION

1. Clearing

1. Clear and remove obstructions to excavating. Remove trees and stumps not required to be retained.
2. Clear site of all rubbish, rocks, boulders, tree stumps and other useless materials and debris, remove from site and dispose of unless instructed otherwise.
3. If required, Cut all dead trees and remove stumps and roots to a minimum depth of 600 mm below proposed finished grade.
4. Burying of useless materials on the site is permitted only when approved in writing by the Architect.
5. Do bury only in areas designed by the Architect and do so in strict accordance with all applicable laws and regulations.
6. Be responsible for obtaining the necessary permits and assume all costs.
7. Bury to such depth and in such manner so as not to affect landscape work.

8. Backfill with approved fill and compact.

2. Lines and Levels

1. Establish accurate lines and levels as required and supply batter boards, line stakes and templates and establish permanent reference lines and bench marks required.

3. PERFORMANCE

1. General

1. After stripping of topsoil, do all necessary rough grading, excavating, and filling, where required, to establish the sub-grade under all areas to the extent, elevations and depth required for completion of work.
2. Level of sub-grade shall be to the depths specified, after compaction of sub-grade and of materials placed thereon to allow for finished grades shown on drawings.
3. Remove all unsuitable material, soft and/or unstable areas in sub-grade to approved depth and backfill with clean, approved fill material.
4. Provide for uniform slopes between points for which finished grades are shown on drawings. Meet and blend with existing grades in a smooth manner.
5. Establish smoothly rounded grades at top and toe of slopes and banks.
6. Do not grade when soil is wet or frozen.
7. Compact sub-grade behind curbs, walls, and under paving and other hard surfaces to the specified density. Compact sub-grade below future portable classroom area.
8. Preparations of sub-grade:
 1. Scarify sub-grade on which topsoil is to be placed, to the minimum depths specified.
 2. Scarify sub-grades under areas which are to be raised by placing fill to minimum depth of 3" (75 mm) to provide a

good bond and prevent slipping of fill.

9. Fill material shall be clean, free of topsoil and organic matter and debris, and shall be approved by the Architect before placing. On site excavating material may be used for filling when approved by the Architect.
10. Where required, supply and spread approved fill materials to raise existing grades to the specified sub-grade level, as shown on the drawings for new finish elevations.
11. Place fill in loose layers, not exceeding 200 mm in depth and compact each layer to a minimum dry density of ninety-five percent (95%) of the maximum Standard Proctor Density, before placing subsequent layers.
12. The surface shall be shaped at all times to ensure adequate surface run-off and prevent ponding and scouring.
13. Keep excavation free of water by bailing, pumping or a system of drainage as required and provide pumps, suction and discharge lines or well points of sufficient capacity and maintain until such time as the permanent drainage system is installed or until Architect agrees to its removal. Take all necessary measures to prevent flow of water into excavation.
14. Water discharged from de-watering systems shall be equal to or better in quality than the receiving stream or sewer storm water and shall be free of pollutants. Provide settling ponds and/or other treatment facilities as required to treat discharges at no cost to Owner.
15. Supply and install additional erosion controls and temporary sedimentation ponds, plastic tubing and temporary catch basins, as required to prevent erosion and contamination of sediment onto other properties or into waterways.
16. Maintain existing and any additional erosion controls until sod has been installed or seed areas have been growing for 6 months then remove all temporary erosion controls.

2. Roadways, Parking Lots, Concrete Walks and Curbs Excavation

1. Excavate and rough grade at roadways, parking lots and hard surfaced areas to suit layouts shown on the drawings.
2. At roadways and paved parking areas (heavy duty asphalt areas), excavate to remove all topsoil, organic matter or

deleterious material to a depth not less than 540 mm below the final asphalt grade but not less than sufficient depth to remove all topsoil, asphalt, soft and compressible materials to expose competent subgrade soil level.

3. At medium duty asphalt areas excavate to remove all topsoil, organic matter or deleterious material to a depth not less than 415 mm below finished grade but not less than sufficient depth to remove all topsoil, asphalt, soft and compressible materials to expose competent subgrade soil level.
4. At concrete walk areas excavate to a minimum depth of 475 mm below finished grade **but not less** than sufficient depth to remove all top soil, soft and compressible materials to expose competent subgrade soil level.
5. Slope and shape subgrade towards catch basins and subgrade subdrains with 2% fall at roads and a minimum 1% at parking areas. (See drawing for further details.) Proof-roll existing sub-grade after excavation and shaping with a heavy vibratory roller.
6. Sub-excavate any soft or compressible materials and fill with modified Granular "B" compacted to 100% of SPMDD.
7. Provide rock removal and excavation where encountered at site service areas to obtain required depths.

3. General Backfilling

1. Prior to placing backfill, proof roll the exposed subgrade thoroughly with a smooth heavy roller to compact any loose zones. Sub-excavate any soft or compressible materials.
2. Proceed promptly with backfilling as work progresses after obtaining Architect's review.
3. Remove shoring material during backfilling.
4. Inspect moisture content of fill prior to placing. Limit addition of water only to extent required to provide optimum moisture content for compaction. Puddling or flooding with water to compact fill is not permitted.
5. Place all backfill and engineered fill in 200 mm (8") thick maximum layers. Compact each layer before placing next using approved mechanical equipment until compaction and level is reached.
6. Areas adjoining vulnerable building components which cannot be

thoroughly compacted by drawn equipment, shall receive equivalent compaction with mechanical tampers.

7. Fill shall be free of frost, snow and ice and in no instance shall fill be placed on frozen snow, or ice covered ground.

4. Backfilling Below Building

1. Refer to Specification Section 02300- Excavation, Trenching & Backfilling (Building Area).

5. Roadways, Parking Lots and Hard Surfaced Areas, Fill

1. Refer to specification sections; 02520 Concrete Walks and Curbs, and 2510 Asphalt Paving for compacted fill work

6. Rough Grading

1. Rough grade all areas around the building in accordance with the site plan and required and existing grades, and as directed by the Architect. Co-ordinate this work with work of other sections.
2. Areas to receive sod or seeding shall be rough graded to an elevation 12" (300 mm) below finished grade.
3. Slope ground so that water will drain at all times away from the building.
4. Rough graded areas shall be cleanly raked free of coarse material and left ready for final grading.

7. Installation of Topsoil

1. Spread a minimum of 12" (300 mm) topsoil over entire sodded and seeded areas and 24" (600mm) topsoil at all planting beds and tree locations. Existing topsoil on site to be spread over all sodded and seeded areas. Provide additional topsoil if required.
2. Depth indicated is compacted depth.
3. Spread topsoil on prepared subgrade of the work site.
4. Fine grade and loosen topsoil to produce a smooth even surface free from debris, sod, stones and roots over 1" (25 mm) in diameter. Eliminate rough spots and low areas. Prepare loose friable bed by means of cultivation and subsequent raking.
5. Compact (85% Standard Proctor Density) unless indicated otherwise elsewhere.

6. Meet and match all existing turf areas, curbs, manholes and catch basin frames in a smooth uniform line to the satisfaction of the Architect.
7. Landscape contractor to provide mixed topsoil where planting material will be installed.
8. Co-ordinate with Landscape contractor for installation of topsoil to be installed at all areas to be seeded, sodded and hydraulic seeded.
9. Coordinate with Landscape contractor for installation of topsoil to be installed at landscaped areas.

4. PROTECTION OF EXCAVATIONS

1. Protect adjacent construction and underground services from damage resulting from the excavation operations and from frost penetration.

5. PROTECTIVE MEASURES

1. Furnish all necessary barriers and other protection around open excavations. For other barriers and hoardings, consult General Works Section.
2. Maintain barricades in good condition at all times until they are no longer required.

6. FIELD QUALITY CONTROL

1. All materials and workmanship shall be subject to test and inspection by a testing and inspection company appointed by the General Contractor.
2. A representative (inspector) of the testing and inspection company will make random site inspections.
3. Sieve analysis, SPMD tests for fill materials and field density tests of the compacted fill materials will be made by this inspector to ensure that the specified standard of work is achieved.
4. All excavation, placing and compaction procedures will be subject to the approval of the inspector.
5. Materials which fail to achieve the specified standard of compaction shall be re-compacted or replaced as directed by the Inspector.
6. The cost of testing will be paid for by the Cash Allowance Section 01020 in

accordance with the General Conditions.

7. Provide access to the work for the personnel of the testing and inspection company.
8. The compaction tests are performed on behalf of the Owner to satisfy the Architect that the requirements of the Contract Documents have been met. They are not intended as a substitute for the contractor's quality control program.

7. ROAD DUST CONTROL

1. Where directed and after the final layer has been placed and compacted, calcium chloride shall then be applied at the rate directed by the Architect by means of a mechanical spreader.

8. CLEAN-UP

1. At the completion of the work of this Section, remove any excess materials, debris and equipment from the site.
2. Remove from work site all contaminated excavated material and dispose at an approved dump site in conformance with all Federal and Provincial Legislation for disposal of contaminated materials.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary conditions as well as Divisions 01 and 1 Specification Sections apply to this section.

1.2 SUMMARY

1. This section requires the selective removal and subsequent disposal of the following:
 1. Carry out demolition in accordance with requirements of CSA S350-M. Demolish and remove materials from Site.
 2. Work includes but is not limited to demolition and/or removal of portions of existing building ,doors, windows, flooring, roofing, ceiling, plumbing fixtures, concrete, fixed furnishings, railings, mechanical equipment/components, and/or electrical work.
 3. Conduct all demolition and removal work as indicated on drawings and as required to accommodate new construction.
 4. Removal and protection of existing fixtures, materials, equipment and/or items indicated to remain, reuse return to Client and/or salvage.
 5. Contractor to remove existing millwork, sinks, appliances, ductwork, plumbing and electrical as noted on the drawings.
 6. Locate, identify, stub off, and disconnect utility services that are not indicated to remain.
 7. Materials and debris shall not be stacked in building but removed entirely from all circulation spaces at the end of each day.
 8. At end of each day's work leave work in safe and clean condition.

1.3 REMOVAL OF WORK SPECIFIED ELSEWHERE

1. Cutting non-structural concrete floors and masonry wall for piping, ducts and conduits is included with the work of the respective fire suppression, plumbing, HVAC and electrical specifications sections in Divisions 20 to 26.

1.4 RELATED WORK SPECIFIED ELSEWHERE

1. Remodelling construction work and patching are included within the respective sections and drawings, including removal of materials for reuse and incorporation

into remodelling or new construction.

2. Relocation of pipes, conduits, ducts and other mechanical and electrical work is specified in their corresponding divisions.

1.5 SUBMITTALS

1. Submit the following in accordance with Conditions of the contract and Division 01 specifications sections.
 1. Schedule indicating proposed sequence of operations for selective demolition work to Owner's Representative for review prior to start of work. Include coordination for shutoff, capping and continuation of utility services as required, together with details for dust and noise control protection.
 2. Photographs of existing conditions of structure surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations.
 3. File submittals with Owner's Representative prior to start of work.

1.6 STANDARD REFERENCES

1. CSA S350 M80 (R2003) Code of Practice for Safety in Demolition of Structures.

1.7 JOB CONDITIONS

1. Some work may be required to be completed after hours and on weekends.
2. Partial demolition and removal:
 1. Items indicated to be removed but of salvageable value to Contractor may be removed from structure as work progressed. Transport salvaged items from site as they are removed.
 2. Storage or sale of removed items on site will not be permitted.

1.8 PROTECTION

1. Provide temporary barricades and other forms of protection to protect Owner's personnel and general public from injury due to selective demolition work.
2. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structure or element to be demolished to adjacent facilities or work to remain.
3. Protect from damage existing finish work that is to remain in place and become

exposed during demolition operations.

4. Protect floors with suitable coverings when necessary.
5. Protect all existing adjacent work (wainscoting, plaster walls, bases and trim, etc) against damages which might occur from falling debris, scrapes or other causes due to work of this Section.
6. Construct temporary insulated dustproof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks.
7. Ensure that all dust and debris is removed before finishing work commences.
8. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building. .
9. Remove protections at completion of work.

1.9 DAMAGES

1. Inform Owner's Representative immediately of any damage caused to adjacent facilities during demolition activities.
2. Promptly repair damages caused to adjacent facilities by demolition work once Owner's Representative gives the order proceed.

1.10 TRAFFIC

1. Conduct selective demolition operations and debris removals to ensure minimum interference with roads, streets, walks and other adjacent occupied or used facilities.
 1. Do not close or otherwise obstruct streets or walks without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

1.11 QUALITY ASSURANCE

1. Regulatory Requirements: Conform to the latest Occupational Health and Safety Act, as currently amended.
2. Most recent Occupational Health and Safety Act, as currently amended,
3. Conform to OBC, as applicable.

4. Conform to Fire Code, Regulation under Fire Marshals Act, especially Part 8.
 5. Flame Cutting: Only if permitted by authorities having jurisdiction.
 1. Do not use torches for removal until work area is cleared of flammable materials. At concealed spaces, such as interior of ducts and pipe spaces, verify condition of hidden space before starting flame-cutting operations. Maintain portable fire suppression devices during flame-cutting operations.
6. Utility Services: Maintain existing utilities indicated to remain in service and protect them against damage during demolition operation.
 1. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities as acceptable to governing bodies.
 2. Maintain fire protection services during selective demolition operations.
3. Provide bypass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of 72 hours advance notice to Owner if shutdown service is necessary during changeover.
7. Environmental Controls: Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration. Comply with regulations pertaining to environmental protection.
8. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding and pollution.
9. Remove hazardous materials in accordance with applicable laws and regulations.

1.12 DISPOSAL OF WASTE MATERIALS

1. Selling or burning of materials on Site is not permitted.
 2. Provide bin for garbage on sidewalk in a location acceptable to the Owner.
3. Conform to requirements of municipality's Works Department regarding disposal of waste materials.
4. Materials prohibited from municipality waste management facilities shall

be removed from Site and disposed of at recycling companies specializing in recyclable materials

PART 2 PRODUCTS Not Used

PART 3 EXECUTION

3.1 PREPARATION

1. Provide interior and exterior shoring, bracing or support to prevent movement, settlement, or collapse of are to be demolished and adjacent facilities to remain.
2. Cease operations and notify Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.
3. Cover and protect furniture, equipment and fixtures to remain from soilage or damage when demolition work is performed in areas where such items have not been removed.
4. Provide and weatherproof closures for exterior opening resulting from demolition work.

3.2 DEMOLITION

1. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on drawings in accordance with demolition schedule and governing regulations.
2. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.
3. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors or framing.
4. Provide services for effective air and water pollution controls as required.
5. For interior slabs on grade, use removal methods that will not crack or structurally disturb adjacent slabs or partitions.
6. If unanticipated mechanical, electrical or structural elements are encountered and conflict with intended function or design, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written accurate detail. Pending receipt of directive from Owner's Representative, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

3.3 SALVAGED MATERIALS / EQUIPMENT

1. Salvaged items: Where indicated on drawing as "Salvage" or "Deliver to Owner", carefully remove indicated item (s), clean, store and turn over to Owner and obtain receipt.

3.4 DISPOSAL OF DEMOLISHED MATERIALS

1. Remove from building site debris, rubbish and other materials resulting from demolition operations. Transport and legally dispose off site.
2. If hazardous materials are encountered during demolition, comply with applicable regulations, laws and ordinances concerning removal, handling and protection against exposure or environmental pollution.
3. Burning of removed materials is not permitted on project site.

3.5 CLEANUP AND REPAIR

1. Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove partitions and leave interior areas clean.
2. Repair/replace areas, components and/or items that were intended to remain but got damaged during demolition work to the full satisfaction of the Owner.

END OF SECTION

PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Related work specified elsewhere:
 - .1 Section 02 82 00.01 Asbestos Abatement – Type 1 Procedures
 - .2 Section 02 82 00.02 Asbestos Abatement – Type 2 Procedures
 - .3 Section 02 82 00.04 Asbestos Abatement – Type 2 Glove Bag Method
 - .4 Section 02 83 10 Lead Abatement – Class 1 Procedures
 - .5 Section 02 83 11 Lead Abatement – Class 2 Procedures
 - .6 Section 02 84 00 Non-Liquid Polychlorinated Biphenyl Abatement
- .3 Site Conditions identifies all known hazardous building materials within the Project Area. The information provided is for general reference only. Each Contractor must confirm existing conditions on site prior to tender close.
 - .1 The specification fulfils the requirements of Section 30 of the Ontario Occupational Health and Safety Act.
 - .2 The specification fulfils the requirements of the Section 10 of Ontario Regulation 278/05.
- .4 The Outline of Work identifies the location, condition and quantities of hazardous building materials to be removed as part of this project.
 - .1 It is the intent that work prescribed this Section will result in the removal of all hazardous materials as outlined and the decontamination of all surfaces or materials which may have been or become contaminated by hazardous materials either during or prior to work of this Contract.

1.2 Site Conditions

- .1 Refer to the report entitled “Hazardous Building Materials Assessment (Pre-construction), 6611 Pantan Street, Burlington, Ontario”, dated April 14, 2025, prepared by Pinchin Ltd., file number 352316.001.

1.3 Outline of Work

- .1 Coordinate the following items with the Owner's Project Manager and the Construction Manager, which are to be included in the Abatement Contractor's scope of work, including but not limited to: electrical isolations, GFI connection, water connections, HVAC and exhaust ventilation system isolation, bin placement, schedule, disconnects, etc.
- .2 Refer to the Contract Drawings for the extent of construction work, Work Areas, phasing and schedule.
- .3 Install Hoarding Walls between Abatement Work Areas and Occupied Areas as required.
- .4 Using Type 1 procedures prescribed in the Section identified in Related Work, perform the following work:
 - .1 Remove and dispose of asbestos-containing vinyl floor tiles, and non asbestos-containing vinyl floor tiles with asbestos-containing mastic where flooring is scheduled to be removed.
 - .1 Include to remove vinyl floor tiles where present under millwork and/or inside radiators where scheduled to be removed.
 - .2 Remove fasteners from partitions, millwork, and other items scheduled for demolition, where they are attached to flooring with asbestos-containing vinyl floor tiles and/or mastic. If removal using hand-held non-powered tools is not feasible, follow Type 2 procedures outlined in Section 02 82 00.02 and use power tools equipped with an effective HEPA dust collection device
 - .1 Clean up vermiculite debris using Type 2 asbestos procedures as prescribed in Section 02 82 00.02 and seal openings where vermiculite is discovered during work.
 - .3 Remove and dispose of asbestos-containing vinyl floor tiles where not scheduled to be removed but may be disturbed by demolition and/or new installation.
 - .2 Remove and dispose of sinks with asbestos-containing gold mastic, where scheduled to be removed.
 - .3 Remove and dispose of doors, door frames, and/or windows with asbestos-containing caulking/putty in the 1984 era of construction where scheduled to be removed.
 - .1 Remove caulking completely from substrate.
 - .2 Dispose of entire door with asbestos-containing putty in windows as asbestos waste where caulking/putty cannot be removed.
 - .4 Remove and dispose of mastic behind chalkboards/tackboards where scheduled to be removed.
 - .1 Remove mastic completely from substrate.

- .5 Remove and dispose of presumed asbestos-containing roofing above Door #1 as required for the new canopy tie-ins, and above the Boiler Room as required for new openings. Removal is to be done using non powered hand tools.
 - .1 Use Type 2 asbestos procedures, as outlined in Section 02 82 00.02, if removal is done using power tools equipped with HEPA filtered dust collection devices.
- .5 Using Type 2 procedures prescribed in the Section identified in Related Work, remove and dispose of asbestos-containing vinyl floor tile mastic using power tools/machines equipped with a HEPA filtered dust collection device. Site isolation is to include visual barrier comprised of rip-proof polyethylene sheeting, where necessary and where occupants are present.
- .6 Using Type 2 procedures prescribed in the Section identified in Related Work, remove/install items affixed to concrete block walls in the 1959 and 1967 eras of construction where asbestos-containing vermiculite is present within block wall cavities using power tools/machines equipped with a HEPA filtered dust collection device. Site isolation is to include visual barrier comprised of rip-proof polyethylene sheeting, where necessary and where occupants are present.
- .7 Using Type 2 procedures (with full enclosure) prescribed in the Section identified in Related Work, perform the following work in the 1959 and 1967 eras of construction:
 - .1 Remove and dispose of concrete block walls where scheduled for removal.
 - .2 Create openings in concrete block walls as required for wall penetrations.
 - .3 Remove canopy supports affixed to exterior walls.
 - .4 Remove and dispose of four courses of exterior brick from the foundation, where scheduled to be removed.
 - .5 Clean-up vermiculite where encountered during removal work. Install roxul insulation and spray paint red all openings to prevent further vermiculite release.
- .8 Using Type 2 procedures prescribed in the Section identified in Related Work (with a full interior and exterior enclosure), perform the following work in the 1959 era of construction:
 - .1 Remove doors, door frames, windows, window frames, spandrel panels etc. with asbestos-containing caulking/putty where scheduled to be removed.
 - .1 Remove caulking completely from substrate.
 - .2 Dispose of doors with asbestos-containing putty as asbestos waste where caulking/putty cannot be removed.
 - .3 Remove transite panels (ex. board/fascia at Door #1) where scheduled to be removed.
 - .4 Clean-up vermiculite where encountered during removal. Install roxul insulation and spray paint red all openings to prevent further vermiculite release.

- .9 Using Type 2 procedures (with a full interior and exterior enclosure), prescribed in the Section identified in Related Work, remove and dispose of asbestos-containing textured plaster soffit at Door #3 in the 1967 era of construction.
 - .1 Remove all overspray on decking, ducts, light fixture openings and junction boxes.
 - .2 Remove all pipe insulation where present above the soffit.
- .10 Using Type 2 procedures prescribed in the Section identified in Related Work (with a full interior and exterior enclosure), and in conjunction with PCB procedures, perform the following work in the 1967 eras of construction:
 - .1 Remove doors and door frames with asbestos and PCB-containing caulking where scheduled to be removed.
 - .1 Remove caulking completely from substrate and dispose of as PCB waste.
 - .2 Dispose of doors with asbestos-containing putty as asbestos waste.
 - .3 Clean-up vermiculite where encountered during removal. Install roxul insulation and spray paint red all openings to prevent further vermiculite release.
- .11 Using Glove-Bag procedures prescribed in the Section identified in Related Work, remove and dispose of asbestos-containing pipe insulation where scheduled to be removed, as required for mechanical tie-ins, and/or where present above vestibule ceilings scheduled for removal. Allow for 50 fittings and 200 linear feet of pipe insulation on straight sections throughout Work Areas where present above ceiling tiles.
 - .1 If for reasons of pipe geometry or access, Glove Bag procedures cannot be used, remove and dispose of asbestos-containing insulations as per Section 02 82 11 for less than 1 square meter, or following Type 3 procedures in accordance with Ontario Regulation 278/05 for greater than 1 square meter.
- .12 Follow lead procedures prescribed in the Sections identified in Related Work, to perform the following work:
 - .1 Disturbance of lead-containing paint on walls, floors, and piping within the Boiler Room.
 - .2 Demolition of block walls with lead-containing paint in the 1967 era of construction.
 - .3 Removal of exterior canopy beams and decking with lead-containing paint.
 - .4 Any other operation that may disturb lead paint.
- .13 Follow silica procedures prescribed in the MOL Silica on Construction Projects Guidelines when disturbing silica-containing materials.

- .14 Refer to Specification Sections identified in the Related Work for specified personnel protective measures for the safe handling, removal, clean-up, enclosure, or repair of hazardous materials in each phase or work area.
- .15 Visit the site prior to tender close to confirm the location and extent of any hazardous building materials or materials contaminated by hazardous materials.
- .16 Protect surfaces, building fabrics and items remaining within the Abatement Work Area.
- .17 Without disturbing hazardous materials, perform removals where required, prior to abatement work.
 - .1 Maximize waste diversion by use of resale of building materials, or recycling.
- .18 Isolate the Abatement Work Area from adjoining Occupied and Non-Occupied Areas whether present at an interior or exterior location.
- .19 Maintain emergency and fire exits from Abatement Work Area, or establish alternative exits satisfactory to Provincial Fire Marshall and local authorities having jurisdiction. Maintain extra routes from occupied areas. Place emergency exit signs at locations to clearly mark exit route. Seal emergency exit doors so as not to impede use of door during emergency evacuation.
- .20 Remove, clean, store and replace at completion of work, non-operating mechanical and electrical equipment, ducts, building components, materials or items removed to accommodate asbestos removal.
- .21 Remove and dispose of as appropriate waste, building components, materials and items contaminated by hazardous materials that cannot be effectively cleaned.
- .22 Encapsulate remaining hazardous materials at locations where removal is deemed impractical by the Abatement Consultant.
- .23 Encapsulation will not be permitted where removal of building materials or structures scheduled for demolition will facilitate access to the asbestos materials in question.
- .24 Final clean work area to remove visible signs of asbestos and other hazardous materials, other debris or settled dust.
- .25 Apply lock-down agent to exposed surfaces throughout the work area and to surfaces from which any hazardous materials have been removed.
 - .1 Do not apply lock-down to materials which would be damaged by its application.
- .26 Unless otherwise specified, the handling, removal, clean-up or repair of hazardous materials or surfaces contaminated with hazardous materials is to be performed following wet removal techniques.

1.4 Schedule

- .1 Provide necessary manpower, supervision, equipment and materials to maintain and complete the project on schedule.
- .2 Work Hours:
 - .1 Coordinate all work, scheduling and phasing with the Owner.
 - .2 Duration for which HVAC systems may remain shutdown to accommodate quiet hours work will vary in accordance with outside weather conditions and internal demand. Duration of quiet hours work will have to be scheduled accordingly and in consultation with the Abatement Consultant and Owner.
- .3 Provide 48 hours written notice to the Abatement Consultant of any request to work outside normal working hours. Obtain written approval before proceeding.

1.5 Definitions

- .1 Abatement Consultant: Owner's Representative providing inspection and air monitoring.
- .2 Abatement Contractor: Contractor or sub-contractor performing work of this section.
- .3 Abatement Work Area: Area where work takes place which will, or may, disturb hazardous materials.
- .4 Amended Water: Water with wetting agent added for the purpose of reducing surface tension to allow thorough wetting of materials.
- .5 Asbestos: Any of the fibrous silicates defined in Regulation 278/05 including: actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite.
- .6 Asbestos-Containing Material (ACM): Material identified under Site Conditions including any debris, overspray, fallen material and settled dust.
- .7 Authorized Visitors: Building Owner, Abatement Consultant, or designated representative, and persons representing regulatory agencies.
- .8 Competent Worker: A worker who is qualified because of knowledge, training and experience to perform the work, is familiar with Regulation 278/05 and the Occupational Health and Safety Act, and has knowledge of the potential or actual danger to health and safety in the work.
- .9 Contaminated Waste: Material identified under Site Conditions, including fallen material, settled dust, other debris and materials or equipment deemed to be contaminated by the Abatement Consultant.
- .10 Curtained Doorway: Doorway consisting of two (2) overlapping flaps of rip-proof polyethylene arranged to permit ingress and egress from one room to another while permitting minimal air movement between rooms.

- .11 DOP Test: A testing method used to determine the integrity of the Negative Pressure unit or vacuum using a Dispersed Oil Particulate (DOP) or Poly Alpha Olefin (PAO) HEPA filter leak test. This test is to be conducted on site where units are to be installed. Refer to the Environmental Abatement Council of Canada (EACC) DOP/PAO Testing Guideline 2013 or ANSI/ASME N510-2007.
- .12 Fitting: Individual segments or pieces of a mechanical service line which may include but is not limited to the hangers, tees, elbows, joints, valves, unions, etc.
- .13 Friable Material: Material that when dry can be crumbled, pulverized or powdered by hand pressure and includes such material that is crumbled, pulverized or powdered.
- .14 HEPA: High Efficiency Particulate Aerosol filter that is at least 99.97 percent efficient in collecting a 0.3 micrometre aerosol.
- .15 Lead-Containing: The Ontario Ministry of Labour (MOL) has not established a lower limit for concentrations of lead in paint, below which precautions do not need to be considered during construction projects. Pinchin follows the recommendations of the Environmental Abatement Council of Canada (EACC) Lead Guideline for Construction, Renovation, Maintenance or Repair. The Guideline suggests that 0.1% (1,000 ppm) lead in paint represents a de minimis concentration of lead in paint for construction hygiene purposes, that is a concentration below which the lead content is not the limiting hazard in any disturbance of leaded paint for non-aggressive disturbance of painted finishes, (hand powered demolition, chipping, scraping, light sanding, etc.).
- .16 Lead Waste: Waste generated from removal of lead-containing materials, or the substrate and paint finish where left intact.
- .17 Milestone Inspection: Inspection of the Abatement Work Area at a defined point in the abatement operation.
- .18 Negative Pressure: A reduced pressure within the Abatement Work Area (> 0.02 inches of water column) established by extracting air directly from Abatement Work Area and discharging it to exterior of building.
- .19 Non-Friable Material: Material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
- .20 Occupied Area: Any area of the building or adjoining space outside the Abatement Work Area.
- .21 Personnel: All Contractor's employees, sub-contractors employees, supervisors.
- .22 PCB Material: means solid material containing PCBs at a concentration of more than fifty milligrams per kilogram (mg/kg) or 50 parts per million (ppm), or liquid with greater than 2 mg/kg or ppm.
- .23 PCB Waste: PCB Equipment, PCB Material, PCB Liquids and materials or items contaminated with PCBs.

- .24 PCM: Phase Contrast Microscopy.
- .25 Remove: Remove means remove and dispose of (as applicable type of waste) unless followed by other instruction (e.g. remove and turn over to Owner).
- .26 TEM: Transmission Electron Microscopy.

1.6 Regulations and Guidelines

- .1 Comply with Provincial, and local requirements, provided that in any case of conflict among those requirements or with these Specifications, the more stringent requirements shall apply. Work shall be performed under regulations in effect at the time work is performed.
- .2 Where regulations are not present, follow accepted industry standards and applicable Guideline documents.
- .3 Regulations include but are not limited to the following:
 - .1 Ministry of Labour, Immigration, Training, and Skills Development R.S.O. 1990, c. O.1 Occupational Health and Safety Act and its regulations, including:
 - .1 Ontario Regulation 278/05 – Asbestos on Construction and in Buildings and Repair Operations
 - .2 Ontario Regulation 213/91 – Construction Projects
 - .2 Waste Management regulation R.R.O. 1990, Reg. 347 as amended under the Environmental Protection Act.
 - .3 PCB Regulations, SOR 2008-273 and R.R.O. 1990, Reg 362.
 - .4 Environmental Abatement Council of Canada (EACC), Lead Guideline For Construction, Renovation, Maintenance or Repair, October 2014.
 - .5 Ministry of Labour, Guideline, Silica on Construction Projects, 2011.

1.7 Quality Assurance

- .1 Removal and handling of hazardous materials is to be performed by persons trained in the methods, procedures and industry practices for Abatement.
- .2 Ensure work proceeds to schedule, meeting all requirements of this Specification.
- .3 Complete work so that at no time airborne dust, visible debris, or water runoff contaminate areas outside the Abatement Work Area.
- .4 Any contamination of surrounding area (indicated by visual inspection or air monitoring) shall necessitate the clean-up of affected area, and in the same manner applicable to an Abatement Work Area at no cost to the Owner.
- .5 All work involving electrical, mechanical, carpentry, glazing, etc., shall be performed by licensed persons experienced and qualified for the work required.

1.8 Supervision

- .1 Provide on site for each work shift, a Shift Superintendent(s), who has authority regarding all aspects related to manpower, equipment and production.
- .2 Supervisory personnel must hold a recognized certificate proving attendance at an asbestos removal training course (2 day minimum duration) and have performed supervisory functions on at least five (5) other asbestos abatement projects of similar size and complexity.
- .3 At all times during work, the Shift Superintendent(s) must be on site. Failure to comply with this requirement will result in a stoppage of all work, at no cost to the Owner.
- .4 Replace supervisory personnel, with approved replacements, within three (3) working days of a written request from the Owner. Owner reserves the right to request replacement of supervisory personnel without explanation.
- .5 Do not replace supervisory personnel without written approval from the Owner.

1.9 Instruction and Training

- .1 Instruction and training must be provided by a competent person.
- .2 All workers completing Type 1, 2 or 3 asbestos abatement must be trained in compliance with Section 19 of O.Reg. 278/05.
 - .1 For Type 3 asbestos abatement, workers must be trained and certified per Section 20 of O.Reg. 278/05.
- .3 All workers completing lead, silica, or PCB work must be trained to perform the work.

1.10 Notification

- .1 Before commencing work, notify orally and in writing, an inspector at the office of the Ontario MLITSD nearest the project site, where required.
- .2 Inform all trades on site of the presence and location of hazardous materials identified in the Contract documents.
- .3 Notify the Owner or Owner's Representative, the Joint Occupational Health and Safety Committee and the Provincial Ministry of Labour, if suspected asbestos-containing materials not identified in the contract documents are discovered during the course of the work. Stop work in these areas immediately.
- .4 Notify Sanitary Landfill site as per O.Reg. 347/90 as amended.

1.11 Submittals

- .1 Submit prior to starting work:
 - .1 Workplace Safety and Insurance Board Clearance Certificate.

- .2 Insurance certificates.
 - .3 Copy of Company Health and Safety Policy and applicable programs.
 - .4 Ontario MLITSD Notice of Project form and/or Notice of Asbestos Removal Work Form.
 - .5 Copy of Certificate of Approval for disposal of asbestos waste.
 - .1 If transporting asbestos waste in bulk, copy of environmental compliance approval for a waste management system authorizing the transportation of asbestos waste in bulk.
 - .6 Pre-removal damage survey of the Abatement Work Area(s), waste transport routes, and bin storage areas.
- .2 Submit the following information regarding personnel prior to starting work:
- .1 Proof in the form of a certificate that supervisory personnel have attended a training course on asbestos removal or are certified as supervisors as an Asbestos Abatement Supervisor (AAS) under the Ministry of Training, Colleges and Universities.
 - .2 Written statement that personnel have had instruction on hazards of exposure to hazardous materials identified within this scope, the use of respirator, protective clothing, worker and waste decontamination procedures, and all aspects of work procedures and protective measures.
 - .3 WHMIS training certificates for all personnel.
 - .4 Certificate proving that each worker on site has been fit tested for the respirator appropriate for the work being performed.
 - .5 Proof of training for the following site-specific hazards or conditions identified:
 - .1 Lead Worker Training
 - .2 PCB Worker Training
- .3 Submit the following information regarding HEPA filtered devices prior to construction of enclosure or asbestos abatement:
- .1 Performance data on HEPA filtered vacuums including DOP tests no more than 3 months old.
 - .2 Performance data on negative air units including DOP tests which must be no more than 3 months old if the unit is vented outdoors or which must be performed on site immediately prior to initial usage and when HEPA filters are changed if the unit is vented indoors.
 - .3 DOP tests to be performed by an independent testing company.
 - .1 DOP testing company is required to submit a detailed technical report of testing protocol, including Introduction, Methodology, Results,

- Conclusions, and Recommendations, including results of the Air-Aerosol Mixing Uniformity test as per ASME N510-1989 (1995).
- .2 DOP testing company must also provide calibration certificates from an independent calibration firm or from the manufacturer of the testing equipment for both the aerosol photometer and the pressure gauge on the aerosol generator dated within 1 calendar year from the on-site testing date.
 - .3 DOP testing company must also provide the National Sanitation Foundation (NSF) certification name and number of the on-site technician performing the testing.
 - .4 Proof of calibration of DOP testing equipment.
 - .4 Submit the following prior to isolating the work area:
 - .1 Safety Data Sheets for chemicals or material used in the course of the Abatement Project.
 - .5 Submit the following upon completion of the work.
 - .1 Manifests, waybills, bills of lading etc. as applicable for each type of waste.

1.12 Insurance

- .1 Maintain a Commercial General Liability Policy with an insurance company acceptable to the Halton District School Board and the General Contractor. The intent of this policy is to hold the Halton District School Board and the General Contractor harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Commercial General Liability insurance shall be provided on an “occurrence” basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period.
- .2 Maintain an Automobile or Fleet Policy, and Non-owned Automobile Policy with an insurance company acceptable to the Halton District School Board and the General Contractor. The intent of these policies is to hold the Halton District School Board and the General Contractor harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract.
- .3 Maintain a Pollution Liability Policy (or asbestos/lead liability policy or specific coverage under the CGL for asbestos/lead abatement) with an insurance company acceptable to the Halton District School Board and the General Contractor. The intent of this policy is to hold the Halton District School Board and the General Contractor harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Pollution Liability shall be provided on an “occurrence” basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period. Without limiting the generality of the foregoing, the policy shall insure the operations of abatement and shall not contain any environmental and/or health hazard exclusions relating to remediation operations.

- .4 Forward all certificates to the Halton District School Board and the General Contractor before work is commenced, showing the Halton District School Board and the General Contractor as additional insured as their interest may appear.
- .5 the Halton District School Board and the General Contractor may request a certified true copy of the policies.
- .6 The limits will not be less than:
 - .1 Commercial General Liability \$5,000,000.00
 - .2 Automobile \$2,000,000.00
 - .3 Pollution Policy \$5,000,000.00

1.13 Inspection

- .1 From commencement of work until completion of clean-up operations, the Abatement Consultant is empowered by the Owner to inspect for compliance with the requirements of governing authorities, adherence to specified procedures and materials, and to inspect for final cleanliness and completion.
- .2 The Abatement Consultant is empowered by the Owner to order a shutdown of work when leakage of asbestos from the controlled work area has occurred or is likely to occur.
- .3 Any deviation from the requirements of the Specifications or governing authorities that is not approved in writing may result in a stoppage of work, at no cost to the Owner.
- .4 Additional labour or materials expended by the Contractor to rectify unsatisfactory conditions and to provide performance to the level specified shall be at no additional cost to the Owner.
- .5 Inspection and air monitoring performed as a result of Contractor's failure to perform satisfactorily regarding quality, safety, or schedule, shall be back-charged to the Contractor.
- .6 Facilitate inspection and provide access as necessary. Make good work disturbed by inspection and testing at no cost to the Owner.
- .7 Refer to the Sections identified in Related Work for specified milestone inspections which are to take place at defined points throughout the abatement operation specific to each phase or work area.
- .8 Provide 24 hours written notice to the Abatement Consultant of any request for scheduling of milestone inspections or transportation of waste through Occupied Areas.
- .9 The following Milestone Inspections may take place, at the Owner's cost, as outlined in each related specification:
 - .1 Milestone Inspection - Clean Site Preparation

- .1 Inspection of preparations and set-up prior to contaminated work in the Abatement Work Area.
- .2 Milestone Inspection – Bulk Removal Inspection
 - .1 Inspection during asbestos removal, monitoring removal methods, site deficiencies, performing occupied air monitoring, etc.
- .3 Milestone Inspection - Visual Clearance
 - .1 Inspection of Abatement Work Area after completion of all abatement, but prior to application of lock-down agents or dismantling of enclosure.
- .10 Refer to the Sections identified in Related Work for specified milestone inspections which are to take place at defined points throughout the abatement operation specific to each phase or work area.
- .11 Do not proceed with next phase of work until written approval of each milestone is received from the Abatement Consultant.

1.14 Air Monitoring - Asbestos

- .1 Air monitoring will be performed using Phase Contrast Microscopy (PCM) following the National Institute for Occupational Safety and Health Method 7400.
- .2 Co-operate in the collection of air samples, including providing workers to wear sample pumps for up to full-shift periods. Contractor will be responsible for the cost of testing equipment repairs or resampling resulting from the actions of the Contractor's forces.
- .3 Results of PCM samples at or exceeding 0.05 fibres per cubic centimeter of air (fibre/cc) or greater, outside an Abatement Work Area, or from within the Abatement Work Area during or following Glove Bag Work, will indicate asbestos contamination of these areas. Respond as follows:
 - .1 Suspend work within the adjoining Abatement Work Area until written authorization to resume work has been received from the Abatement Consultant.
 - .2 Isolate and clean area in the same manner applicable to the Abatement Work Area.
 - .3 Maintain work area isolation, and repeat clean-up operations until visual inspection and air monitoring results are at a level equal to that specified.
 - .4 At the discretion of the Abatement Consultant provide additional negative air units at locations specified in response to elevated fibre levels being detected in the Clean Change Room or Occupied Areas.
- .4 Results of PCM samples at or greater than 0.01 fibres per cubic centimeter of air (fibre/cc), collected within the Abatement Work Area enclosure after the site has passed a visual inspection, and an acceptable coat of lock-down agent has been applied, will indicate asbestos contamination of these areas. Respond as follows:

- .1 Maintain work area isolation and re-clean entire work area. Then apply another acceptable coat of lock-down agent to exposed surfaces throughout the work area.
- .2 Repeat above measures until visually inspected and air monitoring results are at a level equal to that specified
- .3 Alternate to items above, the Asbestos Abatement Contractor can pay for analysis of PCM samples by Transmission Electron Microscopy (TEM) at NVLAP accredited laboratory.
 - .1 Enclosure to remain sealed, with negative pressure maintained, and subject to required daily inspections until TEM results are received.
- .5 Additional labour or materials expended by the Contractor to rectify unsatisfactory conditions and to provide performance to the level specified shall be at no additional cost to the Owner.
- .6 Cost of additional inspection and sampling performed as a result of elevated fibre levels in areas outside the Abatement Work Area or from within the work area following completion of work, will be back-charged to the Contractor.

1.15 Worker Protection

- .1 Instruct workers before allowing entry to the Abatement Work Area. Instruction shall include training in use of respirators, dress, showering, entry and exiting from an Abatement Work Area, and all other aspects of work procedures and protective measures.
- .2 Workers shall not eat, drink, chew gum or tobacco, vape or smoke in the Abatement Work Area.
- .3 Workers shall be fully protected at all times when possibility of disturbance of hazardous materials exists.
- .4 Provide soap, towels and facilities for washing of hands and face, which shall be used by all personnel when leaving the Abatement Work Area.
- .5 Respiratory Protection
 - .1 Refer to each particular Section of the Specification for specified type of respiratory equipment specific to each phase or work area.
 - .2 Respirators shall be:
 - .1 Certified by the National Institute of Occupational Safety and Health (NIOSH) or other testing agency acceptable to the Ministry of Labour.
 - .2 Fitted so that there is an effective seal between the respirator and the worker's face. Ensure that no person required to enter an Abatement Work Area has facial hair which affects the seal between respirator and face.
 - .3 Assigned to a worker for their exclusive use.
 - .4 Maintained in accordance with manufacturer's specifications.
 - .5 Cleaned, disinfected and inspected by a competent person after use on

- each shift, or more often if required.
- .6 Repaired or have damaged or deteriorated parts replaced.
- .7 Stored in a clean and sanitary location.
- .8 Provided with new filters as necessary, according to manufacturer's instructions.
- .9 Worn by personnel who have been fit checked by qualitative or quantitative fit-testing.
- .10 Instruction on proper use of respirators must be provided by a competent person as defined by the Occupational Health and Safety Act.
- .3 Provide protective clothing, to all personnel which:
 - .1 Is made of a material that does not readily retain nor permit penetration of asbestos fibres or lead/silica dust.
 - .2 Consists of head covering and full body covering that fits snugly at the ankles, wrists and neck.
 - .3 Once coveralls are worn, treat and dispose of as contaminated waste.
 - .4 Is replaced or repaired if torn or ripped.
- .4 Use hard hats, safety footwear and other protective equipment and apparel required by applicable construction safety regulations.

1.16 Visitor Protection

- .1 Provide clean protective clothing and equipment to Authorized Visitors.
- .2 Instruct Authorized Visitors in the use of protective clothing and Abatement Work Area entry and exit procedures.
- .3 Authorized visitors are required to be fit tested on respirators, prior to entering Abatement Work Area.
 - .1 Respirator worn must be compliant with Section 13 and Table 2 of O.Reg. 278/05.

1.17 Signage

- .1 Asbestos Abatement Signs: Post signs at access points to the Abatement Work Area, stating at minimum, the following:
 - .1 There is an asbestos dust hazard.
 - .2 Access to the work area is restricted to persons wearing protective clothing and equipment.
- .2 Lead Abatement Signs: Post signs at access points to the Abatement Work Area, stating at minimum, the following:
 - .1 There is a lead dust, fume or mist hazard.
 - .2 Access to the work area is restricted to authorized persons.

- .3 Respirators must be worn in the work area.
- .3 Silica Warning Signs: Post signs at access points to the Abatement Work Area, stating at minimum, the following:
 - .1 There is a silica dust hazard.
 - .2 Access to the work area is restricted to authorized persons.
 - .3 Respirators must be worn in the work area.
- .4 Vehicles, Bins and Asbestos Waste Containers: Post signs on both sides of every vehicle used for the transportation of asbestos waste and on every asbestos waste container. Signs must display thereon in large, easily legible letters that contrast in colour with the background the word “CAUTION” in letters not less than ten centimetres in height and the words:
 - .1 CONTAINS ASBESTOS FIBRES
 - .2 Avoid Creating Dust and Spillage
 - .3 Asbestos May be Harmful To Your Health
 - .4 Wear Approved Protective Equipment.
- .5 Place placards in accordance with Transportation of Dangerous Goods Act.

1.18 Waste and Material Handling

- .1 Waste bins must be placed on grade or in receiving.
- .2 All bins for hazardous materials must be covered and locked when waste transfer is not being performed.
- .3 Ensure redundant non-ACM, rubble, debris, etc. removed during contaminated work are treated, packaged, transported and disposed of as appropriate waste.
- .4 Clean, wash and apply Post Removal Sealant to metal waste prior to removal from Abatement Work Area. Recycle metals.
- .5 Clean, wash and apply Post Removal Sealant to non-porous materials prior to disposal as clean waste. Obtain prior written approval from the Abatement Consultant for each individual type of material.
- .6 Clean and wash equipment prior to removal from Abatement Work Area if removed prior to completion.
- .7 Place all equipment, tools and unused materials that cannot be cleaned in Abatement Waste Containers.

- .8 As work progresses, and at regular intervals, transport the sealed and labelled waste containers from the Abatement Work Area to waste bin.
- .9 Place items in bins according to waste classification. Place asbestos waste, lead waste, metals, non-asbestos waste, etc. in separate bins.
- .10 Removal of waste containers and decontaminated tools and materials from the Abatement Work Area shall be performed as follows:
 - .1 Remove any visible contamination from the surface of non-porous or cleanable waste being removed from the Abatement Work Area. If the item can be cleaned, remove it from the site as clean waste.
 - .2 Place waste or item in Waste Container and seal closed.
 - .3 Wet wipe outside of Waste Container.
 - .4 Within Decontamination Facility, Transfer Room or at the perimeter of the Abatement Work Area, place in second Waste Container. Seal closed.
 - .5 Remove waste containers and transport to appropriate bin.
- .11 Transport waste and materials via the predetermined routes and exits. Arrange waste transfer route with Owner. Use a closed, covered cart to transport through Occupied Areas.
- .12 Provide workers transporting waste with means to access full personal protective equipment and all tools required to properly clean up spilled material in the case of a rupture of a Waste Container.
- .13 Pick-up and drop off of garbage bin shall be at pre-approved times, and must not interfere with the Owners operations.
- .14 Transport hazardous waste to landfill or waste transfer station licensed by the provincial Ministry of the Environment.
- .15 Cooperate with the provincial Ministry of the Environment inspectors and immediately carry out instructions for remedial work at dump to maintain environment, at no additional cost to the Owner.

1.19 Re-establishment of Objects and Systems

- .1 Re-establish objects and items relocated by the Contractor's workforce to facilitate work.
- .2 Re-establish electrical, communication, HVAC and other services previously disconnected or otherwise isolated to accommodate work by this Section.
- .3 Make good at completion of work, all damage not identified in pre-removal survey.

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

- .1 Refer to the Sections identified in Related Work for specified materials, equipment or facilities specific to each phase or work area.
- .2 Materials and equipment must be in good condition and free of debris and fibrous materials. Disposable items must be of new materials only.
- .3 Airless Sprayer: AC powered pressure washer that allows wetting agent to mix with water, uses no air or compressed air, and has a nozzle to regulate power and pressure.
- .4 Amended Water: Water with wetting agent added for purpose of reducing surface tension to allow thorough wetting of materials.
- .5 Asbestos Waste Container: A container acceptable to disposal site, Ministry of the Environment, and Ministry of Labour, comprised of the following:
 - .1 Dust tight.
 - .2 Suitable for the type of waste.
 - .3 Impervious to asbestos.
 - .4 Identified as asbestos waste.
- .6 Discharge Ducting: Polyethylene Tubing. Reinforced with wire. Diameter to equal negative pressure machine discharge. Not to be longer than required, or so long that negative pressure is compromised.
- .7 Ground Fault Panel: Electrical panel as follows:
 - .1 Ground fault circuit interrupters of sufficient capacity to power temporary electrical equipment and lights in Asbestos Work Area.
 - .2 Interrupters to have a 5 mA ground fault protection.
 - .3 Necessary accessories including main switch disconnect, ground fault interrupter lights, test switch to ensure unit is working, and reset switch.
 - .4 Openings sealed to prevent moisture or dust penetration.
 - .5 Inspected by the Electrical Safety Authority.
 - .6 Panel uses CSA approved parts and been constructed, inspected and installed by a licensed electrician.
 - .7 Provide one Ground Fault Panel for each 5,000 square feet (500 square metres) of Abatement Work Area.

- .8 HEPA Filtered Negative Pressure Machine: Portable air handling system which extracts air directly from the Abatement Work Area and discharges the air to the exterior of the building. Equipped as follows:
 - .1 Prefilter and HEPA filter. Air must pass HEPA filter before discharge.
 - .2 Pressure differential gauge to monitor filter loading.
 - .3 Auto shut off and warning system for HEPA filter failure.
 - .4 Separate hold down clamps to retain HEPA filter in place during change of prefilter.
- .9 HEPA Vacuum: Vacuum with necessary fittings, tools and attachments. Discharged air must pass through a HEPA filter.
- .10 Hose: Leak-proof, minimum bursting strength of 500 PSI or greater if required, abrasion resistant covering, reinforcing, and machined-brass couplings. Maintained and tested. Hose to be temperature resistant if it is to carry domestic hot water.
- .11 Lead Waste Container: An impermeable container acceptable to disposal site and Ministry of the Environment, that is:
 - .1 Dust tight.
 - .2 Suitable for the type of waste.
 - .3 Evaluated for leachable lead content, and disposed of in accordance with applicable regulations.
 - .1 Where lead waste exceeds 5.0 mg/L of lead in the TCLP analysis, label as lead waste and dispose of as leachate toxic hazardous waste.
 - .2 Where lead waste is below 5.0 mg/L of lead in the TCLP analysis, disposed of as construction waste.
- .12 OSB: Oriented Strand Board.
- .13 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints.: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints.
- .14 Post Removal Sealant (or Lockdown): Sealant that when applied to surfaces serves the function of trapping residual asbestos fibres or other dust. Product must have flame spread and smoke development ratings both less than 50. Product shall leave no stain when dry. Post Removal Sealant shall be compatible with replacement insulation or fireproofing where required and capable of withstanding service temperature of substrate. Apply to manufacturer's instructions.
- .15 Protective Clothing: Disposable coveralls complete with head covering and full body covering that fits snugly at the ankles, wrists and neck.

- .16 Rip-Proof Polyethylene Sheeting: 8 mil (0.20 mm) fabric made up from 5 mil (0.13 mm) weave and two (2) layers of 1.5 mil (0.05 mm) poly laminate or approved equal. In sheet size to minimize on-site seams and overlaps.
- .17 Sprayer: Garden type portable manual sprayer or water hose with spray attachment if suitable.
- .18 Tape: Duct tape or tape suitable for sealing polyethylene to surfaces under both dry and wet conditions in the presence of Amended Water.
- .19 Wetting Agent: Non-sudsing surfactant added to water to reduce surface tension and increase wetting ability.

PART 3 EXECUTION

- .1 Refer to the Sections identified in Related Work for specified procedures for work area preparation, maintenance, site dismantlement, application of lock-down agent and all other procedures for the safe handling, removal and clean-up of hazardous materials specific to each phase or work area.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.
- .2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of asbestos-containing materials following Type 1 or Low Risk procedures, and Pinchin and Owner specific requirements.

1.3 Personal Protection

- .1 Protect all personnel at all times when possibility of disturbance of ACM exists.
 - .1 Provide non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters when requested by personnel.
 - .2 When requested by personnel, provide protective clothing.
- .2 Provide protective clothing, to all personnel entering the Abatement Work Area.
- .3 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.4 Inspections

- .1 Refer to Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

- .1 Refer to Section 02 81 00.

PART 3 EXECUTION

3.1 Site Preparation

- .1 Remove stored or non-fixed items from the Abatement Work Area including but not limited to equipment, furniture, waste etc. Store in area provided by Owner.
- .2 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.
- .3 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.
- .4 Install one layer of polyethylene sheeting on walls, floors, finishes, millwork, electrical equipment, equipment and furnishings remaining in the Abatement Work Area.

- .5 Install one layer of rip-proofing polyethylene sheeting over one layer of polyethylene sheeting on walls, floors, finishes, millwork, electrical equipment, equipment and furnishings remaining in the Abatement Work Area.
- .6 Install polyethylene drop sheets below areas of work.
- .7 Install polyethylene sheeting on openings in walls and floors (as required) and seal.
- .8 Install signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.
- .9 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.
 - .1 Lock-out/tag-out power at electrical panels.
 - .2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.
- .10 Provide power from ground fault interrupt circuits.
- .11 Shut down HVAC systems serving the Abatement Work Area.
 - .1 Install polyethylene sheeting over openings in ducts and diffusers and seal.
 - .2 HVAC to remaining areas of building must not be disrupted during work of this section.
 - .3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.
 - .4 Perform work at scheduled times after shutting down HVAC systems affecting the Abatement Work Area.
- .12 Provide amended water for wetting ACM, and adequate method of wetting (garden sprayers, airless sprayers, etc).
- .13 Without disturbing asbestos-containing materials, remove and dispose of non-hazardous materials as clean waste prior to asbestos removal work, where possible.

3.2 Maintenance of Abatement Work Area

- .1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.
- .2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.
- .3 Maintain Abatement Work Area in tidy condition.
- .4 Remove any standing water on polyethylene/floor at the end of every shift.
- .5 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.3 Asbestos Removal - General

- .1 Do not use powered tools or non-hand held tools.
- .2 Do not use compressed air to clean or remove dust or debris.
- .3 Do not break, cut, drill, abrade, grind, sand or vibrate ACM if it cannot be wetted. Type 2 procedures would be required if the material cannot be wetted due to hazard or damage.
- .4 Wet ACM prior to work and keep ACM wet throughout the removal process.

- .5 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
- .6 Frequently and at regular intervals, place all waste in asbestos waste containers.
- .7 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.4 Asbestos Removal - Vinyl Asbestos Tile

- .1 Wedge a heavy duty scraper in seam of two adjoining tiles and gradually force edge of one tile up and away from floor. Do not break off pieces of tile, but continue to force balance of tile up.
- .2 Place tile, without breaking into smaller pieces, into Asbestos Waste Container.
- .3 Force scraper through tightly adhered areas by striking scraper handle with a hammer.
- .4 Heat tile thoroughly with a hot air gun until heat penetrates through tile and softens adhesive in areas where scraper will not remove tile.
- .5 Deposit waste into asbestos waste disposal bag.
- .6 HEPA vacuum floor on completion of work in area.

3.5 Asbestos Removal – Doors/Windows and Removal of Caulking and Putty

- .1 Wet all material to be disturbed.
- .2 Undo fasteners if necessary to remove material.
- .3 Break material only if unavoidable, and wet material if broken during work.
- .4 Use only non-powered hand-held tools to remove ACM.
- .5 Scrape to remove material adhered to substrate.
- .6 Place removed ACM directly into an asbestos waste container.

3.6 Asbestos Removal - Sinks

- .1 Wet all material to be disturbed.
- .2 Undo fasteners if necessary to remove material.
- .3 Break material only if unavoidable, and wet material if broken during work.
- .4 Use only non-powered hand-held tools to remove ACM.
- .5 Place removed ACM directly into an asbestos waste container.

3.7 Asbestos Removal – Chalkboards/Tackboards

- .1 Wet all material to be disturbed.
- .2 Undo fasteners if necessary to remove material.
- .3 Break material only if unavoidable, and wet material if broken during work.
- .4 Use only non-powered hand-held tools to remove ACM.
- .5 Scrape to remove material adhered to substrate.
- .6 Place removed ACM directly into an asbestos waste container.

3.8 Asbestos Removal - Removal of Other Non-Friable Asbestos Materials – Roofing Materials and Transit

- .1 Wet all material to be disturbed.
- .2 Undo fasteners if necessary to remove material.
- .3 Break material only if unavoidable, and wet material if broken during work.
- .4 Use only non-powered hand-held tools to remove ACM.
- .5 Scrape to remove material adhered to substrate.
- .6 Place removed ACM directly into an asbestos waste container.

3.9 Abatement Work Area Dismantling

- .1 Wash or HEPA vacuum equipment and tools used in contaminated Abatement Work Area to remove all asbestos contamination, or place in Asbestos Waste Containers prior to being removed from Abatement Work Area.
- .2 Place tools and equipment used in contaminated work site but not cleaned in polyethylene bags prior to removal from Abatement Work Area.
- .3 Clean polyethylene sheeting and drop sheets which with HEPA vacuum or wet cleaning methods at completion of work.
- .4 Wet drop sheets and polyethylene sheeting.
- .5 Carefully roll polyethylene sheeting and drop sheets toward the centre. As polyethylene is rolled away, immediately remove visible debris beneath with a HEPA vacuum.
- .6 Remove remaining polyethylene sheeting and tape.
- .7 Place polyethylene sheeting, drop sheets, tape, disposal clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.

3.10 Waste and Material Handling

- .1 Refer to Section 02 81 00.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.
- .2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of asbestos-containing materials following Type 2 or Moderate Risk procedures, and Pinchin and Owner specific requirements.

1.3 Personal Protection

- .1 Protect all personnel at all times when possibility of disturbance of ACM exists.
- .2 Provide the following minimum respiratory protection to all personnel:
 - .1 Full face respirators with P100 high efficiency (HEPA) cartridge filters, for:
 - .1 Removal of all or part of a ceiling if asbestos is likely lying on the surface.
 - .2 Use of a HEPA filtered power tool on non-friable ACM if the material is not wetted.
 - .2 Non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters.
- .3 Provide protective clothing, to all personnel entering the Abatement Work Area.
- .4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.4 Inspections

- .1 Refer to Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

- .1 Refer to Section 02 81 00.

2.2 Hoarding Walls

- .1 Type A Hoarding Wall: One layer of rip-proof polyethylene sheeting installed floor to ceiling, secured with telescopic poles, clips, or other suitable methods.
- .2 Windows: Install sufficient transparent windows area in hoarding walls to allow observation of entire work area from outside the enclosure where existing solid walls do not make up the perimeter.

2.3 Transfer Room

- .1 Transfer Room to be generally 2000 mm x 2000 mm x 2200 mm high. Increase size accordingly to accommodate number of workers.
- .2 Install walls as follows:
 - .1 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.
 - .2 Install one layer rip-proof polyethylene sheeting on interior walls of Transfer Room.
- .3 Install one layer of rip-proof polyethylene sheeting over one layer of 6 mil polyethylene sheeting beneath entire Transfer Room.
- .4 Install one layer rip-proof polyethylene sheeting over roof.
- .5 Turn 600 mm of polyethylene down the sides over polyethylene on the perimeter walls.
- .6 Install a fire extinguisher, mount to wall.

2.4 Curtained Doorways

- .1 Construct as follows:
 - .1 Install two flap doors, full width and height of door opening at all doors to Abatement Work Area and both ends of Transfer Room.
 - .2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.
 - .3 Install weights attached to bottom edge of each door flap.
 - .4 Provide direction arrows on flaps to indicate opening.

2.5 Platforms

- .1 Install a framework, on top of which the working platform is to be placed by use of metal scaffolding or equivalent. The working platform shall consist of scaffold boards over which plywood (of sufficient thickness to support personnel and equipment as required by provincial Occupational Health and Safety Act) is fastened in place.
- .2 Submit Engineered Shop drawings where required.
- .3 Install platform supports in and around existing fixtures, walls and equipment so as not to interfere with the operating, use, or maintenance of space or equipment.
- .4 Install platform to accommodate door swings and to maintain exit routes.
- .5 Install platform to accommodate removal and installation of windows.
- .6 Install support bases of dimension and strength to protect floors. Repair or replace damage caused by erection, weight or dismantling of platform.
- .7 Install platform to maintain a minimum clear height of 2000 mm.
- .8 Install Hoarding Walls on platform so as to completely isolate Abatement Work Area on platform from Occupied Area.
- .9 Install temporary lighting using fluorescent fixtures at underside of platforms to maintain existing lighting levels.
- .10 Provide emergency exits or escape hatches as require to meet Occupational Health and Safety requirements. Hatches are to be constructed in a water and air tight manner that

can be readily opened in an emergency situation. Provide emergency lighting at each hatch.

PART 3 EXECUTION

3.1 Site Preparation - General

- .1 Remove stored or non-fixed items from the Abatement Work Area including but not limited to equipment, furniture, waste etc. Store in area provided by Owner.
- .2 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.
- .3 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.
- .4 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.
 - .1 Lock-out/tag-out power at electrical panels.
 - .2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.
- .5 Provide power from ground fault interrupt circuits.
- .6 Shut down HVAC systems serving the Abatement Work Area.
 - .1 Install polyethylene sheeting over openings in ducts and diffusers and seal.
 - .2 HVAC to remaining areas of building must not be disrupted during work of this section.
 - .3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.
 - .4 Perform work at scheduled times after shutting down HVAC systems affecting the Abatement Work Area.
- .7 Provide amended water for wetting ACM, and adequate method of wetting (garden sprayers, airless sprayers, etc).

3.2 Site Preparation –Enclosure Required

- .1 Install polyethylene enclosure complete with Windows at Abatement Work Areas for the work identified in Section 02 81 00 – General Provisions.
- .2 Install Transfer Room where duration of work is to last longer than one 8 hour shift.
- .3 Seal openings in floor using tape, polyethylene, etc. Floor openings are to be sealed independently prior to installation of floor polyethylene.
- .4 Install polyethylene sheeting on floors of Abatement Work Area. Use sufficient layers to provide adequate protection for carpeting and equipment.
 - .1 Minimum requirement over carpet is one layer of 6 mil polyethylene under one layer of rip-proof polyethylene.
 - .2 Cover floors first so that polyethylene on walls is overlapped by at least 305 mm.
- .5 Construct Hoarding Walls between Abatement Work Area perimeter and occupied areas.
- .6 Install polyethylene sheeting at openings in walls (as required) and seal.
- .7 Install 6 mil polyethylene sheeting on walls within the Abatement Work Area., including

- existing walls that make up, or are within, the Abatement Work Area.
- .8 Provide a completely sealed polyethylene top for free standing enclosures.
 - .9 Extend to underside of ceiling system, enclosures for access into ceilings. Enclosure may be supported from the ceiling system if ceiling can support the polyethylene.
 - .10 Install Curtained Doorways.
 - .11 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged. Items to remain include but are not limited to:
 - .1 Millwork.
 - .2 Doors.
 - .3 Bulkheads.
 - .4 Toilet Partitions.
 - .5 Plumbing Fixtures.
 - .6 Electrical Equipment.
 - .7 Mechanical Equipment.
 - .12 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.
 - .13 Establish negative pressure in Abatement Work Areas as follows:
 - .1 Provide sufficient HEPA filtered negative pressure machines to exchange a volume of air equivalent to that of the Abatement Work Area a minimum of every 20 minutes.
 - .2 Provide additional HEPA filtered negative pressure machines as required to ensure air flow from Occupied Area into Abatement Work Area.
 - .3 Arrange negative air units to maximize the distance between units and decontamination facilities.
 - .4 Provide weighted flaps in perimeter Hoarding Walls as necessary to provide make-up air.
 - .5 Operate HEPA filtered negative pressure machines continuously from first disturbance of ACM until completion of dismantling.
 - .6 Replace prefilters to maintain specified flow rate.
 - .7 Replace HEPA filter as required to maintain flow rate and integrity of unit.
 - .8 Discharge HEPA filtered negative air machines as follows:
 - .1 To building exterior.
 - .1 Remove existing glazing where necessary and replace with a 19 mm plywood panel.
 - .2 Install panel securely in window frame so that it cannot be pushed into the building and make weather-tight with caulking.
 - .3 For each negative pressure unit, provide a 300 mm diameter, screened, duct opening through panel.
 - .4 Direct discharge away from building access points.
 - .5 Reinstall glazing to match existing upon completion of work.
 - .2 Into Occupied Areas as required.
 - .1 Install and make airtight all negative air discharge ducting.

- .2 Use metal reinforced polyethylene discharge ducting in locations where the ducting must be protected from damage or collapse.

- .14 Place required tools to complete the abatement with the Abatement Work Area.
- .15 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.

3.3 Site Preparation – No Enclosure Required

- .1 Install caution tape around work area where existing walls are not present.
- .2 Site isolation to include a visual barrier comprised of rip-proof polyethylene sheeting, where incessancy and where occupants are present.
- .3 Cover walls, floors, finishes, millwork, equipment and furnishings remaining in the Abatement Work Area with polyethylene sheeting before disturbing ACM to control the spread of dust.
- .4 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged. Items to remain include but are not limited to:
 - .1 Millwork.
 - .2 Doors.
 - .3 Bulkheads.
 - .4 Toilet Partitions.
 - .5 Plumbing fixtures.
 - .6 Electrical Equipment.
 - .7 Mechanical Equipment.
- .5 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.
- .6 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.
- .7 Place HEPA vacuum in Abatement Work Area.
- .8 Place required tools to complete the abatement with the Abatement Work Area.

3.4 Maintenance of Abatement Work Area

- .1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.
- .2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.
- .3 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Inspection must be performed by competent person.
- .4 Maintain Abatement Work Area in tidy condition.
- .5 Remove standing water on polyethylene/floor at the end of every shift.
- .6 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.5 Asbestos Removal - General

- .1 Do not use compressed air to clean or remove dust or debris.
- .2 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
- .3 Frequently and at regular intervals, place all waste in asbestos waste containers.
- .4 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.6 Asbestos Removal – Thermal Systems Insulation (less than 1 Square Metre)

- .1 Construct an enclosure around Abatement Work Area and use the procedures described above under *Site Preparation – Enclosure Required*.
- .2 Adequately wet exterior of the ACM with amended water to suppress dust.
- .3 Remove asbestos-containing mechanical insulations in layers, maintaining all exposed surfaces of insulation in a wet condition.
- .4 Remove wetted ACM directly into waste containers. Do not allow ACM to fall to the floor of the Abatement Work Area.
- .5 Clean all surfaces from which ACM has been removed with scouring pads, vacuuming or wet-sponging to remove all visible material after completion of removal of ACM.
- .6 Remove visible dust and debris.
- .7 Seal exposed ends of asbestos-containing insulation to remain, with canvas and lagging.
- .8 HEPA vacuum or wet clean entire Abatement Work Area, including any surfaces not covered with polyethylene sheeting. Any materials removed to access ACM that are to be re-used, and any abatement equipment, must be wet cleaned or HEPA vacuumed prior to completion.
- .9 Apply Post Removal Sealant to all surfaces within the Abatement Work Area including those from which ACM has been removed.

3.7 Asbestos Removal - Asbestos-Containing Vinyl Floor Tile Mastic with HEPA Filtered Power Tools/Machine

- .1 Use the procedures described above under *Site Preparation – Enclosure Required*.
- .2 Wet all material to be disturbed.
- .3 Turn on HEPA vacuum. Vacuum to remain operation throughout work.
- .4 Grind mastic completely to bare concrete using a grinder with a HEPA filtered dust collection device.
- .5 Place removed ACM directly into an asbestos waste container.
- .6 If power tool can disconnect from HEPA vacuum, remove tool, and HEPA vacuum tool and bit, blade, etc, and shrouds.
- .7 Wet clean or HEPA vacuum the entire Abatement Work Area, including surfaces not covered with polyethylene sheeting. Any materials or equipment removed to access ACM that are to be reused, must be wet cleaned or vacuumed prior to reinstatement.

3.8 Asbestos Disturbance - Removal/Installation of Items Affixed to Block Walls with Asbestos-Containing Vermiculite using HEPA Filtered Power Tools

- .1 Use the procedures described above under *Site Preparation – No Enclosure Required*.
- .2 Site isolation to include a visual barrier comprised of rip-proof polyethylene sheeting, where incessancy and where occupants are present.
- .3 Wet all material to be disturbed.
- .4 Use only power tools with an effective HEPA dust collection device.
- .5 Turn on HEPA dust collection device attached to power tool. HEPA device to remain operational throughout work.
- .6 Remove/install all items affixed to walls as required.
- .7 Place ACM waste directly into an asbestos waste container.
- .8 Wet clean or HEPA vacuum the entire Abatement Work Area, including surfaces not covered with polyethylene sheeting. Any materials or equipment removed to access ACM that are to be reused, must be wet cleaned or vacuumed prior to reinstatement.

3.9 Asbestos Removal – Block Walls with Asbestos-Containing Vermiculite

- .1 Use the procedures described above under *Site Preparation – Enclosure Required*.
- .2 Wet all material to be disturbed.
- .3 Remove block walls for openings/penetrations required for mechanical equipment and where scheduled for demolition.
- .4 Place removed ACM directly into an asbestos waste container.
- .5 Clean-up vermiculite where encountered during removal. Install roxul insulation and spray paint red all openings to prevent further vermiculite release.
- .6 Wet clean or HEPA vacuum the entire Abatement Work Area, including surfaces not covered with polyethylene sheeting. Any materials or equipment removed to access ACM that are to be reused, must be wet cleaned or vacuumed prior to reinstatement.

3.10 Asbestos Removal – Exterior Brick where Asbestos-Containing Vermiculite is Present in Block Walls

- .1 Use the procedures described above under *Site Preparation – Enclosure Required*.
- .2 Wet all material to be disturbed.
- .3 Remove courses of exterior brick on foundation walls to extent noted on contract drawings.
- .4 Place removed ACM directly into an asbestos waste container.
- .5 Clean-up vermiculite where encountered during removal. Install roxul insulation and spray paint red all openings to prevent further vermiculite release.
- .6 Wet clean or HEPA vacuum the entire Abatement Work Area, including surfaces not covered with polyethylene sheeting. Any materials or equipment removed to access ACM that are to be reused, must be wet cleaned or vacuumed prior to reinstatement.

3.11 Removal of Doors, Windows, Spandrel Panels, Transite Panels in the 1959 Era of Construction

- .1 Construct an enclosure on the inside and outside of the Abatement Work Area and use

the procedures described above under *Site Preparation –Enclosure Required*.

- .2 Wet all material to be disturbed.
- .3 Undo fasteners with hand tools if necessary to remove material. If power tools are used, they must be equipped with a HEPA filtered dust collection device.
- .4 Remove doors/window frames and remove caulking completely from substrate.
- .5 Clean-up vermiculite where encountered during removal. Install roxul insulation and spray paint red all openings to prevent further vermiculite release.
- .6 and spray foam openings to prevent vermiculite release.
- .7 Dispose of entire windows/doors with asbestos-containing putty as asbestos waste.
- .8 Remove transite panels.
- .9 Place removed ACM directly into an asbestos waste container.

3.12 Removal of Doors, Windows, Spandrel Panels in the 1967 Era of Construction

- .1 Construct an enclosure on the inside and outside of the Abatement Work Area and use the procedures described above under *Site Preparation –Enclosure Required*.
- .2 Wet all material to be disturbed.
- .3 Undo fasteners with hand tools if necessary to remove material. If power tools are used, they must be equipped with a HEPA filtered dust collection device.
- .4 Remove doors/window frames and remove caulking completely from substrate. Caulking to be disposed of as PCB waste.
- .5 Clean-up vermiculite where encountered during removal. Install roxul insulation and spray paint red all openings to prevent further vermiculite release.
- .6 Dispose of entire windows/doors with asbestos-containing putty as asbestos waste.
- .7 Place removed ACM directly into an asbestos waste container.

3.13 Removal of Asbestos-Containing Textured Plaster Soffit in the 1967 Era of Construction

- .1 Construct an enclosure on the inside and outside of the Abatement Work Area and use the procedures described above under *Site Preparation –Enclosure Required*.
- .2 Wet all material to be disturbed.
- .3 Undo fasteners with hand tools if necessary to remove material. If power tools are used, they must be equipped with a HEPA filtered dust collection device.
- .4 Remove all overspray on decking, ducts, light fixtures and junction boxes.
- .5 Remove vermiculite where accessible within exterior wall cavities and spray foam openings to prevent vermiculite release.
- .6 Remove any pipe insulation present above the soffit.
- .7 Place removed ACM directly into an asbestos waste container.

3.14 Asbestos Removal - Dust and Debris

- .1 Use the procedures described above under *Site Preparation – No Enclosure Required*.
- .2 Remove visible dust and debris from Abatement Work Area using HEPA vacuums or wet cleaning methods.

3.15 Application of Post Removal Sealant

- .1 Apply one coat of Post Removal Sealant with an airless sprayer, in accordance with Manufacturer's Instructions, to cover all surfaces on all items in the Abatement Work Area, including but not limited to polyethylene, ACM substrate, structural steel, and surfaces scheduled for demolition.
- .2 Do not apply post removal sealant to materials that will be damaged by its application.

3.16 Abatement Work Area Dismantling

- .1 Wash or HEPA vacuum equipment and tools used in contaminated Abatement Work Area to remove all asbestos contamination, or place in Asbestos Waste Containers prior to being removed from Abatement Work Area.
- .2 Place tools and equipment used in contaminated work site but not cleaned in polyethylene bags prior to removal from Abatement Work Area.
- .3 Clean polyethylene sheeting and drop sheets which with HEPA vacuum or wet cleaning methods at completion of work.
- .4 Wet drop sheets and polyethylene sheeting.
- .5 Carefully roll polyethylene sheeting and drop sheets toward the centre of enclosure. As polyethylene is rolled away, immediately remove visible debris beneath with a HEPA vacuum.
- .6 Remove remaining polyethylene sheeting and tape, and dispose of as asbestos waste.
- .7 Place polyethylene sheeting, drop sheets, tape, disposal clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.
- .8 Remove remaining site isolation, seals, tape, etc.
- .9 Remove Transfer Room.
- .10 Remove seals, tape, Signage etc.
- .11 Immediately upon shutting down negative air units, seal air inlet grill and exhaust vent with polyethylene and tape.
- .12 Seal openings in HEPA vacuums.
- .13 Remove and dispose of the pre-filters from HEPA filtered negative pressure machines as asbestos waste.
- .14 Remove HEPA filtered negative pressure machines and discharge ducting or HEPA vacuums.
- .15 Remove temporary lights.
- .16 Remove ground fault panels.
- .17 Place contaminated materials including polyethylene sheeting, drop sheets, seals, tape, disposable coveralls, and other contaminated waste in asbestos waste containers.

3.17 Waste and Material Handling

- .1 Refer to Section 02 81 00.

3.18 Re-Establishment of Items

- .1 Upon completion of work:

- .1 Move items that were removed from Abatement Work Area prior to work, back into same location within Abatement Work Area.
- .2 Remove and disconnect Ground fault Panel, tags and locks from electrical panels and re-energize equipment and items.
- .3 Remove hose bibs installed and repair pipe.
- .4 Remove negative air discharge panel and reinstall glazing to match existing.
- .5 Reinstall ducts removed to perform cleaning of ducts or to access ACM.
- .6 Clean, mop and vacuum Abatement Work Area and area beneath any tunnels, platform and Decontamination Facilities.
- .7 Enable building air handling systems.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.
- .2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of asbestos-containing materials following Glove Bag procedures, and Pinchin and Owner specific requirements.
- .3 If for reasons of pipe temperature, geometry or access, Glove Bag procedures cannot be used, remove and dispose of asbestos-containing insulations as per Section 02 82 11 for less than 1 square meter, or following Type 3 procedures in accordance with Ontario Regulation 278/05 for greater than 1 square metre.

1.3 Personal Protection

- .1 Protect all personnel at all times when possibility of disturbance of ACM exists.
- .2 Provide the following minimum respiratory protection to all personnel:
 - .1 Non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters.
- .3 Provide protective clothing, to all personnel entering the Abatement Work Area.
- .4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.4 Inspections

- .1 Refer to Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

- .1 Refer to Section 02 81 00.
- .2 Glove Bag: Prefabricated bag which provides a completely sealed envelope surrounding a given section of piping to permit the removal of asbestos-containing insulation from within the bag while maintaining the integrity of the bag and preventing the spread of airborne asbestos fibres. The glove bag shall be equipped with,
 - .1 sleeves and gloves that are permanently sealed to the body of the bag to allow the worker to access and deal with the insulation and maintain a sealed enclosure

- throughout the work period,
 - .2 valves or openings 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,
 - .3 a tool pouch with a drain,
 - .4 a seamless bottom and a means of sealing off the lower portion of the bag, and
 - .5 a high strength double throw zipper and removable straps, if the bag is to be moved during the removal operation.
- .3 Securing Straps: For some types of Glove Bag, reusable nylon straps at least 25mm wide with metal tightening buckle for sealing ends of bags around pipe and/or insulation.

PART 3 EXECUTION

3.1 Site Preparation - General

- .1 Remove to the extent necessary to access piping, stored or non-fixed items from the Abatement Work Area including but not limited to equipment, furniture, waste etc. Store in area provided by Owner.
- .2 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.
- .3 Shut down HVAC systems serving the Abatement Work Area.
 - .1 Install polyethylene sheeting over openings in ducts and at diffusers and seal.
 - .2 HVAC to remaining areas of building must not be disrupted during work of this section.
 - .3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.
 - .4 Perform work at scheduled times after shutting down HVAC systems affecting the Abatement Work Area.
- .4 Install caution tape around work area where existing walls are not present.
- .5 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.
- .6 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.
- .7 Cover walls, floors, finishes, millwork, equipment and furnishings below the pipe to be worked on in the Abatement Work Area with polyethylene sheets before disturbing ACM. Drop sheets shall extend a minimum of 1,800 mm from pipe.
- .8 Use existing lighting or install temporary lighting to a level that will provide for safe and efficient use of work area - minimum 550 LUX.
- .9 Provide Amended Water for wetting ACM, in garden sprayers. Provide one garden sprayer for each worker.
- .10 Do not use compressed air to clean or remove dust or debris when completing work of this section.
- .11 Place HEPA Vacuum in Abatement Work Area for each worker.
- .12 Place required tools to complete the abatement within the Abatement Work Area.
- .13 Post Notice of Project, where required by O.Reg. 278/05.

3.2 Maintenance of Abatement Work Area

- .1 Maintain Abatement Work Area in tidy condition.

3.3 Glove Bag Removal

- .1 Do not use Glove Bags on hot pipes that may damage Glove Bag. Refer to manufacturer's limitations.
- .2 Prior to use of Glove Bag on damaged orunjacketed insulation:
 - .1 Spray any areas of damaged insulation jacketing with mist of Amended Water.
 - .2 Tape over damaged insulation to provide temporary repair.
 - .3 Mist areas of insulation with no jacketing and wrap with polyethylene sheeting and seal with tape.
- .3 Place any tools necessary to remove insulation in tool pouch built into Glove Bag.
- .4 Inspect the Glove Bag for damage and defects immediately before it is attached to the pipe or duct.
 - .1 If damage or defects are observed, dispose of Glove Bag.
- .5 Install Glove Bag as per manufacturer's instructions.
- .6 Remove metal jacketing or banding carefully. Do not damage the Glove Bag.
- .7 Remove insulation from pipe as per manufacturer's directions.
 - .1 Volume and weight of insulation must not exceed capacity of the Glove Bag or supports.
 - .2 Arrange insulation in the Glove Bag to maximize use of the Glove Bag.
- .8 Only glove bags designed to be moved may be re-used on other sections of pipe or moved down same section of pipe (e.g. Safe-T-Strip).
- .9 At regular intervals during its use, if damage or defects are observed during the use of the Glove Bag, which cannot be readily repaired with tape and not affect the integrity or strength of the glove bag.
 - .1 Discontinue use of Glove Bag.
 - .2 Wash inner surface of Glove Bag.
 - .3 Wet insulation.
 - .4 Pull an Asbestos Waste Container over Glove Bag before removing from pipe.
 - .5 Remove Glove Bag and Asbestos Waste Container, seal with tape.
 - .6 Place in a second Asbestos Waste Container and seal with tape.
 - .7 Clean immediate area with a HEPA Vacuum prior to resuming work.
- .10 If bag is to be moved along pipe for use on adjacent section of insulation:
 - .1 Wash inner surface of Glove Bag.
 - .2 Wash tools and place tools in pouch.
 - .3 Wet surface of insulation in lower section of bag and any exposed end of asbestos insulation remaining on pipe with Amended Water.
 - .4 Insert nozzle of HEPA filtered vacuum cleaner into bag through valve and evacuate air from bag.

- .5 Seal closure strip.
- .6 Loosen securing straps to maintain a loose seal of Glove Bag to insulation or pipe.
- .7 Use double throw zipper as necessary to pass hangers.
- .8 Tighten straps once bag is in new position and continue insulation removal until Glove Bag is full, work is completed on the pipe or an obstruction prevents further movement of the bag.
- .11 If bag is to be removed from a pipe for use on a new section of pipe, perform the following:
 - .1 Wash inner surface of Glove Bag.
 - .2 Wash tools and place tools in pouch.
 - .3 Wet surface of insulation in lower section of bag and any exposed end of asbestos insulation remaining on pipe with Amended Water.
 - .4 Insert nozzle of HEPA filtered vacuum cleaner into bag through valve and evacuate air from bag.
 - .5 Seal valve cover on valve Glove Bags.
 - .6 Seal closure strip.
 - .7 Wash top section of Glove Bag and tool pouch thoroughly.
 - .8 Undo securing straps, unfasten zipper and carefully move bag to new section of pipe.
- .12 To remove bag after completion of insulation removal operation:
 - .1 Wash inner surface of Glove Bag.
 - .2 Wash and place all tools in one hand (glove), pull hand out inverted, twist to create a separate pouch, tape inverted hand at two separate locations 25 mm apart so as to seal pouch.
 - .1 Remove inverted hand and tools by cutting between the two tape seals.
 - .2 Place inverted hand pouch and tools into the next clean Glove Bag to be used or into a water bucket, open pouch underwater and clean tools.
 - .3 Wet surface of insulation in lower section of bag and any exposed end of asbestos insulation remaining on pipe with Amended Water.
 - .4 Insert nozzle of HEPA filtered vacuum cleaner into bag through valve and evacuate air from bag.
 - .5 Seal valve cover on valve Glove Bags.
 - .6 Seal closure strip if equipped with one. Twist bag at tapered point and secure with tape.
 - .7 Pull an Asbestos Waste Container over Glove Bag before removing from pipe.
 - .1 Undo straps and unzipper, or cut upper portion of single-use Glove Bag.
 - .2 Seal Asbestos Waste Container with tape.
 - .8 Ensure pipe is clean of all residue after removal of Glove Bag. If necessary, after removal of each section of asbestos, vacuum all surfaces of pipe, using HEPA vacuum or wipe with wet cloth.
- .13 Seal all surfaces of freshly-exposed pipe with Post Removal Sealer.
- .14 Cover exposed ends of any remaining asbestos insulation with canvas and lagging using

Type 2 Procedures.

3.4 Clean-Up and Dismantling

- .1 Clean and remove from Abatement Work Area:
 - .1 Equipment and tools.
 - .2 Temporary lighting if used.
 - .3 Polyethylene seals from HVAC systems.
- .2 Place polyethylene sheeting, drop sheets, seals, tape, clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.
- .3 Clean Abatement Work Area with HEPA vacuums or wet wiping/mopping.
- .4 Seal openings in HEPA vacuums.
- .5 Proceed with the dismantlement of all barricades, etc. following receipt of authorization to proceed from the Asbestos Abatement Consultant.
- .6 Remove barricades, fencing, caution tape, signs, etc.

3.5 Waste and Material Handling

- .1 Refer to Section 02 81 00.

3.6 Re-Establishment of Items

- .1 Upon completion of work:
 - .1 Move all items that were removed from Abatement Work Area prior to work, back into same location within Abatement Work Area.
 - .2 Remove tags and locks from electrical panels and re-energize equipment and items.
 - .3 Enable building air handling systems.
 - .4 Clean and vacuum Abatement Work Area.

END OF SECTION

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PART 1 GENERAL

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.
- .2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of lead-containing materials following Class 1 or Low Risk procedures, and Pinchin and Owner specific requirements.
- .3 Comply with requirements of this Section when performing following Work:
 - .1 Removal of lead-containing surface coatings with a chemical gel, stripper or paste.
 - .2 Removal of materials coating with lead-containing surface coatings, using non-powered hand tools, where the materials remains primarily intact, and is not crumbled, pulverized or powdered.
 - .3 Operating construction equipment (i.e., excavator, bulldozer) during building demolition or renovation where lead-containing surface coatings are present.
 - .4 Installation or removal of batteries in emergency lighting.

1.3 Instruction and Training

- .1 Provide instruction and training to all workers including the following:
 - .1 Hazards of lead.
 - .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:
 - .1 Limitations of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Proper fitting of equipment.
 - .4 Disinfecting and cleaning of equipment.
 - .3 Personal hygiene to be observed when performing the work.
 - .4 The measures and procedures prescribed by this section including decontamination of the worker.
 - .5 Instruction and training must be provided by a competent person.

1.4 Personal Protection

- .1 Provide non-powered half-face respirators with P100 high efficiency cartridge filters when requested by personnel.
- .2 Provide protective clothing, when requested by personnel, entering the Abatement Work Area, including:

- .1 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.
- .3 Provide protective clothing, to all personnel entering the Abatement Work Area, including:
 - .1 Dust impermeable gloves appropriate for the work being completed.
- .4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.
- .5 Lead-specific soaps and hygiene indicators are recommended to be provided for shower and hand-wash stations.

1.5 Inspections

- .1 Refer to Inspections in Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

- .1 Refer to Section 02 81 00.

PART 3 EXECUTION

3.1 Site Preparation - General

- .1 Provide washing facilities consisting of a wash basin, clean water, soap and towels.
 - .1 Workers are to use washing facilities each time leaving the Abatement Work Area.
- .2 Stored or non-fixed items, including but not limited to equipment, furniture, waste etc., shall be removed from the Abatement Work Area prior to abatement work.
- .3 Remove visible dust from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.
- .4 Provide amended water for wetting materials, and adequate method of wetting (garden sprayers, airless sprayers, etc.).
- .5 Do not use compressed air to clean or remove dust or debris.
- .6 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
- .7 Frequently and at regular intervals, place all waste in waste containers.
- .8 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.2 Site Preparation – No Enclosure Required

- .1 Isolate Abatement Work Area with barrier tape.

- .2 Protect floor surfaces covered from wall to wall with polyethylene sheets.
- .3 Maintain Abatement Work Area in tidy condition.
- .4 Remove waste and debris frequently.
- .5 Remove standing water on polyethylene/floor at the end of every shift.
- .6 Turn off water supply to hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.3 Lead-Containing Paint Abatement

- .1 Removal methods minimizing dust generation should be used wherever possible.
 - .1 Wet methods are to be used to reduce dust generation.
 - .2 Wetting agents should be used where possible.
 - .3 Wet methods are not to be used if it creates a hazard or cause damage to equipment or to project.
- .2 Provide drop sheets below all lead operations that may produce dust, chips or debris containing lead.
- .3 Waste water from cleaning or removal operations must be contained, for treatment or disposal.
- .4 Remove lead-containing paint in small sections and pack as it is being removed in sealable lead waste containers.
- .5 Follow manufacturer's instructions for all use of chemical gels, strippers and pastes.
 - .1 Ensure agent neutralizers, where required, are applied.
 - .2 Do not use chemical gels, strippers or pastes on surfaces where they are scheduled to be repainted, and the material affect the new paint application.
- .6 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.
- .7 After wire brushing and wet sponging to remove visible lead-containing paint, wet clean entire work area, and equipment used in process.
 - .1 Compressed air or dry sweeping not be used to clean up lead-containing dust or waste.
 - .2 Ensure all waste is cleaned and packaged.
- .8 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside.

3.4 Bulk Lead Removal

- .1 Lead-containing batteries should be removed, and recycled in appropriate programs.

3.5 Waste Management and Disposal

- .1 Per Section 02 81 00.

3.6 Final Cleaning

- .1 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.
- .2 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .3 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

END OF SECTION

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PART 1 GENERAL

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.
- .2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of lead-containing materials following Class 2 or Moderate Risk procedures, and Pinchin and Owner specific requirements.
- .3 Comply with requirements of this Section when performing following Work:
 - .1 Removal of lead containing paint using power tools with an effective dust collection system equipped with HEPA filter.
 - .2 Welding, torching or high temperature cutting of lead-containing surface coatings or materials indoors, with use of an effective fume collector or smoke eater.
 - .3 Welding, torching or high temperature cutting of lead-containing surface coatings materials outdoors.
 - .4 Removal of lead-containing surface coatings or materials by scraping or sanding (including wet sanding) using non-powered hand tools.
 - .5 Demolition of plaster or other building components that crumble, pulverize or powder and are covered with lead-containing surface coating.
 - .6 Wet cleaning or HEPA vacuuming of significant amounts of lead-containing dust and debris that can be made easily airborne.

1.3 Instruction and Training

- .1 Provide instruction and training to all workers including the following:
 - .1 Hazards of lead.
 - .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:
 - .1 Limitations of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Proper fitting of equipment.
 - .4 Disinfecting and cleaning of equipment.
 - .3 Personal hygiene to be observed when performing the work.
 - .4 The measures and procedures prescribed by this section including decontamination of the worker.
 - .5 Instruction and training must be provided by a competent person.

1.4 Personal Protection

- .1 Provide the following respiratory protection to all personnel, at minimum:
 - .1 Non-powered half-face respirators with P100 high efficiency cartridge filters.
- .2 Provide protective clothing, to all personnel entering the Abatement Work Area, including:
 - .1 Dust impermeable gloves appropriate for the work being completed.
 - .2 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.
- .3 Provide protective clothing, to all personnel entering the Abatement Work Area.
- .4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.
- .5 Lead-specific soaps and hygiene indicators are recommended to be provided for shower and hand-wash stations.

1.5 Inspections

- .1 Refer to Inspections in Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

- .1 Refer to Section 02 81 00.

2.2 Hoarding Walls

- .1 Type A Hoarding Wall: One layer of rip-proof polyethylene sheeting installed floor to ceiling, secured with telescopic poles, clips, or other suitable methods.

2.3 Transfer Room

- .1 Install vented wood door in wood frame at doorway to Occupied Area. Door must have locking passage set. Provide two keys to Abatement Consultant and one to Owner.
- .2 Transfer Room to be generally 2000 mm x 2000 mm x 2200 mm high. Increase size accordingly to accommodate number of workers.
- .3 Install walls as follows:
 - .1 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.
 - .2 Install one layer rip-proof polyethylene sheeting on interior walls of Transfer Room.
- .4 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting beneath entire Transfer Room.
- .5 Install one layer rip-proof polyethylene sheeting over roof.

- .6 Turn 600 mm of polyethylene down the sides over polyethylene on the perimeter walls.
- .7 Install a fire extinguisher, mount to wall.

2.4 Curtained Doorways

- .1 Construct as follows:
 - .1 Install two flap doors, full width and height of door opening at all doors to Abatement Work Area and both ends of Transfer Room.
 - .2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.
 - .3 Install weights attached to bottom edge of each door flap.
 - .4 Provide direction arrows on flaps to indicate opening.

PART 3 EXECUTION

3.1 Site Preparation - General

- .1 Provide washing facilities consisting of a wash basin, clean water, soap and towels.
 - .1 Workers are to use washing facilities each time leaving the Abatement Work Area.
- .2 Stored or non-fixed items, including but not limited to equipment, furniture, waste etc., shall be removed from the Abatement Work Area prior to abatement work.
- .3 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.
 - .1 Lock-out/tag-out power at electrical panels.
 - .2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.
- .4 Shut down HVAC systems serving the Abatement Work Area.
 - .1 Install polyethylene sheeting over openings in ducts and diffusers and seal.
 - .2 HVAC to remaining areas of building must not be disrupted during work of this section.
 - .3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.
 - .4 Perform work at scheduled times after shutting down HVAC systems affecting the Abatement Work Area.
- .5 Remove visible dust from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.
- .6 Provide amended water for wetting materials, and adequate method of wetting (garden sprayers, airless sprayers, etc.).
- .7 Provide electrical power and shut off for operation of powered tools and equipment. Provide ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard.
 - .1 Ensure safe installation of electrical lines and equipment.

- .8 Do not use compressed air to clean or remove dust or debris.
- .9 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.
- .10 Frequently and at regular intervals, place all waste in waste containers.
- .11 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.2 Site Preparation – Enclosure Required

- .1 Install Transfer Room where duration of work is to last longer than one 8 hour shift.
- .2 Install Curtained Doorways.
- .3 Install polyethylene sheeting at openings in walls (as required) and seal.
- .4 Seal openings in floor using tape, caulking, polyethylene, etc. Floor openings are to be sealed independently prior to installation of floor polyethylene.
- .5 Install polyethylene sheeting on floors of Abatement Work Area. Use sufficient layers to provide adequate protection for carpeting and equipment.
 - .1 Cover floors first so that polyethylene on walls is overlapped by at least 305 mm.
- .6 Install 6 mil polyethylene sheeting on walls to remain, within the Abatement Work Area., including existing walls that make up, or are within, the Abatement Work Area.
- .7 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged.
- .8 Place required tools to complete the abatement with the Abatement Work Area.
- .9 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.
- .10 Establish negative pressure in Abatement Work Areas as follows:
 - .1 Provide sufficient HEPA filtered negative pressure machines to exchange a volume of air equivalent to that of the Abatement Work Area a minimum of every 20 minutes.
 - .2 Provide additional HEPA filtered negative pressure machines as required to ensure air flow from Occupied Area into Abatement Work Area.
 - .3 Operate HEPA filtered negative pressure machines continuously from first disturbance of ACM until completion of dismantling.
 - .4 Replace prefilters to maintain specified flow rate.
 - .5 Replace HEPA filter as required to maintain flow rate and integrity of unit.
 - .6 Discharge HEPA filtered negative air machines to building exterior, where possible.
 - .1 Direct discharge away from building access points.
- .11 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of lead hazard, and lead hazard where appropriate.

3.3 Site Preparation – No Enclosure Required

- .1 Cover materials to remain in the Abatement Work Area with polyethylene sheeting before disturbing ACM to control the spread of dust.
- .2 Install caution tape around work area where existing walls are not present.
- .3 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.
- .4 Place HEPA vacuum in Abatement Work Area.
- .5 Place required tools to complete the abatement with the Abatement Work Area.
- .6 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of a lead dust hazard.

3.4 Maintenance of Abatement Work Area

- .1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.
- .2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.
- .3 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Inspection must be performed by competent person.
- .4 Maintain Abatement Work Area in tidy condition.
- .5 Remove standing water on polyethylene/floor at the end of every shift.
- .6 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.5 Lead Abatement

- .1 Use the procedures described above under *Site Preparation – Enclosure Required*.
 - .1 Removal of lead-containing surface coatings or materials by scraping or sanding (including wet sanding) using non-powered hand tools.
 - .2 Demolition of plaster or other building components that crumble, pulverize or powder and are covered with lead-containing surface coating.
- .2 Use the procedures described above under *Site Preparation – No Enclosure Required*.
 - .1 Removal of lead containing paint using power tools with an effective dust collection system equipped with HEPA filter.
 - .2 Welding, torching or high temperature cutting of lead-containing surface coatings or materials indoors, with use of an effective fume collector or smoke eater.
 - .3 Welding, torching or high temperature cutting of lead-containing surface coatings materials outdoors.
- .3 Provide washing facilities consisting of a wash basin, clean water, soap and towels.
 - .1 Workers are to use washing facilities each time leaving the Abatement Work Area.
- .4 Removal methods minimizing dust generation should be used wherever possible.

- .1 Wet methods are to be used to reduce dust generation.
 - .1 Wetting agents should be used where possible.
 - .2 Wet method not be used if it creates a hazard or cause damage to equipment or to project.
- .5 Provide drop sheets below all lead operations that may produce dust, chips or debris containing lead.
- .6 Waste water from cleaning or removal operations must be contained, for treatment or disposal.
- .7 Remove lead containing paint in small sections and pack as it is being removed in sealable waste containers.
- .8 Waste generated should be maintained wet until cleaned and packaged.
- .9 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.
- .10 After wire brushing and wet sponging to remove visible lead containing paint, wet clean entire work area, and equipment used in process.
 - .1 Compressed air or dry sweeping not be used to clean up lead-containing dust or waste.
 - .2 Ensure all waste is cleaned and packaged.
- .11 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside. Ensure containers are removed by workers who have entered from uncontaminated areas dressed in clean coveralls.

3.6 Waste Management and Disposal

- .1 Per Section 02 82 00.

3.7 Final Cleaning

- .1 Following specified cleaning procedures, proceed with final cleanup.
- .2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Clean visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.
- .3 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and seal. Dispose of in accordance with waste materials generated.
- .4 Clean Work areas and Transfer Room, where present.
- .5 Remove sealed waste containers and equipment used in Work and remove from work areas at appropriate time in cleaning sequence.
- .6 Conduct final check to ensure no dust or debris remain on surfaces as result of dismantling operations.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

- .1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.
- .2 Requirements specified elsewhere:
 - .1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

- .1 Unless otherwise shown or specified it is the intent that work performed as per this section will result in the removal and destruction of:
 - .1 PCB-containing caulking
- .2 All Work shall be performed in strict accordance with the Project Documents and all governing codes, rules, and regulations. Where conflicts occur between the Project Documents and applicable codes, rules, and regulations, the more stringent shall apply.

1.3 Quality Assurance

- .1 Ensure the removal and handling of PCBs is performed by persons experienced in the methods, procedures and industry practices.
- .2 Complete work so that at no time do PCBs contaminate the building or environment.

1.4 Instruction and Training

- .1 Instruction and training must be provided to all workers and supervisors. Instruction and training includes the following:
 - .1 Hazards of PCBs.
 - .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during work, including:
 - .1 Limitations of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Proper fitting of equipment.
 - .4 Disinfecting and cleaning of equipment.
 - .3 Personal hygiene to be observed when performing the work.
 - .4 The measures and procedures prescribed by this section.
- .2 Instruction and training must be provided by a competent, qualified person.

1.5 Personal Protection

- .1 Workers handling PCB-containing materials are advised to avoid skin and eye contact.
- .2 During removal of PCBs, personnel are to wear personal protective equipment

appropriate to the task.

- .3 During removal of PCB caulking, personnel are to wear, at minimum:
 - .1 Provide workers, at a minimum, with non-powered half-face respirators with P100 high efficiency and Organic Vapour cartridge filters.
 - .2 Provide workers, with protective eye wear.
 - .3 Provide protective clothing, to all personnel entering the Abatement Work Area.
 - .4 Provide disposable gloves (nitrile), to all personnel entering the Abatement Work Area.

1.6 Inspections

- .1 Refer to Inspections in Section 02 81 00 – General Provisions.
- .2 The following Milestone Inspections are to be scheduled:
 - .1 Milestone Inspection - Clean Site Preparation
 - .2 Milestone Inspection – Bulk Removal Inspection
 - .3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS

2.1 Materials

- .1 Containment Drums: new, not used double bung 45 gallon No. 16 gauge cold rolled steel drums with removable steel lid, PCB resistant gasket (nitrile rubber, cork or Teflon), and 12 gauge compression type ring closure with 5/8" bolt and forged lug. Drums shall be newly painted inside and out with bright white rust-resistant enamel. Metal pail of 16 gauge steel with removal steel lid, are also acceptable for smaller quantities of waste.
- .2 Decontamination Area: An established area for the purpose of decontaminating personnel and equipment.
 - .1 Of sufficient size to accommodate cleaning of equipment and removing personal protective equipment.
 - .2 Install PCB warning signs / tape at the entrance to the decontamination area.
 - .3 The floor shall be covered with polyethylene sheeting.
 - .4 Include a hand washing station complete with soap and towels and 6 mil polyethylene bags for disposal of PCB-contaminated items such as gloves, Tyvek suite rags etc.
 - .5 All personnel must enter and exit the Abatement Work Area through the decontamination area.
 - .6 All equipment and surfaces of waste containers must be cleaned prior to removing them from the decontamination room or area.
 - .7 Work clothing must be cleaned with a HEPA vacuum before it is removed.

- .3 Drum liners: clear polyethylene bag, 36" x 60", 6 mil thick. Open one 36" end.
- .4 Label: appropriate PCB Labels and Placards of sufficient size to be clearly legible, for display on waste containers (bags, boxes, rolloffs or drums) which will be used to contain or transport PCB contaminated material, in accordance with TDG regulations.
- .5 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints. New materials only.

PART 3 EXECUTION

3.1 General

- .1 Do not contaminate building surfaces with PCBs.
- .2 Should visible PCB debris be observed outside the Work Area, immediately stop Work notify the Consultant and Owner; institute emergency procedures as directed. All costs incurred in decontaminating such non-Work Areas and the contents thereof shall be borne by the Contractor, at no additional cost to the Owner.
- .3 Notify Owner's Representative of any spills immediately.
 - .1 Any spills of PCBs are to be cleaned to the satisfaction of the Owner's Representative at the contractors cost. This includes removal and replacement of building materials as required.
- .4 Conduct PCB removal operations in a manner that fully protects Contractor's and Subcontractor's employees, the general public, other building occupants and the environment from exposure to PCB.
- .5 Non-PCB items remaining such as windows, doors, masonry, and all other building construction and components from which PCB materials are removed shall be decontaminated by physical or chemical means such that no visible residue remains. The removal of the PCB materials may require the use of scrapers, solvents, mastic removal chemicals, or other methods/procedures to ensure complete removal.
- .6 Use hand tools that generate the least amount of dust and will still complete the PCB caulk removal.
 - .1 Grinding electromechanical tools (e.g. angle grinders, masonry groove cutters, circular saws, and slot mills, etc.) are not allowed to be used for exterior open-air PCB caulk removals.
- .7 Remove accessible caulk that could be disturbed before cutting building components, such as window frames.

3.2 Work Area Preparation - Interior Removal:

- .1 Isolate all HVAC equipment, including installing polyethylene sheeting on all air returns and exhausts. Turn off all HVAC systems serving work area when feasible.
- .2 All floor areas adjacent to the work area shall have a layer of polyethylene sheeting, attached to the interior wall and laid down on the surfaces below the abatement work

area, at least 5 feet wide or to the furthest point of gravity fall for dislodged debris by methods used, whichever is further.

- .3 All movable objects shall be removed from the immediate work area. All non-movable objects shall be covered with one layer of polyethylene sheeting and sealed at the edges.
- .4 Temporary dust barriers consisting of a minimum of polyethylene sheeting shall be at installed at hallways, corridors, doorways, and other openings to the work area not used for passage during removals to establish work area containment enclosure.
- .5 Polyethylene sheeting overlapping curtained doorway shall be installed at the entrance to the work area.

3.3 Equipment and Area Decontamination

- .1 When removal of PCB materials is completed, the decontamination process shall consist of HEPA vacuuming, wet wiping/mopping and a repeated HEPA vacuuming of the entire work area. All surfaces in and around the work area must be free of dust generated during the work.
- .2 Decontaminate all tools and equipment before removal from the work area.
- .3 If dust or debris has migrated to areas of the building other than the immediate work area, those areas shall be incorporated into the work area and thoroughly decontaminated to ensure all visible dust generated by the activity is eliminated.
- .4 Uncontaminated dust barriers and other protective sheeting shall be placed in disposable construction bags and disposed of as normal trash.
- .5 Visually inspect the area for any remaining dust or debris. HEPA vacuum and wet wipe until space is clean. Dispose of vacuum contents as PCB waste.
- .6 Upon completion of decontamination and removing temporary dust barriers, a final inspection shall be performed by the Contractor.
- .7 Failure of any visual inspection by the Consultant, the Contractor will clean the affected areas at no additional expense to the Owner.

3.4 Transportation and Reporting

- .1 All waste containers shall be fully enclosed and lockable (i.e. enclosed dumpster, trailer, etc.).
 - .1 While on-site, the container shall be labelled with PCB Warning Labels and as required by Federal and Provincial regulations.
- .2 All waste generated as part of the PCB project shall be removed from the site within ten (10) calendar days after successful completion of all PCB abatement work.
- .3 The Hauler, with the Abatement Contractor and the Abatement Consultant, shall inspect the transport container prior to the Hauler taking possession and signing the Hazardous Waste Manifests.

- .4 A Hazardous Waste Manifest shall be utilized solely as the waste Manifest for transportation. A hauler billing form or bill of lading may be used if the hauler needs an independent record, but shall not be used as a shipping document.
 - .1 The Manifest shall be completed by the Contractor and verified by the Consultant that all the information and amounts are accurate and the proper signatures are in place.
 - .2 The Manifest shall have the appropriate signatures of the Owner's Representative (the Generator) and the Hauler representative prior to any waste being removed from the site.
 - .3 Upon arrival at the Disposal Site, the Manifest shall be signed by the Disposal Facility operator to certify receipt of PCB materials covered by the manifest.
 - .4 The Disposal Facility operator shall return the original Manifest to the Owner's Representative (the Generator) as required by the Ministry of Environment, Conservation and Parks.
 - .5 Provide a copy of the completed waste manifest proving receipt of the PCB waste by the Disposal Facility.
- .5 Transport materials following Transportation of Dangerous Goods Act.
 - .1 Transport PCBs to approved incineration site for destruction and ensure materials are destroyed.
- .6 The facility used to process the PCBs shall be approved by the Ministry of the Environment and shall have valid Certificates of Approval to carry out the work outlined herein.
 - .1 The facility must issue a Certificate of Destruction identifying types and quantities of PCBs generated from the project.

END OF SECTION

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PART ONE - GENERAL

1.1 DESCRIPTION

- 1.1.1 Work included: Furnish all labour, materials, equipment and services specified, indicated, or required to provide excavating, trenching, backfill and compaction.
- 1.1.2 Related Work Described Elsewhere:
 - .1 Soils Report – Section 02010.
 - .2 Earthwork Below Paving and Sidewalks - Section 02215.
 - .3 Site Servicing and Grading
 - .4 Division 22 – Plumbing
 - .5 Division 26 - Electrical

1.2 SAMPLES

- 1.2.1 Submit 20 kg (45 lbs.) samples of each type of fill specified including representative samples of excavated materials for analysis by testing laboratory.
- 1.2.2 Ship samples prepaid to testing laboratory in tightly closed containers to prevent contamination.

1.3 SUBMITTALS

- 1.3.1 Comply with pertinent provisions of Section 01300 regarding shoring, bracing and underpinning required in connection with excavation.
- 1.3.2 If drawings for structural elements are required, they shall bear the signature and stamp of a Professional Engineer Registered in Ontario.

1.4 SHORING AND BRACING

- 1.4.1 Take precautions to guard against movement or settlement of adjacent structures, earth, benchmarks, services, walks, paving, curbs and adjacent grades. Provide bracing and shoring if required.
- 1.4.2 Shore and brace excavations to prevent failure in accordance with *Construction Safety Act* and *Shoring and Timbering in Trenches* by the Construction Safety Association of Ontario.
- 1.4.3 Engage a registered structural engineer to design and assume responsibility for shoring, bracing, and caissons.
- 1.4.4 Make good any damage and be liable for any injury resulting from inadequate shoring or bracing.

1.5 DEWATERING

- 1.5.1 Take precautions necessary to sufficiently dewater excavation and fill areas to allow foundation construction and pipe installation.

1.6 UTILITY LINES

- 1.6.1 Where possible, known underground and surface utility lines are indicated. Locations of known existing services on plans are only approximate. Contractor shall be responsible for locating their exact position during the work. Notify Public Utility or Municipal Authorities well in advance of planned excavations and shoring adjacent to their services.
- 1.6.2 Record locations of maintained, re-routed and abandoned underground utility and sewer lines.
- 1.6.3 Make good any damage caused to existing utility and sewer lines resulting from work.

1.7 PROTECTION

- 1.7.1 Protect excavated earth from freezing by approved method.
- 1.7.2 Grade around excavations to prevent surface water runoff into excavated area.

PART TWO - PRODUCTS

2.1 MATERIALS

- 2.1.1 Reference to the abbreviation MTC indicates Ontario Ministry of Transport and Communications.
- 2.1.2 Grade Fill: Type 1 fill - Granular 'A' material conforming to OPSS Form #1010. Crushed rock composed of hard, uncoated cubical fragments produced from a naturally formed deposit and graded within the following limits:

Sieve Size (MTC)	Percent Passing
37.5 mm	100
16.0 mm	62-100
9.5 mm	48-73
4.75 mm	33-55
1.18 mm	15-45
300 µm	5-22
75 µm	0-8

- 2.1.3 Subgrade Fill: Type 2 fill - Granular 'B' material conforming to OPSS Form # 1010. Clean sand and gravel graded within the following limits:

Sieve Size (MTC)	Percent Passing
106.0 mm	100
22.4 mm	57-100
4.75 mm	26-100
10-85	1.18 mm
5-40	300 um
0-8	75 um

- 2.1.4 All fills shall be free of frost, ice or frozen particles, or stones greater than 106mm for granular 'B' or 37.5mm for granular 'A'.

2.2 STOCKPILING

- 2.2.1 Stockpile fill materials in areas designated by Consultant. Stockpile granular materials in a manner to prevent segregation. Protect from freezing.

PART THREE - EXECUTION

3.1. EXCAVATING

- 3.1.1 Excavate to elevations and dimensions indicated or required for construction of work plus space required to erect forms, shoring, permit inspection.
- 3.1.2 Make excavation to clean lines to minimize quantity of fill material required.
- 3.1.3 Earth bottoms of excavations to be dry undisturbed or previously compacted soil, level, free from loose or organic matter.
- 3.1.4 Excavation must not interfere with normal 45° splay of bearing from bottom of any footing.
- 3.1.5 When complete, have Consultant inspect excavations before pouring any concrete.
- 3.1.6 Correct unauthorized excavation at no extra cost as follows:
- .1 Fill under bearing surfaces and footings with concrete as specified for footings.
 - .2 Fill under other areas with Type 2 fill compacted to 100% Standard Proctor Density.

3.2 EXCESS WATER CONTROL

- 3.2.1 Unfavourable weather: Do not place, spread, or roll and fill material during unfavourable weather conditions. Do not resume operations until moisture content and fill density are satisfactory to the Consultant.
- 3.2.2 Softened subgrade: Where soil has been softened or eroded by flooding or placement during unfavourable weather, remove all damaged areas and recompact as specified for fill and compaction below.

3.2.3 Dewatering:

- .1 Provide and maintain at all times during construction, ample means and devices with which to remove promptly and dispose of all water from every source entering the excavations or other parts of the work.
- .2 Dewater by means which will ensure dry excavations and the preservation of the final lines and grades of bottoms of excavations.

3.3 BACKFILLING

- 3.3.1 Do not commence backfilling until work of other sections to be backfilled has been inspected by the Consultant.
- 3.3.2 Areas to be backfilled to be free from debris, snow, ice, water or frozen ground.
- 3.3.3 Prior to placing fill under base courses and slabs on grade, compact existing sub-grade to obtain same compaction as specified for fill. Cut out "soft" areas and fill with suitable material until specified compaction can be obtained.
- 3.3.4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by the Consultant.
- 3.3.5 Backfill simultaneously each side of walls and other structures to equalize soil pressures, when possible.
- 3.3.6 Place and compact fill materials in continuous horizontal layers not exceeding 150mm (6") loose depth. Avoid disturbing or damaging buried services. Make good any damage. Increased fill depths are not to be attempted without demonstration of compaction to Consultant.
- 3.3.7 Maintain optimum moisture content to enable compaction to attain specified density.
- 3.3.8 Where sheathing and shoring materials are used to support sides of excavation and are to be later removed, leave them in place as long as possible, compatible with the placing and compacting of backfill, in order to eliminate voids or pockets in the backfill and to minimize possible movement or loss of adjacent ground and damage to facilities.
- 3.3.9 Bring all filled areas to rough grade level. Leave surfaces clean and free of coarse materials.
- 3.3.10 Bedding of Mechanical and Electrical Services to be carried out by this Section under the direction of the trade concerned using cohesionless material.

3.4 FILL TYPES AND COMPACTION

- 3.4.1 Exterior sides of perimeter walls: use granular "B" to sub-grade levels. Compact to 95% Standard Proctor maximum dry density.

- 3.4.2 Within building area: Use granular "B" to underside of base course for concrete slabs. Compact to 100% Standard Proctor maximum dry density.
- 3.4.3 Under concrete slabs, including areas under thickened slabs: Provide 200mm (8") base course of granular "A" fill to underside of slab. Compact to 100% Standard Proctor maximum dry density.

3.5 GRADING

- 3.5.1 Rough grading to levels, profile and contours required and made ready to receive surface treatment as indicated on site plan.

3.6 INSPECTION AND TESTING

- 3.6.1 Testing of materials and compaction will be carried out by testing laboratory designated by the Consultant.
- 3.6.2 Owner will pay for inspection and testing costs.
- 3.6.3 Sieve analysis: proposed fill materials will be tested to confirm suitability for intended use and conformity with specifications.
- 3.6.4 Density tests: tests will be conducted in place on compacted fill to ASTM D2922 for Standard Proctor Density.
- 3.6.5 If, during progress of work, tests indicate fills installed under this contract do not meet specified requirements, remove defective fills, replace and retest at Contractor's expense. All re-testing is to be at the Contractor's expense.

3.7 FREQUENCY OF TESTS

- 3.7.1 Consultant will determine frequency of testing as construction progresses. The following materials will be tested: excavated surfaces, fill under floor or other slabs on grade, backfill of structural walls.

3.8 SURPLUS

- 3.8.1 Remove surplus material not required for backfill, grading or landscaping, from the site.

3.9 INSULATION

- 3.9.1 Installation of perimeter foundation insulation specified under Section 07200 (Building Insulation) is to be installed by this Section as backfilling progresses.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One, General Requirements, is part of this Section and shall apply as if repeated here.

1.2 STANDARDS

1. All aggregates, equipment, methods and materials shall conform strictly to the Specifications of the Ministry of Transportation and Communications.
2. Refer to ASTM C309-91, ASTM D698-91, CAN/CSA-A23.1-M90, CAN/CSA-A23.2-M90, OPSS 1010-93, OPSS 1308-83.

1.3 WARRANTY

1. The work under this section shall be under warranty in accordance with the Conditions of CCDC-2-2020 but for a period of two years after the date of issue of the Architect's Certificate of Substantial Completion.

1.4 SPECIAL PROTECTION

1. Barricade paved surfaces from traffic until surfaces are ready for normal traffic. Any damage or marked surfaces are to be removed and replaced by contractor.

1.5 UNIT PRICES

1. Provide unit prices as requested in tender form.

PART 2 PRODUCTS

2.1 MATERIALS

1. Granular Base Course: Conform to the Ontario Provincial Standard Specifications form 1010, for material designated as Class "A" and "B".
3. Concrete: Materials shall conform to Section 03300.
4. Joint Filler: For concrete walks 13 mm thick premoulded bituminous impregnated fibre conforming to ASTM D.1751-71a.
5. Joint Sealant: Conform to CGSB 19-GP-24M Tremco THC900 self levelling urethane, or Sternson's Duoflex or Rubber Caulk 6000 by PRC Canada Inc.
6. Air Entrainment: Admixture as manufactured by the Master Builders Co. or Sternson Ltd.

7. Concrete Curing: Conform to Section 03300
8. Concrete Sealer: Boiled Linseed oil conforming to ASTM D-260-58T cut back with kerosene to form a 50/50 mixture.
9. Reinforcing Materials shall conform to section 03300.

PART 3 EXECUTION

3.1 EXAMINATION

1. Before work commences ensure that subgrading and filling as specified in Section 02215 and this section, has been correctly completed and that the subgrade is satisfactory in all aspects for placing of pavement. Report to Architect any deficiencies before proceeding with work.
2. Verify that sub-grade densities, as may be specified in Section 02215 have been attained.
3. Provide additional compacted granular material where required.

3.2 INSTALLATION

1. Concrete Work

1. Concrete work of this Section shall be executed generally as specified on Section 03300.
2. The compressive strength of concrete after 28 days shall be 32 Mpa unless indicated or specified otherwise.

2. Concrete Walks and Slabs

1. Lay concrete for walks min. 125 mm (5") thick of 32 Mpa concrete on granular "A" compacted to 100% SPMDD and Granular "B" to 98% SPMDD. Entrained air mix shall be 6% ±1%.

Note: Granular "A" to be a minimum 150 mm thick. Provide Granular "B" to be a minimum 500 mm thick as required to bring existing grade up to underside Granular "A" Layer.

2. Finish wearing surface of walks with wood float or as directed by Architect. Round off edges of slab with an edging tool.
3. Score surface of walks as indicated on drawings using proper tool or as directed by Architect.
4. Turn down perimeter edges of sidewalks a min. 125 mm (5") in addition to sidewalk thickness, complete with 300 mm (12") thick

compacted stone base. See drawings for additional details.

5. Slope walks away from building a minimum 1% toward storm sewer systems.
6. Slope all concrete walks to one side at ¼" (6 mm) per foot for drainage or as directed by the Architect.
7. Widths of sidewalks as per site plan dimensions (not as per OPSD drawings).

3. Concrete Curbs (Barrier)

1. Curb design shall be in conformance with current OPSD details as indicated on drawings, using a minimum 500 mm thick base of compacted granular B to refusal.
2. Entrained air in the concrete shall be 6%±1%.
3. Curb Type: as per OPSD 600.11, Concrete Barrier Curb or as indicated on the Civil drawings.

4. Concrete Sidewalk Ramps/drop Curbs

1. Provide drop curbs and barrier-free ramped access to AODA standards including tactile warning strips where drop curbs shown on drawings.
2. Refer to OPSD 310.030 and Civil Drawings.

5. Expansion Joints

1. Provide isolation joints filled with ½" (13 mm) joint filler at the following locations:
 1. Where shown and noted on drawings.
 2. At maximum 6000 mm (20'-0") intervals in both directions in sidewalks and concrete paved areas.
 3. Where two sidewalks intersect or meet.
 4. Where a sidewalk or concrete pavement meets building or curb.
 5. Refer also to OPSD 310.010 and OPSD 310.020.
 6. Install joint sealant at all expansion joints including locations where concrete abuts building (at entrances etc.).

6. Contraction Joints

1. Provide contraction and dummy joints in sidewalks at locations shown on drawings or at approximately 1500 mm (5'-0") intervals in both directions. Refer to OPSD-310.010 and OPSD-310.020.
2. Form joints by scoring concrete with "T" shaped tool providing a score 25 mm (1") deep.

7. Concrete Curing

1. Concrete curing shall be done in accordance with Section 03300.

8. Sealing of Concrete

1. Seal concrete surfaces using boiled linseed oil conforming to ASTM D-260-58T, cut back with kerosene to form a 50/50 mixture. Uniformly apply with spray, brush or roller in 2 coats not exceeding 9.2 sq.m./litre (50 sq. yds. per gallon) per coat. Surface shall be clean, dry and at least 2 weeks old. Air temperature above 7 degrees C. (45 degrees F.).

3.3 MAKING GOOD

1. Where new or existing concrete walks and curbs are disturbed or cracked, at the end of the project the Contractor shall remove concrete to the nearest joint in each direction and install new concrete to the satisfaction of the Architect.

END OF SECTION

PART ONE – GENERAL

1.1 SECTION INCLUDES

- 1.1.1 Provision of all labour, materials, equipment, and incidental services necessary to provide concrete formwork and accessories as indicated on the drawings and specified herein.

1.2 RELATED SECTIONS:

- .1 Section 03200 – Concrete Reinforcement
- .2 Section 03300 – Cast-in-Place Concrete

1.3 REFERENCE STANDARDS

(All Codes and Standards referred to herein are to be latest edition.)

- .1 CAN/CSA-S269.3, Formwork.
- .2 CAN/CSA-A23.1, Concrete Materials & Methods of Concrete Construction.
- .3 CAN/CSA-A23.2, Methods of Test and Standard Practices for Concrete.
- .4 CSA-086, Engineering Design in Wood.
- .5 CSA 0121, Douglas Fir Plywood.

1.4 TOLERANCES

- 1.4.1 Perform forming operations and place hardware so that finished concrete will be within the tolerances set out in CAN/CSA-A23.1.
- 1.4.2 Variations in building lines which result in extension of the building over lot lines or restriction lines will not be permitted.
- 1.4.3 Tolerances referenced are acceptable with regard to structural requirements. Interfacing tolerances may not be compatible with the above. Review and coordinate interfacing tolerances so that the various elements come together properly.

1.5 DESIGN REQUIREMENTS

- 1.5.1 Design formwork to safely support vertical and lateral loads until they can be supported by the structure, as recommended in CAN/CSA-S269.3.

1.6 SHOP DRAWINGS

- 1.6.1 If requested by the Consultant submit shop drawings in accordance with Section 01300. Each shop drawing shall bear the stamp and signature of a Professional Engineer registered in the Province of Ontario.
- 1.6.2 Indicate method and schedule of construction, materials, arrangement of joints, ties, shores, and locations of temporary embedded parts. Comply with CAN/CSA-S269.3 for formwork drawings.

PART TWO – PRODUCTS

2.1 MATERIALS

- 2.1.1 Formwork Lumber. Wood for form facing for exposed concrete shall be exterior PMBC concrete form grade Douglas Fir Plywood or aluminum.
- 2.1.2 For non-architectural concrete work: plywood and wood formwork materials to CSA-086.1.
- 2.1.3 Form ties: removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25mm diameter in concrete surface.
- 2.1.4 Tubular Column Forms: round, spirally wound laminated fiber forms, internally treated with release material.
- 2.1.5 Form Release Agent: chemically active release agents containing compounds that react with free lime in concrete, resulting in water insoluble soaps.

PART THREE – EXECUTION

3.1 FABRICATION AND ERECTION

- 3.1.1 Verify lines, levels and centers before proceeding with formwork and ensure dimensions agree with drawings.
- 3.1.2 Obtain Consultant's approval in writing for use of earth forms.
- 3.1.3 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.
- 3.1.4 Form footing sides unless footings are strictly specified to be placed against undisturbed soil.
- 3.1.5 Refer to architectural drawings for concrete members requiring architectural exposed finishes.
- 3.1.6 Do not place shores and mud sills on frozen ground.
- 3.1.7 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations, and levels indicated within tolerances required by CAN/CSA-A23.1.
- 3.1.8 Where shown, camber formwork such that hardened concrete, prior to stripping of forms, is cambered as shown. Maintain beam depth and slab thickness from

cambered surface.

- 3.1.9 Align form joints and make watertight. Keep form joints to a minimum.
- 3.1.10 Use 25mm chamfer strips on external corners and/or 25mm fillets at internal corners of concrete members, unless specified otherwise.
- 3.1.11 Camber slabs and beams 1 in 500 of span unless shown otherwise.
- 3.1.12 Mark building, grid or other lines on forms to permit the accurate positioning of reinforcing steel.
- 3.1.13 Construct templates and supports to rigidly fix reinforcing dowels in the forms prior to concreting.
- 3.1.14 Provide suitable markers to indicate the location and configuration of continuing concrete members so that dowels can be positioned accurately in relation to their position in the continuing members.
- 3.1.15 Set anchor bolts, templates, steel connection units, hardware, or other inserts into the forms and secure them rigidly so that they do not become displaced during concreting. Set and secure these items to the tolerances specified and required in the appropriate Sections.

3.2 SLEEVES, CHASES AND FORMED OPENINGS

- 3.2.1 Form sleeves, chases and openings except where such items are specified to be formed or sleeved by the appropriate trade.
- 3.2.2 All openings, sleeves, chases are not necessarily shown on the structural drawings nor are their sizes or locations shown. Refer to architectural, mechanical and electrical drawings and specifications for openings and sleeving requirements not shown, located and dimensioned on the structural drawings.
- 3.2.3 No sleeves, chases and openings through structural members shall be formed without the Consultant's written approval.

3.3 REMOVAL AND RE-SHORING

- 3.3.1 Leave formwork in place for following min. periods of time after placing concrete:
 - .1 3 days for walls
 - .2 1 day for footings and abutments
 - .3 3 days for beams, slabs, decks and other structural members
 - .4 3 days for columns
- 3.3.2 Remove formwork when concrete has reached 75% of its design strength or minimum period noted above, whichever comes later, and immediately replace

with adequate re-shoring.

- 3.3.3 Provide all necessary re-shoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.

3.4 DEFECTIVE MATERIALS AND WORK

3.4.1 Materials or work which fail to meet specified requirements may be rejected by the Consultant whenever found at any time prior to final acceptance of the work regardless of previous inspection. If rejected defective materials or work shall be promptly removed and replaced or repaired to the satisfaction of the Consultant, at no expense to the Owner.

END OF SECTION

PART ONE – GENERAL

1.1 SECTION INCLUDES

- 1.1.1 Provision of all labour, materials, equipment and incidental services necessary to provide all concrete reinforcement and accessories such as chairs, supports, bolsters etc.

1.2 RELATED SECTIONS

- 1.2.1 Section 03100 – Concrete Formwork
- 1.2.2 Section 03300 – Cast-in-Place Concrete

1.3 REFERENCE STANDARDS

(All Codes and Standards referred to herein are to be latest edition)

- .1 Reinforcing Steel Institute of Ontario (RSIO), Manual of Standard Practice.
- .2 CAN/CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
- .3 CAN/CSA-A23.2, Methods of Test and Standard Practices for Concrete.
- .4 CSA-A23.3, Design of Concrete Structures.
- .5 CSA-G30.3, Cold Drawn Steel Wire for Concrete Reinforcement.
- .6 CSA-G30.5, Welded Steel Wire Fabric for Concrete Reinforcement.
- .7 CSA-G30.14, Deformed Steel Wire for Concrete Reinforcement.
- .8 CSA-G30.15M, Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
- .9 CAN/CSA-G30.18, Billet-Steel Bars for Concrete Reinforcement.
- .10 ANSI/ACI 315, Details and Detailing of Concrete Reinforcement.
- .11 ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures.
- .12 Ontario Provincial Standard Specification (OPSS) 1443 Material Specifications for Organic Coatings for Steel Reinforcement.

1.4 TOLERANCES

- 1.4.1 Perform fabrication and setting so that completed work will be within the tolerances set out in CAN/CSA-A23.1.
- 1.4.2 These tolerances are acceptable with regard to structural requirements. Interfacing tolerances may not be compatible with the above. Review and coordinate interfacing tolerances so that the various elements come together properly.

1.5 SUBMITTALS

- 1.5.1 Mill Certificates
 - .1 Reinforcement from Canadian Mills need not be tested. Steel from foreign mills shall be tested at no cost to the Owner.
- 1.5.2 Shop Drawings
 - .1 Prepare placing drawings to a minimum scale of 1:50 in a clear complete manner that will permit placing of reinforcement to be performed without

-
- reference to contract drawings.
- .2 Detail reinforcement in accordance with the contract documents, CAN/CSA-A23.1 and detailing standards in RSIO Manual of Standard Practice As a minimum, show the following:
- .1 Bar sizes, spacing, location and quantities of reinforcement, welded wire fabric.
 - .2 Identification of each bar with code mark corresponding to bar lists.
 - .3 Details illustrating placement of reinforcement at openings, change of levels, spandrels, stairs, etc.
 - .4 Clearances between reinforcement, and minimum concrete protection to reinforcement.
 - .5 Location and embedment of dowels.
 - .6 Location, number and type of support accessories.
- 1.5.3 Certificates
- .1 Canadian Manufacture: Provide Consultant with certified copy of reports of reinforcing steel showing physical and chemical analysis minimum (5) weeks prior to commencing reinforcing work.
 - .2 Submit code marks or symbols used on reinforcement of each manufacturer so that Consultant may identify grades and size of reinforcement.
- 1.5.4 Substitutions
- .1 Substitution of different size bars permitted only upon written approval of Consultant.

PART TWO – PRODUCTS

2.1 MATERIALS

- 2.1.1 Reinforcing Steel: Only Canadian manufactured deformed steel to CSA G30 Series and to the material specification shown on the drawings. Reinforcement larger than 6mm (1/4") diameter shall be deformed bars. Hard grade billet steel or rail steel shall not be used for stirrups, column or beam ties or spirals.
- 2.1.2 Chairs, bolsters, bar supports, spacers: to CAN/CSA-A23.1. In the case of concrete exposed to view or weather the accessories shall be such that no metal is permitted to come closer than 40mm from a formed face and 50mm from a troweled surface. Use precast concrete supports for exposed concrete beams and soffits and concrete cast against soil/rock.

2.2. FABRICATION

- 2.2.1 Fabricate reinforcing in accordance with CAN/CSA-A23.1 and the RSIO Manual of Standard Practice.
- 2.2.2 Identify with a tag each bar with code mark corresponding to that appearing on bar list.
- 2.2.3 Bend reinforcement once only and at room temperature. Do not straighten or re-bend reinforcement. Do not use bars with kinks or bends not shown on the

drawings.

- 2.2.4 Replace bars which develop cracks or splits.

PART THREE – EXECUTION

3.1 PLACING REINFORCEMENT

- 3.1.1 Prior to concreting, place reinforcement, support and secure against displacement, as indicated on reviewed placing drawings and in accordance with CAN/CSA-A23.1.
- 3.1.2 Place reinforcement accurately and secure against displacement by using ties or clips at intersections. Tack welding of reinforcement to secure in place will not be permitted.
- 3.1.3 Secure reinforcement in walls using sufficient spacers on each face to maintain the requisite distance between reinforcement and wall face and so that vertical bars are plumb. Provide spreader bars of minimum size 10M spaced at 2m centers in both directions.
- 3.1.4 Do not drive or force reinforcement into fresh concrete.
- 3.1.5 Set column and wall dowels prior to concreting with wooden templates or other approved means.
- 3.1.6 Where toppings are placed on waterproof membranes, vapour barriers and the like, prevent reinforcement or tie wire contacting these items.
- 3.1.7 Pre-assemble column and beam cages as necessary. Do not "spring" or bend ties and stirrups in order to place longitudinal reinforcement.
- 3.1.8 Pre-tie reinforcement for footings and lower into place so as not to disturb the soil at founding elevation.

3.2 FIELD BENDING

- 3.2.1 Do not field bend reinforcement except where indicated or authorized in writing by Consultant.
- 3.2.2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
- 3.2.3 Replace bars which develop cracks or splits.

3.3 CONSTRUCTION JOINTS

- 3.3.1 Obtain written approval from the Consultant for location and details of construction joints not shown.
- 3.3.2 Continue reinforcement through the joint in its normal position. Add additional reinforcement across the joint as shown or directed.

3.4 QUALITY CONTROL

- 3.4.1 Provide a system of quality control to ensure that the minimum standards

- specified herein are attained.
- 3.4.2 List the names, qualifications, duties and responsibilities of supervisory and quality control personnel.
 - 3.4.3 Bring to the attention of the Consultant any defects in the work or departures from the Contract Documents which may occur during Construction. The Consultant will decide upon corrective action and give recommendations in writing.
 - 3.4.4 The Consultant's general review during construction and inspection and testing by Independent Inspection and Test Companies reporting to the Consultant is undertaken to inform the Owner of the Contractor's performance and shall in no way augment the Contractor's quality control or relieve the Contractor of contractual responsibility.

3.5 NOTIFICATION

- 3.5.1 Prior to commencing significant segments of the work, give the Consultant and Independent Inspection and Testing Companies appropriate notification so as to afford reasonable opportunity to review the work. Failure to meet this requirement may be cause for the Consultant to classify the work as defective.

3.6 INSPECTION AND TESTING

- 3.6.1 The Owner will appoint an Independent Inspection and Testing Company to make inspections or perform tests as the Consultant directs. Inspection and testing shall be paid from a cash allowance.
- 3.6.2 A series of specimens for each grade and size of reinforcing steel contained in any 100 tonnes of steel shipped may be tested. A series of tests will include two bars for each test required of each size and grade of steel used. Reinforcing steel tests will be made in accordance with CSA G30 Series.

3.7 DEFECTIVE MATERIALS AND WORK

- 3.7.1 Where evidence exists that defective work has occurred or that work has been carried out incorporating defective materials, the Consultant may have additional tests, inspections or surveys performed, in order to determine if work is defective. 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.
- 3.7.2 Materials or works which fail to meet specified requirements may be rejected by the Consultant whenever found at any time prior to final acceptance of the work regardless of previous inspection. If rejected, defective materials or work shall be promptly removed and replaced or repaired to the satisfaction of the Consultant, at no expense to the Owner.

END OF SECTION

PART ONE - GENERAL

1.1 DESCRIPTION

1.1.1 Work included: Provide all cast-in-place concrete, complete in place, as indicated on the drawings, specified herein, and needed for a complete and proper installation.

1.1.2 Related work described elsewhere:

- .1 Section 03100 - Concrete Formwork and Accessories
- .2 Section 03200 - Concrete Reinforcement
- .3 Section 03345 - Concrete Finishing
- .4 Section 07211 - Insulation

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

1.2.1 Anchors, bolts, hangers, sleeves, ties, inserts and other items required to be cast into concrete are to be supplied by applicable trade.

1.3 REQUIREMENTS OF REGULATORY AGENCIES

1.3.1 All Codes and Standards referred to herein are to be latest edition.

1.3.2 Applicable Codes and Standards governing work of this Section:

- .1 CAN/CSA A23.1 - Concrete Materials & Methods of Concrete Construction.
- .2 CAN/CSA A23.2 - Methods of Test and Standard Practices for Concrete.
- .3 CAN/CSA A23.3 - Design of Concrete Structures.
- .4 CAN/CSA A5 - Portland Cement.
- .5 Ontario Building Code (OBC).

1.4 SOURCE QUALITY CONTROL

1.4.1 Supply concrete from a plant which has membership in the Ready-Mix Concrete Association of Ontario or otherwise approved by the Consultant.

1.5 SUBMITTALS

1.5.1 General: Comply with pertinent provisions of Section 01300.

1.6 INSPECTION AND TESTING

1.6.1 An independent Inspection and Testing Company may be appointed to perform material tests. The costs of testing will be paid, on approval by the Consultant, from the Allowances Section 01020.

1.6.2 Inspection Company shall:

- .1 Approve proposed concrete design mixes, if requested by the Consultant.
- .2 Perform testing in accordance with CAN/CSA A23.2
- .3 Submit complete reports including any abnormal conditions and

explanations if poor results obtained.

- .4 Supply molds for test specimens.

1.6.3 Take concrete tests as follows:

- .1 Record slump for each set of test specimens and perform air test when air entrainment specified.
- .2 When placing concrete under cold weather requirements, take one additional specimen for each test set and store it on site under conditions similar to concrete it represents. Test this specimen at seven days before removing formwork.
- .3 Ship cylinders to Testing Laboratory with complete shipping tags securely wired to cartons and pay costs of cartons and shipping.
- .4 Frequency of tests: Take one set of cylinders for each day's placement and for each 50 cubic meters of concrete placed if daily placement exceeds 50 cubic meters and as further directed by the Consultant.

1.6.4 Contractor shall:

Pay for additional tests, including load tests and/or report on corrective measures due to:

- .1 Changes in materials or proportions of mix requested by Contractor,
- .2 Failure of test specimens to meet requirements,
- .3 Failure of concrete in structure to meet requirements for strength, density, uniformity, protection and curing,
- .4 Using unidentified reinforcing steel or reinforcing steel from non-Canadian Mills.

1.7 COLD WEATHER CONCRETING

- 1.7.1 When atmospheric temperature is at or below 5° C or when there is a possibility of it falling to that limit, place concrete in accordance with requirements of CAN/CSA A23.1 "Cold Weather Concreting" and ACI 306 "Recommended Practice for Cold Weather Concreting."
- 1.7.2 Exercise particular care to ensure that previously placed concrete and reinforcing steel are adequately heated to prevent freezing of new concrete placed directly against it.
- 1.7.3 Exercise care to avoid rapid temperature changes (thermal shock) when removing an area from temporary heating conditions.
- 1.7.4 Remove and replace all concrete damaged by frost or freezing at the direction of the Consultant at no cost to the Owner.
- 1.7.5 Accelerating chemical admixtures shall not be used without the written approval of the Consultant.

1.8 HOT WEATHER CONCRETING

- 1.8.1 When atmospheric temperature is at or above 27° C place concrete in

accordance with CAN/CSA A23.1 "Hot Weather Concreting" and ACI 305 "Recommended Practices for Hot Weather Concreting."

- 1.8.2 Exercise particular care to prevent surface crazing of floor slabs due to combined high temperatures and drying winds.
- 1.8.3 The use of water reducing-retarding chemical admixture in the concrete mix may be required at the Consultant's discretion.

PART TWO - PRODUCTS

2.1 GENERAL

- 2.1.1 Use only materials specified.
- 2.1.2 Use materials in accordance with manufacturer's specifications. Have manufacturer's representative on site when material application is not familiar.

2.2 CONCRETE MATERIALS

- 2.2.1 All materials shall conform to standards specified in 1.3.
- 2.2.2 All cement in below grade concrete shall be moderate Portland cement Type 20. All other cement shall be normal Type 10 in accordance with CSA A5. CSA TYPE GUL Portland-Limestone Cement to be used to reduce CO₂ emissions in concrete.
- 2.2.3 Supplementary cementing materials in accordance with C.S.A. Standards A23.5.
- 2.2.4 Supplementary cement materials to be used to reduce CO₂ emissions in concrete. Maximum supplementary cement materials for suspended slabs on deck and beams is 20% and for slabs on grade is 50% use of slag or 30% use of fly ash, the use of supplementary cement material in slabs on grade also to be coordinated with the finishers. No supplementary cementing materials are permitted for concrete which is to be stained. Refer to Architectural Finish Schedules.

2.3 BONDING AGENT FOR PATCHING MORTAR

- 2.3.1 Daraweld C - W.R. Grace
- 2.3.2 Acrylic Concrete Adhesive - CPD
- 2.3.3 Acrylic Bond - U.S.E. Chemicals
- 2.3.4. Acry-lok by W. R. Meadows

2.4 GROUT, NON-METALLIC, NON SHRINK

- 2.4.1 Masterflow 713 - BASF

2.4.2 In-Pakt – CPD

2.4.3 CG-86 construction grade grout by W. R. Meadows

2.5 WATER REDUCING ADMIXTURE

2.5.1 Pozzolith - BASF

2.5.2 WRDA - Grace Construction

2.6 AIR ENTRAINING ADMIXTURES

2.6.1 MBVR - BASF

2.6.2 NVR - Sternson

2.7 ISOLATION JOINTS

2.7.1 Polyethylene or paint or other suitable inorganic material capable of isolating adjacent placements by acting as a bond breaker.

2.8 VAPOUR BARRIER

2.8.1 Vapour Barrier under slabs shall be in accordance with recommendation of Geotechnical Consultant and Soils Investigation Report or 15 MIL POLY, or as otherwise directed by the Architect in the contract documents.

PART THREE – EXECUTION

3.1 CONCRETE MIX DESIGN CRITERIA & PROPORTIONING OF CONCRETE - PROPERTIES

3.1.1 Design all concrete mixes for the compressive strength and slump requirements in accordance with CAN/CSA A23.1 and as specified in "Proportioning" of this section. Allow for the appropriate coefficient of variation for each strength class for the batch plant supplying the concrete.

3.1.2 Submit detailed mix designs for each class of concrete for review by the Material Testing Consultant at least two weeks prior to the commencement of concreting. Submit up to date statistical data for the batch plant confirming the coefficient of variation for each strength class.

3.1.3 Note that concrete that is to be stained may not have any supplemental cementitious materials in the mix.

3.1.4 Proportion the materials in accordance with the mix designs supplied to provide the following specified design strengths, slumps and air contents.

- 3.1.5 For fibre concrete provide fibres at the rate of 2.2 lbs (1.0kg) per cubic metre of concrete. Provide a compatible slump enhancer to ensure that no slump loss occurs with the addition of fibres.

CONCRETE PROPERTIES

LOCATION	28 DAY COMPRESSIVE STRENGTH (MPa)	WATER to CEMENT RATIO	SLUMP (1) (mm)	AIR CONTENT (2) (%)	CLASS of EXPOSURE
Mud Slabs & Lean Fill	10	--	125	--	N
Underpinning Blocks	20	--	100	--	N
Strip Footings, Isolated Column Footings, Raft Slab Footings ⁽³⁾	25	--	100	--	N
Piers and Columns Isolated ⁽³⁾	25	--	100	--	N
Piers and Columns cast monolithic with walls ⁽³⁾	to match wall concrete				
Piers and Columns Exterior ⁽³⁾	35 ⁽⁶⁾	0.40	100	5~8	C-1
Grade Beams - Exterior	25	0.55	100	4~7	F-2
Grade Beams - Interior	25	--	100	--	N
Walls Foundation - Exterior	25	0.55	100	4~7	F-2
Walls Foundation - Interior	25	--	100	--	N
Walls Shear Wall Exterior Foundation	30	0.55	100	4~7	F-2
Walls Shear Wall Interior Foundation ⁽⁴⁾	30	--	100	--	N
Retaining wall – Exterior	35 ⁽⁶⁾	0.40	100	5~8	C-1
Interior Slabs on Grade	25	0.50 ⁽⁸⁾	100 ⁽¹⁰⁾	--	N
Interior Slabs on Composite Steel Deck	25	0.55 ⁽⁹⁾	100	--	N
Suspended Slabs – Interior ⁽⁷⁾	30	--	100	--	N
Suspended Slabs - Exterior	35 ⁽⁶⁾	0.40	100	5~8	C-1
Housekeeping Pad	20	--	100	--	N
Topping ⁽⁵⁾	30	0.55	100	--	N

Footnotes:

- (1) Concrete slump for all concrete is 75mm plus or minus 25mm unless prior approval for mix and placement procedure is received from the Consultant. Slump shown in table is maximum value prior to addition of water reducing agent.
- (2) If concrete is placed by pumping, addition sampling and air content testing is required at pump discharge.
- (3) Unless noted otherwise in Column and Footing Schedule.
- (4) Refer to shear wall elevations and/or schedules for concrete properties not specified here.
- (5) Toppings less than 100 mm in thickness to have 10 mm maximum coarse aggregate.
- (6) 56-day compressive strength.
- (7) Unless noted otherwise on plan.
- (8) 0.40 for polished concrete areas.
- (9) 0.45 for polished concrete areas.

10) Interior slabs on grade to have slump 50-100mm without super P, 125-175mm with super P. For polished concrete floors maximum slump to be 80mm after addition of water Reducing agent.

3.1.6 Provide an approved water-reducing admixture in all concrete. (Obtain approval before using during hot weather).

3.1.7 Concrete exposed to freeze/thaw conditions shall be air entrained controlled at 5% plus or minus 1%.

3.1.8 **Do not use calcium chloride or products containing calcium chloride in concrete.**

3.1.9 Maximum size of coarse aggregate shall be 19mm, toppings less than 100 mm in thickness to have 10 mm maximum coarse aggregate.

3.2 INSTALLATION

3.2.1 Clean equipment, for mixing and transporting concrete, of hardened concrete and foreign materials before and after use.

3.2.2 Place concrete as rapidly and as near as possible to its final position.

3.2.3 Transport concrete, from mixer to place of final deposit by methods which will prevent separation or loss of ingredients.

3.2.4 Remove debris including ponded water from places to be occupied by concrete prior to pouring.

3.2.5 Concrete free fall not to exceed 2m.

3.2.6 Concreting once started shall be a continuous operation until placing of section is completed. Do not permit cold joint to develop.

3.2.7 Thoroughly consolidate concrete during and after placing by spading and vibrating to work concrete around reinforcement, water bars or other embedded materials. This includes footings.

3.2.8 Do not spread concrete horizontally into place by means of vibration.

3.2.9 Ensure that finished concrete is dense, uniform, free of air holes and honeycombs and that no segregation of cement paste and aggregate occurs.

3.2.10 Maximum time between batching materials and placing concrete is 1.5 hours.

3.2.11 Remove snow and ice from hardened concrete or forms with hot air.

3.3 FOOTINGS

3.3.1 Place footings on undisturbed soil or engineered fill as outlined on drawings.

- 3.3.2 Construct footing commencing from lowest elevation and proceeding to higher elevations.
- 3.3.3 Form sides of footings. Forms for footings shall be full depth for column footings. For wall footings forms shall be footing depth or less 20mm maximum.
- 3.3.4 Depths of footings called for on drawings are minimum.
- 3.3.5 Concrete shall not be placed until subgrade has been inspected and approved.
- 3.3.6 All footings shall be centered under load bearing elements unless approved otherwise in writing by the Engineer.

3.4 SLABS ON EARTH - Interior

- 3.4.1 All floor on grade shall be as outlined on drawings.
- 3.4.2 Concrete shall not be placed until subgrade has been inspected and approved.
- 3.4.3 Isolate all floors on grade from perimeter walls.

3.5 EXTERIOR SLABS

- 3.5.1 Provide slabs and curbs as detailed on drawings, of 32 MPa concrete.
- 3.5.2 Concrete shall contain entrapped plus entrained air controlled at 5% plus or minus 1%.
- 3.5.3 Place slabs over 150mm deep bed of granular "A".
- 3.5.4 Divide slabs with isolation joints at 6m maximum centers, at edge of building and along curbs. Provide false joints at 2 m maximum centers between isolation joints.

3.6 CUTTING AND PATCHING

- 3.6.1 Break out and make good all temporary openings in concrete work for pipes, conduits, ducts, shoring and other such work during construction using a mix or mortar of the same proportions as the surrounding work and finished to match surrounding work.

3.7 FINISHING OF FORMED SURFACES

- 3.7.1 Exposed surfaces: Immediately after stripping of forms, surfaces shall be inspected before any repairing or surface treatment is started.
- 3.7.2 Concrete members which are patched without approval will be classified as

defective work and may be required to be removed.

- 3.7.3 Remove honeycombed and other defective surfaces down to sound concrete, thoroughly wet, including surrounding areas, and repair with patching mortar containing bonding agents.
- 3.7.4 Producing smooth surfaces by means of cement plaster will not be permitted.
- 3.7.5 Walls shall have fins ground smooth, plastic cones removed and form ties cut back.
- 3.7.6 Fill tie holes with patching mortar containing an approved bonding agent.
- 3.7.7 When forms are removed before concrete is seven days old, cure surfaces immediately.

3.8 MISCELLANEOUS CONCRETE ITEMS

- 3.8.1 Filling In: Fill in holes and openings left in concrete structures for the passage of work of other trades, unless otherwise directed, after the work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in-place construction. Provide all other miscellaneous concrete filling to concrete block lintels, solid courses, beams, etc. to complete the work.
- 3.8.2 Miscellaneous Concrete Work: Provide all miscellaneous foundations, piers and slabs as detailed on the drawings.
- 3.8.3 Concrete for Exterior Curbs and Landscaping: Provide and install curbs and bands of 32 MPa, air entrained and concrete sawcut control joints at 1.5m on centre at corners and depress where indicated.

3.9 REMEDIAL WORK

- 3.9.1 General: Reinforce or replace deficient work as directed by the Consultant and at no additional cost to the Owner.
- 3.9.2 Patching: Repair defective areas and fill form-tie holes and similar defects in accordance with Chapter 9 of ACI 301. Where, in the opinion of the Consultant, surface defects such as honeycomb occur, repair the defective areas as directed by the Consultant.

END OF SECTION

PART ONE - GENERAL

1.1 DESCRIPTION

- 1.1.1 Work Included: Provide all concrete finishing, complete, as indicated on the drawings, specified herein, and needed for a complete and proper installation.
- 1.1.2 Related work described elsewhere:
 - .1 Section 03300 – Cast-in-Place Concrete

1.2 QUALITY ASSURANCE

- 1.2.1 Standards:
 - .1 Comply with CAN/CSA A23.1 and the requirements of the Concrete Floor Contractors Association.
 - .2 In case of conflict between the reference standards, the more stringent requirements shall govern.

1.3 QUALIFICATIONS

- 1.3.1 Only skilled competent workmen, familiar with products and their application shall be permitted to perform work.

1.4 TOLERANCES

- 1.4.1 Allowance shall be from level given on Drawings, as determined by straight edge placed anywhere on the slab in any direction.
- 1.4.2 Finishes with a Class A tolerance shall be true planes within 6mm using a 3m straight edge (1/4" in 10'-0").
- 1.4.3 Finishes with a Class B tolerance shall be true planes within 6mm using a 1m straight edge (1/4" in 3'-0").

PART TWO - PRODUCTS

2.1 MATERIALS

- 2.1.1 Use only materials specified.
- 2.1.2 Use materials in accordance with manufacturer's specifications. Have manufacturer's representative on site when material application is not familiar.

2.2 CURING AND SEALING COMPOUND

- 2.2.1 Acrylic cure and seal - CPD.
- 2.2.2 Clear Seal 150 - Grace Construction Ltd.

- 2.2.3 CS-309-20 by W. R. Meadows.
- 2.2.4 Alternate materials approved equal.

2.3 FILLER IN SAW CUTS

- 2.3.1 Rezi-weld-flex by W. R. Meadows.
- 2.3.2 Loadflex – Sika.
- 2.3.3 Alternate materials approved equal.

PART THREE - EXECUTION

3.1 FLOATING

- 3.1.1 After all bleed water and water sheen has left the concrete surface and concrete is stiffened enough to walk on, mechanically float large open concrete surfaces using a machine fitted with float blades on a steel disc. Shake applied floor hardener is to be applied according to manufacturer's instructions to achieve a uniform surface.

3.2 STEEL TROWELLING

- 3.2.1 Machine or hand trowel concrete to produce a hard, smooth surface.
- 3.2.2 Repeat trowelling, with necessary time intervals in between to allow concrete to further harden until desired finish is achieved.
- 3.2.3 Keep trowel blades relatively flat for initial trowelling, raising blade on angle with subsequent passes.

3.3 GRINDING

- 3.3.1 Where steel trowel finish is not of specified quality, remove ridges, undulations or other imperfections by grinding.

3.4 CURING AND PROTECTION

- 3.4.1 Protection and curing of concrete in accordance with Section 21 of C.S.A. Standard CSA-A23.1.
- 3.4.2 Maintain all equipment and materials for the protection and curing of concrete on site, ready to use before concrete placing is started.
- 3.4.3 Cover walls, piers, columns, beams, and slab edges with wet burlap or tightly wrap with properly lapped 4 mil polyethylene sheeting, immediately after stripping to continue the curing periods. (Surfaces which will not be exposed to

view, or which will not have other surface treatment may be sprayed with curing compound after stripping).

- 3.4.4 Cure horizontal surfaces immediately after finishing operations, but not later than 12 hours, in normal weather, after concrete is placed. Floor and roof slabs shall be kept constantly damp for 14 days by fog spraying or completely covered with wet burlap or 4 mil polyethylene sheeting, properly lapped at side and edge laps and weighted down immediately after finishing, or by the application of Sika FLOR-SEAL or equivalent curing and sealing compound. **Polished** concrete surface shall be completely covered with wet burlap or 4 mil polyethylene sheeting.
- 3.4.5 Cover sidewalks, curbs, gutters, and exterior paved areas with wet burlap or polyethylene sheeting.
- 3.4.6 A sprayed-on membrane curing compound may be used for surfaces listed under paragraph 3.4.3, 3.4.4 and 3.4.5, in lieu of polyethylene sheeting for concrete poured between April 1st and October 14th, except as follows: Floor areas or wall surfaces which are to have topping, **polished** concrete surface or other specialty surface treatments are not to have spray-applied compounds employed but must be polyethylene cured. Coordinate with the flooring contractor to ensure compatibility with flooring adhesives.
- 3.4.7 Freshly finished floors are not to be used for seven (7) days after completion and only light use is permitted for an additional 7 days.
- 3.4.8 Make good cracking and/or reduced strength and/or curling due to concrete drying out too rapidly. Assure that concrete is placed on thoroughly dampened subgrade, except where a poly vapor barrier is used.
- 3.4.9 Protect concrete from harmful effects of heaters, mechanical shock, sunshine, drying winds, cold weather and running or surface water.
- 3.4.10 No materials shall be piled, stored, shovelled or handled on slabs, across slabs, until seven days after placing concrete.

3.5 CONTROL JOINTS

- 3.5.1 Sawcut control joints in slabs on grade. Locate control joints where shown on drawings but in any case of sufficient quantity and at locations to have maximum uncut dimensions of **3.6m** (3.0m for polished concrete surface) in any direction and at all reentrant corners. Cut shall be **3.2mm** wide and one fourth of slab thickness deep. Flush out sawcut immediately with water.
- 3.5.2 Make sawcuts no sooner than 12 hours or later than 24 hours after finishing, depending upon curing conditions. Alternatively, use the "soft" cut technique where directed by the Engineer. Do not fill sawcuts for at least 28 days.

- 3.5.3 After 28 days, clean out sawcuts using brushes and compressed air, removing all dirt and foreign material. Fill sawcuts with specified filler. Finish to match surrounding surfaces.

3.6 SLABS

- 3.6.1 Top of all concrete floor slabs and toppings shall be steel trowel finished to Class A tolerance, except for floors receiving carpet, tile or quarry tile to be Class B.

END OF SECTION

1. GENERAL

1. Description:

1. The General conditions of the Contract and Supplementary General Conditions apply to this Division, except as qualified herein and/or excluded.
2. Refer to all available drawings and specifications.

2. Work Included:

1. Design, supply, delivery and installation of:
 1. Precast concrete architectural wall components at sills, bands and cap at roof parapet of tower.
 2. Field sealing and sealant of all precast concrete wall units inside and outside between precast panels, between precast parapets and tops of wall.
2. Take delivery and cast into precast work boxes/inserts/openings required by other trades.
3. Review of shop drawings of structural steel supplier. Supply information for installation of bracing, supports, inserts and similar accessories that are required for work under this contract to be supplied and installed by others.

3. Reference Standards:

1. CSA A23.1-94, Concrete Materials and Methods of Concrete Construction
2. CSA A23.2-94, Methods of Test for Concrete
3. CSA A23.3-94, Design of Concrete Structures
4. CSA A23.4-94, Precast Concrete-Materials and Construction
5. ASTM C494, Guidelines for the Use of Admixtures in Concrete
6. ASTM C494, Guidelines for the Use of Superplasticizing Admixtures in Concrete
7. CSA A283-1980, Qualification Code for Concrete Testing Laboratories
8. CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles

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9. CSA W186-M1997, Welding of Reinforcing Bars in Reinforced Concrete Construction
 10. W47.1-97, Certification of Companies for Fusion Welding of Steel Structures
 4. Qualifications of Manufacturer:
 1. Fabricated precast concrete elements shall be supplied by manufacturers certified by the Canadian Standards Association in the appropriate category(ies) according to CSA Standard A23.4-94 "Precast Concrete - Materials and Construction". The precast concrete manufacturer shall be certified in accordance with the CSA Certification program for Architectural and Structural Precast Concrete prior to submitting a tender and must specifically verify as part of his tender that he is currently certified in the appropriate category: Precast Concrete Products - Architectural (I) Non-Prestressed. Only precast concrete elements fabricated by certified manufacturers are acceptable to the Owner. Certification must be maintained for the duration of the fabrication and erection for the project.
 2. The precast concrete manufacturer shall have a proven record and satisfactory experience in the design, manufacture and erection of precast concrete units of the type specified. The company shall have adequate financing, equipment, plant and skilled personnel to detail, fabricate and erect the work of this Section as required by the Specification and Drawings. The size of the plant shall be adequate to maintain the required delivery schedule.
 5. By-Laws and Codes:
 1. Conform to applicable requirements of Province, of Ontario Building Code, National Building Code as currently amended, and local authorities having jurisdiction.
 2. Design and provide reinforcement, anchors and supports as required by codes and to Consultant's approval. Submit relevant design data prepared by a qualified structural engineer for approval if so requested by the Consultant.
 6. Allowable Tolerances:
 1. Conform with requirements of CSA A23.4-Section 10, except as noted herein.
 2. Refer to related Sections of this Specification and fabricate work to accommodate specified tolerances.
 7. Source Quality Control:

1. In addition to quality control test specified above, an independent inspection and testing company may be appointed by the Owner to verify compliance with this Specification.
2. Cooperate with Inspector to facilitate his work.
3. Cost to be paid from cash allowance specified under Section 01210.
8. Shop Drawings:
 1. Prepare and submit shop drawings in accordance with the General Conditions of the contract, CSA-A23.4 and CSA-A23.3, and as specified below. Submit in accordance with Section 01330.
 2. Submit fully detailed and dimensioned drawings showing method of fastening and sealing and provisions made to receive work of other Sections. Indicate type of finish and other pertinent information on each shop drawing.
 3. Consult reviewed shop drawings relating to interface elements and show exact location of inserts and anchors required to be cast in precast units for interface elements.
 4. Show system of identifying units for erection purposes on shop drawings and apply similar mark on units at time of manufacture.
 5. Provide Shop Drawings to and obtain approvals from the Authorities having jurisdiction prior to fabrication of the precast panels.
 6. Each drawing submitted shall bear stamp and signature of qualified professional engineer registered in Province of Ontario for the design, review and calculation of these precast units.
9. Samples:
 1. Provide samples of precast units of each profile for approval. Unless otherwise noted, minimum size 300 x 300 x 25 mm. Colour to be selected by Architect and finish as described under "finishes" elsewhere in this Section. Make samples until final unconditional Consultant's approval is obtained. All work shall match approved production run samples.
10. Warranty:
 1. Provide standard warranty with a duration of 2 years in accordance with General Conditions. Warranty shall be in writing and shall warrant work under this Section to be free from defects for the period stipulated.
11. Delivery, Storage and Protection:

1. Accept full responsibility for delivery, handling and storage of units.
 2. Deliver, handle and store precast units in a near vertical plane at all times, and by methods approved by the manufacturer. Do not permit units to contact earth or staining influences or to rest on corners. Do not stockpile defective units but remove from site.
 3. Construct easels for stacking units and place non-staining spacers between each unit. If wood is used it shall be wrapped with polyethylene.
 4. Protect holes and reglets from water and ice during freezing weather.
12. Design:
1. Requirements: Design and fabricate units, brackets and anchorage devices so that when installed they will:
 1. Compensate for unevenness and dimensional differences in structure to which they are secured.
 2. Tolerate structural deflection of span/360 due to live load and distortion of structure, under design criteria conditions, without imposing load on panel assembly.
 3. Adequately sustain precast panel loads, and superimposed wind, snow and rain loads, and seismic loads, without exceeding deflection of 1/360.
 4. Permit no water infiltration into the building under design loads.
 2. Design loads shall be as calculated from the Ontario Building Code based on 30-year probability.

2. PRODUCTS

1. Materials:
 1. Cement, colouring material, aggregates, water and admixture: to CSA-A23.4 and CSA-A23.1. Supplementary cementing materials: to CSA-A23.5-98. Allow for full range of tints available. Final colour for concrete to be selected by Architect.
 2. Exposed aggregate: dolomite. Finish sample to be submitted.
 3. Use same brand and source of cement and aggregate for entire project to ensure uniformity of coloration and other mix characteristics.
 4. Reinforcing steel: epoxy coated to CSA-A23.1.

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5. Forms: to CSA3-A23.4.
 6. Hardware and miscellaneous materials: to CSA-A23.1.
 7. Anchors and supports: to CSA-G40.21, Type [400W].
 8. Welding materials: to CSA W47.1-97 and CSA W186-M1997.
 9. Steel primer: to CGSB 1-GP-40M.
 10. Air entrainment admixture: to ASTM C260.
 11. Bearing pads: smooth, steel.
 12. Bearing pads: Neoprene, [60] durometer hardness to ASTM D2240, and [17] MPa minimum tensile strength to ASTM D412, molded to size or cut from molded sheet
 13. Shims: steel.
 14. Zinc-rich primer: to CGSB 1-GP-181M.
 15. Surface retardant: to ASTM C494.
 2. Concrete Mixes:
 1. Unless otherwise noted or specified, use concrete mix designed to produce a minimum of 35 MPa compressive cylinder strength at 28 days, with a maximum water/cement ratio to CSA A23.4.
 2. Use white or grey cement in facing matrix.
 3. Air Entrainment of Concrete Mix: Refer to CSA-A23.1
 4. Use of calcium chloride is not permitted.
 3. Reinforcement and Anchors:
 1. Attach reinforcement at intersections and weld anchors securely to reinforcement, all in accordance with CSA W.186.70.
 2. Galvanize, paint anchors after fabrication and touch up anchors with zinc rich primer after welding.
 3. Reinforcing Steel: To CSA G30.18.
 4. Fabrication:

1. Fabricate architectural precast concrete units to CSA - A23.4.
 2. Mark each precast unit to correspond to identification mark on shop drawings for location.
 3. Mark each precast unit with the date cast.
 4. Ensure that surfaces to receive sealant are smooth and free of laitance to provide a suitable base for adhesion. Ensure that release agents do not deleteriously affect the sealing of the joints.
 5. Cast panels face down in accurate rigid moulds designed to withstand high frequency vibration. Set reinforcing anchors and auxiliary items to detail. Cast in anchors, blocking and inserts supplied by other Sections as required to accommodate their work. Where possible, permanently attach anchors and inserts to the reinforcing. Vibrate concrete continuously during casting until full thickness is reached. Provide necessary holes and sinkages for flashings, anchors, cramps, etc. as indicated and/or required. Separately and accurately batch cement and aggregates uniformly by weight to ensure maintenance of even and uniform appearance.
 6. Reinforce panels and units with steel reinforcing bars sufficient to withstand handling stresses, temperature changes, wind loads as specified in P.B.C. based on 30-year probability and dead loads. If requested, provide justifying calculations for approval of reinforcing.
 7. Anchors, lifting hooks, shear bars, spacers and other inserts or fittings required shall be as recommended and/or designed by manufacturer for a complete and rigid installation. Each shall conform to requirements of local building by-laws and be of type satisfactory to Consultant. Lift hooks shall be adequately sized to safely handle panels according to panel dimension and weight. Anchors/inserts shall be concealed where practical.
 8. Burn off lift cables paint and fill in where required if unit is damaged due to burn off.
5. Finish:
1. Exposed aggregate finish.
 1. Apply even coat of retardant to inside face of forms.
 2. Remove panels from forms after concrete hardens.

3. Expose coarse aggregate by washing and brushing away surface mortar.
4. Expose aggregate to depth required to match existing.

3. EXECUTION

1. General:

1. Erect precast work in accordance with CSA-A23.4.
2. Supply anchors for precast units required to be cast into the concrete frame to the general contractor for installation. Provide such items in ample time to meet construction program. Supply layout drawings locating accurately the position of all cast-in items to be installed by other Sections.

2. Installation:

1. Set precast concrete units, straight, level and square.
2. Non-cumulative Erection Tolerances
 1. Joint dimension - Nominal 15 mm - to vary not more than +/- 6 mm.
 2. Joint taper - unit edges at joint not out of parallel over 0.6 mm in 300 mm (1/40" per 1 ft.) but not more than 2.9 mm total.
3. Edge alignment - alignment of panel edges not to exceed 6 mm.
4. Offset in faces of adjacent panels to be not more than 3 mm.
5. Bowed panels, within allowable bowing tolerances, arranged so offset between adjacent panels does not exceed 6 mm.
6. Fasten units in place by welding wherever possible. Protect work from damage by weld splatter.
7. Provide temporary erection anchorage for welded anchorage system.
8. Where bolts are used for installation, tighten with equal torque. Secure bolts with lock washers or tack-weld nut to bolt.
9. Clean field welds with wire brush and touch up with galvafruid paint or zinc rich primer.
10. Remove shims and spacers from joints between non-load bearing panels after fastening but before sealant is applied.

11. Provide and install sufficient temporary bracing to brace precast units adequately, at all stages of construction, so that units will safely withstand loads to which they may be subjected. This temporary bracing shall remain in position until all connections have been completed.
 12. Apply sealant and joint backing to exterior and interior joints to provide a complete weather tight installation in accordance with Section 07900. All exterior joints are to be vented.
3. Cleaning:
1. Clean exposed face work by washing and brushing only, as precast is erected, if required. Use precast manufacturer and architect approved masonry cleaner by ProSoCo, if washing and brushing fails to achieve required finish. Remove immediately materials that set up or harden.

End of Section

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One - General Requirements is a part of this Section and shall apply as if repeated here.

1.2 REFERENCE STANDARD

1. Do masonry mortar and grout work in accordance with latest CSA A179-M1994 edition except where specified otherwise.

1.4 SAMPLES

1. Samples of coloured mortar will be evaluated when built into mock-up wall. One colour to be built into mock-up for exterior masonry mock-up for the Architect's review.

PART 2 PRODUCTS

2.1 MATERIALS

1. Masonry Cement: Conform to requirements of CAN/CSA-A8-M93, Masonry Cement.
2. Sand: Conform to requirements of C.S.A. A82.56-M1976 "Aggregate for Masonry Mortar".
3. Water: Potable, free from injurious or other substances detrimental to mortar, or will cause efflorescence.
4. Portland Cement: Conforming to CAN/CSA-A5-M88, white or grey as indicated.
5. Hydrated Lime: Conforming to ASTM C207-79 "Specifications for Hydrated Lime for Masonry Purpose" Type S. Hydrated lime shall be "soaked" 48 hours before paste is mixed with sand.
6. Mortar Colour: Pigment type as supplied by Harcott Pigment Ltd. or approved equal colour to match masonry. Allow for one (1) colour at exterior areas where three (3) colours of masonry are used. Colour admixture not to exceed 10% of cement content by mass.
7. Use of any admixture to meet cold weather requirements is expressly forbidden.
8. Use King 1:1:6 factory bagged mortar by Sika Specially designed for laying brick with colour tinted to match existing mortar colour

2.2 MORTAR TYPES

1. Mortar types shall be as designated and conform to latest C.S.A. A179-M1994

edition, "Mortar and Grout for Unit Masonry".

2. The following mortar types shall be used:
 1. For masonry foundation walls and masonry in contact with earth - Type S.
 2. For interior block unit masonry above grade - Type S unless noted otherwise on plans.
 3. For clay brick masonry exterior (exposed) block veneer, quarried stone and glazed block - 1:1:6 Type "N" mortar.
 4. For structurally reinforced masonry walls - Type "S".

2.3 GROUT

1. To current CSA A179-M1994 standard. The following grout types shall be used:

<u>Type</u>	<u>Fine Grout</u>	<u>Coarse Grout</u>
Portland Cement - cu. ft.	1	1
Hydrated Lime (optional cu.ft.)	1/10	1/10
Damp Loose Sand - cu. ft.	2¼ to 3	2¼ to 3
Pea Gravel - cu. ft. -----	1 to 2	

2. Water - only enough to give creamy pouring consistency. Use a 1 cu. ft. (or metric box) in measuring portions for use in bond beams, lintels, and vertical cells.
3. Low lift grout as per structural drawings.
4. Grout Masonry components where indicated.

2.4 PARGING

1. Parging Mortar: Type M to latest CSA A179-M1994.

PART 3 EXECUTION

3.1 MIXING

1. Mortar used in the construction of unit masonry walls shall conform to C.S.A. A179-M1994.
2. Material proportions, acceptable compressive strengths, locations of use, incorporation of admixtures included in C.S.A. A-179-M1994, shall be modified as may be required by Jurisdictional Authorities.

3. Mix premixed 1:1:6 mortar as in strict conformance with directions provided by the manufacturer.
4. All grouting to conform to the requirements of CSA Standard CAN3-A371-M84.

3.3 TESTING

1. Testing of mortar materials will be carried out by testing laboratory designated by Architect.
2. Submit samples of sand and water for testing to ensure that mortar will not produce efflorescence.
3. Submit samples of sand and water and premixed mortar for testing to ensure that mortar will not produce efflorescence.
4. Mortar shall be tested in accordance with the requirements of clause 4.4.1 in CSA S304.1-94 and CSA A179-94.
5. Testing shall be completed for each 250 m² of masonry, for each storey.

END OF SECTION

1 GENERAL

1.1 Summary

1.1.1 This section to conform to Division 1, General Requirements.

1.1.2 Work included in this Section: The preparation and supply of mortar for all masonry work.

1.2 Related Work Specified Elsewhere

1.2.1 Masonry Procedures: Section 04050.

1.2.2 Specialty Restoration Mortar: Section 04101.

1.2.3 Masonry Accessories: Section 04150.

1.2.6 Masonry Cleaning: Section 04510.

1.3 References and Definitions

1.3.1 Do masonry work to CSA A179M-1976 except where specified otherwise.

1.3.2 Mortar is defective when it is cracked, spalled, chalked, dusted or otherwise crumbling and excessively weathered back or when the Architect states so in writing.

1.4 Submissions

1.4.1 Submit samples, and obtain approvals as specified in Section 04050, Masonry Procedures. Submit the following:

1.4.1.1 Dried 100 mm diameter mortar patties, 20 mm high, for colour match and testing.

1.4.1.2 Dried 50 mm cubes for testing.

1.4.1.3 Submit three (3) samples of each type of mortar prepared, dated and labelled as to batch and mortar type.

1.4.1.4 Submit 50 mm cubes for testing as requested throughout the job. Where testing determines samples do not meet those approved, additional cubes will be required to be submitted at no cost to Owner.

2 PRODUCTS

2.1 Materials

2.1.1 Water: potable, clean and free from contaminants.

2.1.2 Aggregates:

2.1.2.1 Sand: to CSA A82.56M, Aggregates for Masonry Mortar sharp, screened and washed pit sand, free of any organic material, grading and colour to approval of architect as follows:

- .1 Provide custom blended sand conforming to the following sieve analysis for joints in excess of 8 mm wide:

<u>Sieve Size</u> <u>Retained on each sieve</u>	<u>Percentage by Weight</u>	<u>Percentage by weight</u> <u>passing each sieve</u>
No. 4 (4.75 mm)	00	100
No. 8 (2.36 mm)	10	90
No. 16 (1.18 mm)	20	70
No. 30 (600 microns)	20	50
No. 50 (300 um)	20	30
No. 100 (150 um)	15	15
No. 200 (75 um)	15	0

- .1 Provide custom blended sand conforming to the following sieve analysis for joint less than 8 mm wide:

<u>Sieve Size</u> <u>Retained on each sieve</u>	<u>Percentage by Weight</u>	<u>Percentage by weight</u> <u>passing each sieve</u>
No. 4 (4.75 mm)	00	100
No. 8 (2.36 mm)	00	100
No. 16 (1.18 mm)	10	90
No. 30 (600 microns)	20	70
No. 50 (300 um)	30	40
No. 100 (150 um)	25	15
No. 200 (75 um)	15	0

2.1.2.2 Stone Dust: Granite dust and sandstone dust ground to pass 600 micron sieve.

2.1.2.3 Hydraulic Lime: Fresh hydraulic lime, finely ground, moderately hydraulic. Acceptable product: Riverton air entrained hydraulic lime, available from Liner Rolpanit.

2.1.2.4 Lime: Hydrated, high calcium non-hydraulic lime.

2.1.2.5 Pozzolan: Fresh Metakaolinite reative pozzolanic powder. Acceptable product: Metastar, available from Liner Rolpanit.

2.1.2.6 Admixture for Colour: inorganic pigment, dry powder, mineral oxide type, as manufactured by Harcross Pigments Canada, Toronto, Ontario. Provide custom blended pigment as required, to match existing mortar colors.

2.2 **Sources**

2.2.1 Use same manufacturer brands and suppliers for sources of mortar materials for entire project.

2.3 Equipment

2.3.1 All lime putty based mortars are to be prepared in a mortar mill comprising a mortar pan with adjustable cast iron sprung rollers on a cranked roller shaft and will steel scrapers and blades. Acceptable equipment: Rolpanit roller pan mixer by Liner Rolpanit [North American] Inc., or approved equal.

2.3.2 All mortars prepared from dry ingredients may be mixed in paddle mixers.

2.4 Grout Mix

2.4.1 Grout: One tenth (1/10) part Metastar, one (1) part hydrated lime, three (3) parts fine sand, and from five (5) to seven (7) parts water depending on viscosity required; all by volume.

2.5 Back-Pointing, Bedding, Pointing and Repair Mortars

2.5.1 Mortars are based on the proportion specifications of CSA A179M-1976.

2.5.2 Mortar for limestone generally: Type N mortar - one (1) part Portland cement, one (1) part hydrated Lime and (6) parts sand.

2.5.3 Prepare mortar to match existing at Hugh Foster Hall in colour and size of aggregate.

2.5.4 Repair mortars for carrying out mortar fills to existing stone: refer to Section 04900, Stone Conservation.

3 EXECUTION

3.1 Preparation of Grout

3.1.1 Prepare grout in quantities that can be used in 30 minutes only.

3.1.2 Prepare grout by thorough mixing to fully blend constituents to form a pouring consistency grout.

3.1.3 Keep stirring at regular intervals throughout use until grout is placed to prevent settling of solids.

3.1.4 Strain mix through sieve (maximum No. 50/300 microns) to remove solids that would impede pouring and filling of voids.

3.1.5 Use grout within 30 minutes of initial mixing.

3.1.6 Discard all grout mixed beyond 30 minutes.

3.2 Preparation of Mortars

3.2.1 Preparation of Hydraulic Lime/Aggregate Mortars:

3.2.1.1 Prepare masonry boxes and equipment as for all mixes.

3.2.1.2 Prepare blend of aggregates and pigments as determined previously.

3.2.1.3 Thoroughly blend the materials dry in a paddle mixer, gradually adding the hydraulic lime and non hydraulic lime to ensure its complete and even distribution throughout the mix.

3.2.1.4 Add small measured quantities of water, mixing for approximately three (3) minutes after each addition of water. Mix lime putty and sand thoroughly in mortar mill for a total of 5 more minutes once the correct water content is reached.

3.2.1.5 Add just sufficient water to produce a plastic mortar that will hang on the trowel.

3.2.1.6 Allow mix to sit for 15 minutes then re-mix for a further 5 minutes

3.2.1.7 Use within one (1) hour. Do not re-temper.

3.2.2 Bulking of Sand and Aggregates:

3.2.2.1 Bulking is the increase in volume of dry sand when it becomes damp.

3.2.2.2 Damp sand can occupy as much as one-third (1/3) more volume than either dry or saturated sand.

3.2.2.3 Damp sand can be used, however, if its volume is adjusted for bulking.

3.2.3 Test and Adjustment of Sand Quantities for Bulking:

3.2.3.1 Test sand to be used in mortar for bulking at the start of the work, after each new delivery of sand and any severe change in weather.

3.2.3.2 Obtain a sample of sand which accurately reflects the average condition of the pile of damp sand, by the following methods:

- .1 Take four (4) shovelfuls of sand, each from a different level of the pile, and mix thoroughly.
- .2 Place this sand in a conical pile and divide into four (4) quarters with a board. Remove 2 opposite quarters from the pile, and combine the two (2) remaining quarters and mix thoroughly.

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- .3 Repeat this quartering and mixing procedure until a sample of the size required for testing remains.
- 3.2.3.3 Fill a 1-litre capacity jar, about two thirds full with the damp sand to be tested. Drop the sand in loosely. Do not pack it in. Level off the surface, then measure the depth of the damp sand (D).
- 3.2.3.4 Empty the sand into another container, being careful not to lose any, and half fill the first container with water.
- 3.2.3.5 Pour back about half of the test sample of sand slowly into the water so that it is entirely saturated. Rod it thoroughly to remove any air.
- 3.2.3.6 Add the rest of the sand, rodding again to remove, and level off the surface. Measure the depth of the saturated sand (S), which will be less than the depth of the damp sand.
- 3.2.3.7 Calculate the percentage bulking, using formula: $[(D-S) \times 100\%]/S = \text{percentage bulking}$; where D = depth of damp sand, and S = depth of saturated sand.
- 3.2.3.8 When batching the sand for use in mortar, increase the volume of the sand used by the percentage bulking shown in the test. For example, if the mortar mix is a standard 1:1:6 mix requiring 6 parts of sand and the percentage bulking is found to be 20%, the volume of sand used in the mortar should be: $(6 \times 12)/100 = 7.2$ parts. To adjust for bulking, the actual mortar mix will therefore be 1:1:7.2 when this same damp sand is being used.
- 3.2.4 Preparation of Coarse Stuff:
- 3.2.4.1 Prepare measuring boxes to ensure accurate proportioning of lime putty and aggregates.
- 3.2.4.2 Take lime putty from bins, siphon off water by screening lime through muslin to remove excess water.
- 3.2.4.3 Adjust aggregate for bulking as described above.
- 3.2.4.4 Mix lime and sand thoroughly in paddle type mechanical mortar mixer for minimum ten (10) minutes. Do not add water.
- 3.2.4.5 Lime sand coarse stuff may be stored indefinitely if protected from air by storing in plastic air-tight bins.
- 3.2.5 Gauging of Coarse Stuff with Setting Aids [Hydraulic Lime, Pozzolan, Cement] and Pigments:
- 3.2.5.1 Rework coarse stuff to regain workability prior to gauging with setting aids as follows:

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- .1 Remix in the mixer for ten (10) minutes and continue further beating, ramming, and chopping by hand, ensuring thorough mixing to produce stiff workable mix. **DO NOT ADD WATER.**
 - .2 Add mortar colouring additive and ensure thorough mixing with coarse stuff.
 - .3 Slurry setting aid where required to prevent “balling” and add the coarse stuff. Mix thoroughly for minimum five minutes to produce workable, plastic mix, just wet enough to allow the mortar to hang on a trowel.
 - .4 When gauging a setting aid with the coarse stuff the volume of coarse stuff is always equal to the total aggregate content, not the sum of the lime and aggregate. Thus a mix of 1 part setting aid to 3 parts lime and 9 parts sand will be gauged used 1 part setting aid to 9 parts of coarse stuff.

3.2.5.2 Measuring boxes are to be maintained for all mortar constituents.

3.2.5.3 Measuring container is to be maintained for the correct quantity of water for use in all batches.

3.2.5.4 Thoroughly clean all mortar boards, measuring boxes and mixer between batches.

3.2.5.5 Use mortar within two hours and without tempering. Tempering mortar will result in colour change where pigments are used.

3.3 **Mortar Colour**

3.3.1 Mortars are to be prepared to match the existing mortar colors.

End of Section.

1 GENERAL

1.1 Summary

1.1.1 This section to conform to Division 1, General Requirements.

1.1.2 Work Included in this Section:

1.1.2.1 Supply of masonry anchors, dowels and cramps.

1.1.2.2 Supply of accessories for repairs specified in Section 04500, Masonry Restoration.

1.2 Related Work Specified Elsewhere

1.2.1 Masonry Procedures: Section 04050.

1.2.2 Masonry Mortar: Section 04100.

1.2.3 Speciality Restoration Mortar: Section 04101.

1.2.4 Masonry Restoration: Section 04500.

1.3 References

1.3.1 Masonry anchors shall conform to CAN3-A370-M84, Connectors for Masonry.

1.4 Submissions

1.4.1 Comply with requirements specified in Section 04050.

2 PRODUCTS

2.1 Materials

2.1.1 Fasteners: brass or stainless steel screws.

2.1.2 Shields: nylon body expansion type.

2.1.3 Backer Rod: Polyethylene rope, extruded closed cell foam, non absorbent, 30% larger than joint.

2.1.4 Sealant: As per Section 07900

2.1.5 Primer: as recommended by sealant manufacturer.

MASONRY ACCESSORIES

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- 2.1.6 Solvent: MEK or as recommended by manufacturer.
 - 2.1.7 Isolation Tape: pressure sensitive, non-bonding to sealant.
 - 2.1.8 Asphalt Emulsion: brush or spray applied: eg: "Bakor 700-01".
 - 2.1.9 Burlap: clean, non-staining (with no printed matter) to approval of the Consultant
 - 2.1.10 Plumber's Hemp: asbestos free, non-oily jute rope.
 - 2.1.11 Brick ties equal to Stainless steel "FERO Pac Tie" with stainless steel "FERO V-ties, secured with manufacturer-recommended stainless steel anchors installed every other brick course vertically + max. 16" (400mm) off centre horizontally masonry weep hole and vents equal to "QV-Quatro Vent Weep Hole ventilators by Hohmann & Barnard Inc.
 - 2.1.12 Copper Flashing: 16 ounce cooper.
 - 2.1.13 Base wall flashing over 16 ounce copper flashing: Henry "Blueskin TWF" membrane or equal with Henry "Air Bloc 21" over all exposed joint edges. Both installed per the manufacturer's printed installation directions.
 - 2.1.14 Cavity Mortar stop mesh: Equal to "Mortar Net" ½" *13mm) thick x 10" (250mm) height 90% open mesh of high-density polyethylene.

3 EXECUTION

3.1 Installation

- 3.1.1 The installation of masonry accessories are described in Section 04500, Masonry Restoration.

End of Section.

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One - General Requirements are part of this Section and shall apply as if repeated here.

1.2 REQUIREMENTS OF REGULATORY AGENCIES

1. Conform to the latest Ontario Building Code, as currently amended and Local Bylaws, except where indicated otherwise on drawings or specified herein. In case of conflict between Codes, the Ontario Building Code will govern.

1.3 STANDARDS

1. Materials, equipment, and practice shall conform to CSA3-S304-14 and CSA-A371-14, Masonry Code of Practice and CAN/CAN/CSA-A82-14 for brick. Brick masonry units must comply to CAN3-A82.2 M78 and concrete masonry units shall comply to CSA A165 Series-14. Brick masonry units must not have a greater Saturation Coefficient than .78 as set by test method CAN3-A82.2 M78 and must meet specifications CAN/CAN/CSA-A82-14 for SW grade FBX type brick. Brick masonry units will be tested once they are delivered to the site and shall not be installed until testing is complete and units have surpassed the tests.
2. Work of this section to comply with "Plain and Reinforced Masonry-Canadian Structural Design Manual" Supplement to the National Building Code of Canada and CSA-A371-14.
3. Ensure fire rated walls, partitions or separations are in accordance with "Fire Performance Ratings Supplement" of the National Building Code of Canada.

1.4 SAMPLES

1. Construct 3'-0" (900 mm) high by 6'-0" (1800 mm) long wall with 3'-0" (900 mm) long corner return sample masonry wall on site (separate from building) where directed by the Architect. Construct one cavity wall panel of the types of brick, stone and block. Construct with mortar, masonry specified and approved by the Architect, to show colour range, texture, banding, bond, and flashing, joint reinforcement, flashings, membrane flashings, cavity insulation, air vapour/barrier system, weepers, and mortar joints. Construct as many times as required to provide a wall to the satisfaction of the Architect, before commencing masonry work. Prepare similar panels for approval using, acoustical sound block, and all other architectural block types specified.
2. Remove rejected sample walls. Protect approved sample wall from damage and retain in place through duration of project until removal is directed by Architect.
3. Only masonry matching approved sample walls in all respects will be accepted for work of this project.
4. Submit brick and acoustic block samples for architect's choice of colour prior to ordering materials and constructing the sample wall.

1.5 DELIVERY AND STORAGE

1. Stockpile masonry units on platforms or other approved supports to keep units free from ground contact. Prevent staining of masonry units from contact with any material while stored. Secure waterproof covering entirely over each stockpile when masonry work not in progress.
2. Deliver, handle and store masonry units by methods which will guard against soiling or chipping. Protect all holes and reglets from water and ice during freezing weather.
3. Dry out units which fail to meet moisture content limitation during storage on job site and do not lay until tests prove satisfactory.

1.6 SPECIAL PROTECTION

1. Protect exposed masonry corners and projections by methods which will not mar finished surfaces.
2. Masonry stained or damaged shall be replaced as directed by Architect.
3. Cover tops of all walls with well-secured, approved, non-staining and waterproof material while work is not in progress and until satisfactorily covered by metal deck structure or roof membrane. Cover shall be at least 2'-0" (600 mm) wider than width of wall.
4. In cold weather protect masonry and heat materials as provided in CSA-A371-94 and "Recommended and Guide Specifications for Cold Weather Masonry Construction" available through Ontario Masonry Contractors Association. Maintain dry beds for masonry and use dry masonry units only. Do not wet masonry units in winter.
5. In hot weather, protect freshly laid masonry from drying too rapidly by means of waterproof, non-staining coverings.

1.7 SHOP DRAWINGS

1. Submit shop drawings in accordance with Section 01300 - Shop Drawings, Product Data, Samples and Mock-ups.
2. Show all interior and exterior wall elevations indicating all control joints and expansion joints.
3. Submit shop drawings of masonry ties stamped by a professional engineer licensed in the Province of Ontario.
4. Submit samples and shop drawings for Bent Metal Closures and Compartment Control Joints (CCJ).

1.8 DEFECTS DEFINED

1. In addition to non-compliance with specified requirements or other contract requirements, the following will be considered defects:
 1. shrinkage in individual units and erected work;
 2. spalling;
 3. poor colour of texture blending of units;
 4. surface deterioration, dusting;
 5. discolouration, crumbling and similar deterioration of mortar;
 6. failure of built-in items to remain anchored;
 7. chipped units - any chipped area on exposed surface.

1.9 EXTRA MATERIALS

1. Provide the following extra number of masonry units of each type of unit as follows. Store in building at job completion.
 1. Face Brick - 50 units
 2. Arch. Block – 50 units

1.10 ADDITIONAL CONCRETE BLOCK:

1. Include in base tender sum labour and material for an additional 30 m² of 190mm block installed for items not indicated on drawings or found field conditions on site.

PART 2 PRODUCTS

2.1 MATERIALS

1. Water: Clean, free from salts that will cause efflorescence and other substances detrimental to masonry.
2. Dampproof Coursing and Base Wall Flashing: Blueskin TWF by Bakor, ensure membrane is supported on a slope, where there is no support, copper TWF to be installed than Blueskin TWF over top and seal.
3. All Thru Wall Copper Flashings / Copper Drip Flashings: ASTM Specification B370, cold rolled, copper weighing not less than 16 oz. per sq. ft. (3.15 kg per square metre). Copper flashings are to be formed and installed where the word 'flashing', or 'metal flashing', or pre-fin. Metal flashing' are indicated on the drawings to suit flashings above window and door heads, at low roof high wall, at copper bellows, closures and waterstops locations, below window sills, etc. Cover top of copper flashing with Bakor Blueskin TWF membrane reinforced flashing at all locations by this section sealed to wall sheathing 200mm minimum

or in reglet in concrete block, both sealed.

4. Copper flashings are required at all locations where there is no continuous structural or rigid insulation support, especially at cavity locations.
5. Pre Fin. Metal Flashing (except where copper flashing required): to be powder coated to match adjacent wall material colour.
6. TWF Membrane / Base Membrane / Rein. Flexible Membrane Base Flashing: Bakor Blueskin TWF membrane reinforced flashing at all locations with "Air Bloc 21" by Bakor. Install below window sills; and below all metal flashing locations above low roofs at high wall locations, over top of all copper flashings above windows, doors, low roof high wall locations, etc.
7. Sealant: Tremco Dymeric 240 as per Section 07900.
8. Asphalt Emulsion: Conform to CSGB-37-GP-2M.
9. Joint Filler: purpose-made elastomer to ASTM D. 2240-81 of size and shape.
10. Control Joint: "RS Series – Rubber Control Joint", sizing to suit masonry widths as required as manufactured by Hohmann & Barnard Inc. or approved equal.
11. Masonry Weep Holes and Vents: "QV – Quatro-Vent" weep hole ventilator as manufactured by Hohmann & Barnard Inc. (colour to match mortar colour and as selected by Architect).
12. Joint Reinforcement:
 1. Exterior Walls: Fero or Blok-Lok Ltd. stainless steel Slotted Block Tie Connector Plate and V-Tie in combination with ladder type continuous joint reinforcing by Hohmann & Barnard Inc. The Block Shear Connector Plate length shall suit concrete block (inner wythe) width and thickness of insulation. The Fero V-Tie shall be of length to provide placement of V-Tie legs at centreline of veneer (outer wythe). Provide Block Shear Connector Plate Ties at 600 mm horizontal x 400 mm vertical spacing or as noted on drawings. All components shall be stainless steel in accordance with ASTM 79 - AISI Type 302 & 304.
 1. Below Grade Walls: 3/16" (4.7mm) diameter truss design stainless steel joint reinforcement at all below grade block walls by Hohmann & Barnard Inc. or Blok-Lok Ltd.
 2. Interior Walls: 9 ga. (3.66mm) truss design mill galvanized joint reinforcement at all interior walls as manufactured by Hohmann & Barnard Inc. or Blok-Lok Ltd.
 3. Sizes: 2" (50 mm) less than wall thickness.
 4. Rod Size: Side rods 3/16" (4.7mm) and cross rods 3/16" (4.7mm) unless noted otherwise.
 5. Provide prefabricated tees and corners at all locations.

6. Masonry Piers: 2" (50 mm) wide stainless steel ladder masonry reinforcing. The brick shall be tied back to the block with stainless steel "Zee" ties.
 7. Nailing Inserts: 26 gauge hot dipped galvanized steel 1" x 2¼" (50 mm x 55 mm) all metal wall plugs.
 8. Galvanizing: In conformance with ASTM A153 Class B2.
 9. Dovetail Anchor Slots and Ties: stainless steel dovetail anchor slots with minimum 9 gauge hot dipped galvanized dovetail triangle ties by Hohmann & Barnard Inc. or Block-Lok Ltd.
 10. "Z"-Tie: 3/16" (4.76mm) diameter "Z" Tie. See Structural Drawings for details. Provide galvanized finish at interior wall locations and stainless steel at exterior wall locations.
 11. Individual Column and Wall Columns: Hot dipped galvanized. For details see structural drawings.
13. Concrete Masonry Units: Standard Weight and Lightweight Units
1. The following concrete masonry units are to be autoclaved masonry units as manufactured by Boehmers or Day & Campbell:
 1. Standard Weight Concrete Masonry Units: to CSA-A165.1.
 1. Classification: H/20/A/M.
 2. Size: CCMPA metric modular. Sizes as indicated on the drawings.
 2. Lightweight Concrete Masonry Units: to CSA-A165.1.
 1. Classification: H/20/C/M.
 2. Size: CCMPA metric modular. Sizes as indicated on the drawings
 3. 75% Solid & Solid Concrete Masonry Units: to CSA-A165.1.
 1. Classification: S/20/A/M.
 2. Size: CCMPA metric modular. Sizes as indicated on the drawings
14. Bull Nose Cornering:
1. For concrete block (other than architectural concrete block) all vertical exposed outside corners and door jambs shall have a 1" (25 mm) radius and window jambs shall be pencil round radius. Provide square edge block for first course above finished floor and pencil round edge from the base course on. Round off the edge of first block course above the top of the base to match bull-nosed edge of other courses.

15. Concrete Acoustic Masonry Units:

1. Provide full size sample of at least 4 various colours along with specified to Architect for final colour selection prior to ordering. Provide pattern bond / configuration through shop drawings. Follow manufacturer pattern, instructions and guidelines for installation and basic care.

16. Acoustic Concrete Block: to CSA-A165.-1M and ASTM C90.

1. Manufacturer: Richvale York Block Inc
2. Size: CCMPA metric modular. Sizes as indicated on the drawings.
3. Product: Sound Cell, factory installed noise attenuating foam fillers meeting UL94 HF-1. These units shall not be cut.

17. Brick Masonry Units:

1. Provide full size sample of at least 4 various colour themes along with specified (+3 samples of specified variation in colour) to Architect for final colour selection prior to ordering. Provide pattern bond / configuration through shop drawings. Follow manufacturer pattern, instructions and guidelines for installation and basic care.

1. Brick Veneer: (Base Bid)

1. Manufacturer: Endicott Clay Products
2. Classification: CAN/CAN/CSA-A82-06 for SW grade FBX type brick and CAN/CSA-A82-06 testing
3. Size: Utility Size
4. Colour: Manganese Ironspot, Smooth finish
5. Product: Face Brick

2. Architectural Block Veneer (Base Bid)

Where indicated on drawing provide 90 x190 x390 architectural concrete block with smooth finish laid in stackbond as shown on the drawings. Products to be manufactured by Permacon, Richvale York, Brampton Brick or Day & Campbell. Colour to match Permacon Rockland Black or approved equal.

3. **NOTE DELETED AS PER ADDENDUM 3**

18. Cavity Wall Insulation:

1. See Section 07211 – Rigid Insulation and 07214 – Sprayed Foam Insulation / Air Vapour Barrier for installation execution requirements.

19. Building Paper Felt: 30 lb. building paper felt, (13600 g.).

20. Grouting and Steel Reinforcement for Vertical Reinforced Masonry (VRM):

1. Grouting and reinforcement steel to be supplied and installed by this section. All materials and installations to conform to structural drawings and specifications. Provide a mechanical device to hold vertical reinforcement at centres of block cores.
21. Cavity Closures: 12 gauge 304 Stainless Steel supplied and installed under Section 05500.
22. Compartment Control Joint (CCJ): 12 gauge 304 Stainless Steel supplied and installed under Section 05500.
23. Cavity Mortar Stop Mesh: equal to "Mortar Net" 1" (25mm) thick x 10" (250mm) height 90% open mesh of high density polyethylene.

2.2 DATE STONE

1. Contractor to install engraved date stone as part of base bid contract.
2. 400mm x 800mm x 100mm with blackened New Times Roman lettering 300 mm height. Engraving, location to later instruction.
3. Supply of date stone is by cash allowance. Installation of the date stone is included in base bid. Install where directed by Architect.

PART 3 EXECUTION

3.1 ERECTION

1. General Workmanship
 1. Install unit masonry work in complete conformance to governing requirements of Jurisdictional Authorities.
 2. Lay face work from face side. Perform work by skilled mechanics according to best standard practice.
 3. Lay masonry level, true to line, square, plumb, and as detailed. Vertical joints in perpendicular line.
 4. Distribute exposed masonry of varying colours, tones and textures, evenly over wall surface to avoid patches and streaks and to produce a homogeneous blend. Avoid using units that are too contrasting in appearance for satisfactory blending.
 5. Chipped or blemished units may only be used where concealed. Defective and broken units shall be rejected.
 6. Make joints uniform in size and tool to match sample joints. Unless specified or indicated otherwise tool all interior joints whether or not they are behind cabinets or fitments or drywall. Close all cracks and crevices. Strike off flush all joints in unpared masonry covered by earth. Press in flush joints at exterior cavity side of inner block wythe so no voids occur. No mortar shall protrude from joints on wall surfaces to which insulation

and waterproofing are to be applied. Rake out joints at juncture of masonry walls and columns on exterior and interior, as necessary to permit caulking detailed or specified, in walls to be plastered upon directly to provide bond, and where otherwise noted on drawings.

8. Fill all joints completely with mortar including webs. Buttering corners of units, throwing mortar scraping into joints, slushing, deep or excessive furrowing of bed joints not permitted. Do not shift or tap units after mortar has taken initial set. When work is resumed on walls previously laid, and which are either partially or totally set, remove all loose brick and mortar from top and adjoining surfaces. Remove mortar completely when masonry is removed and replace with new.
9. Wet clay and shale masonry units before placing as well as faces of such units in walls previously laid which are either partially or totally set and on which work is resumed. DO NOT wet concrete masonry units. Wetting shall ensure that complete hydration is permitted, but units shall be free from water adhering to their surfaces when they are laid. Wet units:
 1. During hot drying weather so that the mortar is not too rapidly dried;
 2. When their absorption rates are greater than 0.025 oz. per sq. in. (1 gram per sq. cm.) per min. so that rate of absorption when laid does not exceed this amount.
10. Brace walls and piers during construction until structure provides sufficient lateral support.
11. Extend masonry walls to underside of structure above unless indicated otherwise. Cut and fit masonry work as required. Install anchors at top of masonry to provide lateral support, to Structural Consultant's approval. Fill space at block walls at underside of steel deck solid to conform to code and at all interior partitions and at fire separations. Install formed metal closures where top of block and bottom of metal deck is exposed.
12. Build in steel lintels, base plates and wall plates, as specified in Division 5 and reinforced concrete lintels as specified in Division 3. Set steel lintels in a bed of mortar. Install steel reinforcement and grouting as noted and detailed on structural drawings.
14. Install hollow metal door frames with lintels where specified in masonry walls, in accordance with manufacturer's instructions to present a rigid, true, plumb installation.
 1. Note: Completely fill frames with mortar. Keep faces of frames free of mortar during installation and leave clean. Maintain protective coverings.
15. Build in water stops, bellows, bent closures, sheet metal flashings, accessories, access panels, and anchors required for frames, guards, sills, etc., and as otherwise provided in other sections. Cooperate in the setting and aligning of this work.

16. Work shall include damp-proof coursing and membrane reinforced flashing at base flashing as detailed.
17. Consult other trades (including Athletic Equipment Section 11500) and make necessary provisions to permit the installation of their work in a manner to avoid cutting, patching and fitting.
18. Supply and locate dovetail anchor slots in time for placing in concrete formwork at locations where masonry walls abut concrete and where anchorage is required. Install slots at 2'-0" (600 mm) on centre horizontally and install joint reinforcement ties at 16" o.c. vertically.
19. Where flashing, membrane reinforced flashing or waterproofing turns out and terminates in horizontal mortar joints at lintels, shelf angles, spandrels, bases and bottom of cavities in cavity walls, provide clear, free drawing weep holes in the mortar joints of outer wythes at 32" (800 mm) apart horizontally.
20. Chases shall be built, not cut.
21. Bearings and piers required for structural members shall be constructed as indicated on structural drawings.
22. Cut bricks, blocks, and stone to be used in exposed walls with carborundum saw and as per manufacturer's instructions.
23. Where low roof meets high wall leave out one masonry unit every 8'-0" o.c. at weep hole level at locations to be selected by Architect. At the appropriate time, this Contractor shall bring this matter to the architect's attention. These bricks are to be mortared in only when authorized by the architect.
24. A water test will be held by the Architect. This Contractor is to supply hose and water for this test upon Architect's request and carry out test under Architect's directions.
25. Install cavity mortar stop mesh 10" (250 mm) in height in bottom of air cavity space at all cavity wall locations and tops of all lintels or flashing at doors, windows and high wall low roof locations.

2. Concrete Masonry Workmanship

1. Lay out work to minimize cutting of units.
2. Use power driven abrasive disc for coping units and splitting units, or for cutting units to accommodate flush mounted electrical outlets, grilles, pipes, etc. Leave 1/8" (3 mm) clearance between edge of item and opening in masonry unit.
3. Use solid unit where bonding is required if webs of hollow blocks do not align one over the other.

4. Concrete masonry units will be rejected if face blemishes, smears or slicks appear whether wall is painted or not. Do not use chipped block where exposed to view.
 5. KEEP ALL CAVITY SPACES FREE OF MORTAR IN CAVITY WALLS.
 6. Use blocks with 1" (25 mm) radius vertical edges for external corners including door jambs and pencil round at window jambs. At bottom block course where quarry tile base is to be installed, install square edge outer corner block at first course for quarry tile installation and grind block external corner edge round to 1" (25 mm) radius above quarry tile base to top of first course.
 7. Where beams or lintels bear on concrete block walls, the blocks under the bearing shall be solid or filled with concrete for a depth of two courses and a width of 32" (800 mm) or as noted otherwise.
 8. Where joists bear on hollow masonry walls provide minimum 5½" (140 mm) solid masonry under joist bearing, where concealed masonry may be brick.
 9. Provide reinforced block lintels (where steel lintels are not indicated on Structural drawings):
 1. Over square head openings where noted and at all other locations as detailed on structural and architectural drawings.
 2. Over openings not exceeding 5'-0" (1500 mm) where no other support is shown, fill lintels solid with min. 3000 p.s.i. (21 m.p.a.) concrete and reinforce with min. two #5 steel bars; Note: Conform to structural drawings for bond beam reinforcing and concrete detailing
 3. Cast lintels at least 7 days before setting; provide bearing at ends as detailed on structural drawings min. 8" (200 mm).
 10. Where walls 12" (300 mm) and thicker have exposed face on both sides, lay block using two units in wall thickness.
 11. Exposed joints shall be concave unless indicated otherwise.
 12. Use lightweight concrete units for all exposed interior walls.
 13. Provide all structural work at masonry walls as indicated on structural drawings.
3. Brick/ Architectural Concrete Block Masonry Unit Workmanship
1. Lay all brick/architectural concrete block masonry units as detailed on drawings. Vertical and horizontal joints shall be 3/8" (10 mm).
 2. Fill the entire space between facing and back-up units with mortar. Keep all cavity spaces free of mortar in cavity walls.

3. Joints shall be tooled concave or as directed by Architect.
 4. Do not use chipped face unit where exposed to view.
 5. At some openings, units will have to be cut to fit at sills and lintels to suit coursing. See drawing details.
 6. Install stack bond coursing where indicated on elevations.
 7. All architectural concrete block mortar joints (cladding/veneer) shall line up with other concrete block mortar joints where abutting.
 8. All architectural concrete block (cladding/veneer) mortar joints shall line up with concrete block wall mortar joints behind.
4. Damp-proof Course
1. Lay dampproof course over tops of all foundation walls. Lap strips a minimum of 4" (100 mm) at junction and angles and install sealant to secure joints.
 2. Install dampproof course at floor level for all interior partition walls on floor slabs on grade
5. Flashings
1. All Thru Wall metal flashings that are unsupported by a rigid item, shown or required built into walls to be 16 oz./sq. ft. (3.15 kg/sq. m.) copper unless indicated otherwise.
 2. All Thru Wall flashings that are supported can be Bakor thru wall flashing membrane.
 3. Install metal wall flashings above structural supports, where low roof meets high walls projecting above; to support membrane reinforced flashing where it would cross a cavity and be unsupported; above windows; above doors; and where indicated on drawings.
 4. Unless otherwise shown, flashing extends through exterior wythe of masonry and carried 8" (200 mm) minimum up the exterior face of interior wythe. Terminate top edge of flashing 3/4" (19 mm) inside a horizontal mortar joint. Rake joint.
 5. All metal wall flashings shall be placed to direct any moisture to the exterior of a wall (slope mortar below) and step flashing vertically to form a positive dam, with outside edge set in a mineral colloidal asphalt emulsion Type 2 or equal. Ends of all metal flashings to have a 1" (25 mm) up turn at ends to direct moisture to the exterior of the wall.
 6. All formed copper flashings to be preformed to shape shown on drawings. Drip to be 1/4" (6 mm) at 45 degrees F. (7.2 degrees C.) at exterior face of brick, except flashings at lintel ends to be trimmed flush. Lap seams 6"

(150 mm) with three (3) or more beads of sealant between copper.

7. Cover entire top side of copper flashing with membrane reinforced flashing by this section.
8. At stepped flashings at high walls above low, turn up ends of flashing to maintain a positive water flow out of the cavity wall.
9. Blueskin TG to form flashing at base of all cavity walls at grade and Blueskin TWF over all formed copper flashings where membrane is not supported by structure. Lap all seams a min. 4" (100 mm) and secure entire surfaces with adhesive.
10. At low roof high wall flashing locations install a reinforced membrane flashing below the copper flashing as well as Blueskin TWF above. The lower reinforced membrane flashing is to tie down into roof membrane.

6. Shrinkage Control Joints

1. Work shall include shrinkage control joints in wall constructed entirely or partially of masonry units manufactured of concrete:
2. At all locations indicated on drawings.
3. Provide additional interior control joints at junction of walls and columns at maximum horizontal spacing not exceeding 20'-0" (6 mm) in runs of walls where no openings occur at all locations where control joints are not indicated. Obtain Architect's approval of additional control joints prior to proceeding. Carry joints from support of wall to top of wall at structure above.
4. Control joints shall be constructed as detailed and shall provide a complete vertical separation through the wall. Joints shall be a nominal 3/8" (10 mm) wide.
5. Form control joints for interior block masonry walls by placing a layer of building paper up the height of the wall separating block on one side from adjacent block or column. Fill void between blocks with mortar. Rake joints back 3/8" (10 mm). Building paper shall not be exposed.
6. Form shrinkage control joints in exterior masonry walls by placing premoulded joint filler in continuous vertical joint, full height of wall. Leave pre-moulded filler back from face of wall to allow space for joint filler and sealant under Section 07900

7. Joint Reinforcement

1. Reinforce all walls and partitions of concrete masonry units, solid and cavity, and single wythe block walls with joint reinforcement placed in horizontal joints at alternate courses 16" (400 mm) unless indicated otherwise. DO NOT extend joint reinforcement through control joints. Overlap all joints a minimum 8" (200 mm).

2. Where openings occur in these walls, place joint reinforcement in joints at every 8" (200 mm) course, within 32" (800 mm) above and below openings for a distance of 24" (600 mm) beyond opening.
 3. Reinforce all masonry walls where thickness is reduced by a column or chase with a 48" (1200 mm) length of joint reinforcement placed in horizontal joints at 16" (400 mm) centres. Centre reinforcement on column or chase.
 4. Install prefabricated corner sections in reinforced joints at corners and prefabricated tee sections at reinforced joints where partitions intersect other partitions or walls, unless lateral support is being provided or walls or partitions are erected on a different foundation.
 5. Where intersecting walls are erected on different foundations and lateral support is not required, provide straight joint full height of wall with masonry ties at every second joint. Rake joint 3/8" (10 mm).
 6. All exterior wall reinforcing to be stainless two wire truss type with stainless steel Ferro Block Shear Connector Tie with V-Tie leg. All interior partition wall reinforcing, and anchors mill galvanizing truss design
 7. Provide structural work as detailed on structural drawings.
 8. Place masonry reinforcement according to CSA-S304-94.
8. Bonding
1. Wythes of masonry walls shall be bonded by means specified and/or shown on drawings, or as otherwise required by authorities having jurisdiction.
 2. Use running bond unless otherwise indicated. Specialty bonding, banding, stack bonding, soldier coursing to be as indicated on drawings. Use stack bond where indicated on drawings.
 3. Cavity wall wythes shall be bonded with joint reinforcement at 16" (400 mm) o.c. and staggered cross members of reinforcement at alternate courses.
9. Built-in Work
1. Set all loose and miscellaneous items of steel and iron, including all isolated beams, lintels, shelf angles, bearing plates, ventilators and all other loose iron and steel work specified for erection or setting by others when built into masonry work. These items shall be grouted in place using cement mortar.
 2. Install 30 pound (13600 g) building paper felt under steel lintel bearing on one side only. Locate this bond breaker on the same as the control joint occurs.
 3. Supply and install all vertical steel reinforcement and grouting indicated

on the structural drawings. Grouting to be installed using at maximum 5'-0" lifts (1525 mm) using low lift grout.

10. Closures, Bellows and Water Stops

1. Provide 16 oz. per sq. ft. preformed copper water stops and closures formed as indicated on drawings.
2. Overlap all joints a min. 6" (150 mm) to obtain water flow to the exterior and apply 3 beads of sealant at joint.

11. Bent Metal Closures

1. Supplied and installed under Section 05500.

12. Filled Block Partitions

1. Fill all cavities in block partition with concrete and/or grout where indicated.

3.2 POINTING AND CLEANING

1. Point using concave joint at all areas except at single scored block which shall be tooled to match square score in block and provide other joint finishes where directed by Architect.
2. Point all holes, except weepers in masonry. Cut out all defective joints and repoint them with mortar.
3. Clean exposed masonry to satisfaction of Architect after mortar has hardened.
4. Wire brushes or abrasives shall not be used for cleaning.
5. Use of muriatic acid shall not be used for cleaning.
6. Leave masonry clean and free of mortar daubs and with tight mortar joints. Submit data for Architect's approval of chemical cleaner to be used to remove excess mortar on bricks.
7. Rinse masonry surfaces with water immediately after cleaning.
8. Remove and replace defective material at Architect's direction and at no cost to the Owner.
9. Clean up masonry debris and remove from site.

END OF SECTION

1 GENERAL

1.1 Summary

1.1.1 This Section shall conform to Division 1, General Requirements.

1.1.2 Work Included in this Section:

.1 Provision of matching brick as required to match existing/ original brick in colour, size, strength, water absorption and surface texture.

.2 Provision of new cut stones, to match original cut stone in colour, stone type, surface, texture and cut profiles.

.3 Provisions of new foundation stone to match original foundation stone in colour stone type and range of size.

1.2 Related Work Specified Elsewhere

1.2.1 Masonry Mortar: Section 04060

1.2.2 Masonry Accessories: Section 04150

1.2.3 Masonry Restoration: Section 04500

1.2.4 Masonry Cleaning: Section 04510

1.3 References

1.3.1 All new brick shall conform to CSA A82.2.-M78, Burned Clay Brick, and ASTM C216, Facing Brick, except where specified otherwise.

1.3.2 All new stone shall conform to current ASTM standards for each type of stone.

1.4 Submissions

1.4.1 Submit two samples of each type of brick and stone for approval prior to ordering.

1.4.2 Samples shall be full size and of colour, strength and surface texture to be supplied for the entire project.

1.4.3 Submit the following technical data with samples:

.1 Name, address and location of manufacturer.

.2 Full technical data on the characteristics of the brick and stone to include; compressive strength and 24 hour water absorption [for brick in accordance with ASTM C97.]

1.5 Product Delivery, Storage and Handling

- 1.5.1 Deliver brick and stone to site, packed to avoid chipping damage or soiling from any means.
- 1.5.2 Store brick and stone on site in containers or on non-skinning pallets, clear of the ground.
- 1.5.3 Protect against chipping, damage, soiling or staining.

2 PRODUCTS

2.1 Materials

2.1.1. Brick

- .1 Provide matching existing salvaged brick material wherever possible.
- .2 If new burned clay brick is provided: Type I. to CSA A82.2-M78 Grade SW, type FBA or FBX.
- .3 Compressive Strength: min. 17 MPa.
- .4 Shape, size, colour and texture to match existing.
- .5 Absorption not to exceed 8%.
- .6 Fully cured after manufacture.

- 2.1.2.1 All cracked, spalled, chipped or damaged bricks shall be discarded.

3 EXECUTION

3.1 Installation

- 3.1.1 Installation of new and salvaged brick and stone masonry is described in Section 04500: Masonry Restoration.

END OF SECTION

1 GENERAL

1.1 Summary

1.1.1 This section to conform to Division 1 General Requirements.

1.1.2 Work Included in this Section

1.1.2.1 The cleaning of all exterior stone surfaces of the building in the contract area with a biodegradable detergent.

1.1.2.2 The removal of soluble salts from interior stone surfaces of the building in the contract area with poultice powder medium.

1.1.2.3 Cleaning shall include but not be limited to;

- .1 Removal of dust prior to application of consolidant, water repellent.
- .2 Removal of soluble salts from masonry.
- .3 Removal of organic staining, from the masonry.
- .4 Removal of metallic stains: copper, iron.
- .5 Removal of paints, bitumens and tars.
- .6 Removal of localized residual soiling.
- .7 Removal of residual pain to stucco prior to treatment with stain.
- .8 Complete building clean down on completion of the work to remove any mortar staining, dust and animal matter.

1.1.3 Scope and Intent of Cleaning

1.1.3.1 Cleaning shall be carried out to all stone surfaces to remove soiling and staining without causing damage to the substrate.

1.2 Related Work Specified Elsewhere

1.2.1 Masonry Procedures: Section 04050.

1.2.2 Masonry Restoration: Section 04500.

1.3 Submissions and Mock-Ups

1.3.1 Submit samples, literature and details of tools, machinery and equipment as specified in Section 04050 Masonry Procedures.

1.3.2 Execute mock-ups as specified in Section 04050 Masonry Procedures.

1.4 Qualifications

1.4.1 Comply with requirements of Section 04050: Masonry Procedures.

1.5 Environmental Requirements

1.5.1 In addition to the requirements of Section 04050 - Masonry Procedures, the following also applies.

1.5.2 No masonry cleaning involving the use of water shall be undertaken within one month of average temperatures falling below freezing.

1.5.3 No chemical cleaning shall be performed when ambient or wall surface temperatures fall below 10°C. Maintain temperature for a minimum three weeks following cleaning.

1.5.4 No masonry cleaning shall be performed when winds are sufficiently strong to spread cleaning materials or rinsed cleaning materials to adjacent unprotected areas.

1.5.5 Comply with the requirements of the following Federal and Provincial Legislation related to the transportation use and disposal of all chemical type of materials and all revisions and other relevant legislation as applicable to this work.

1.5.5.1 Federal Transportation of Dangerous Goods Act.

1.5.5.2 Ontario Regulation number 309 Liquid Industrial and Hazardous Waste Regulation.

1.5.5.3 All such waste shall be carried by an approved Ministry of the Environment Haulage carrier and disposed of at a Ministry of the Environment approved receiving facility.

1.5.5.4 Provide copies of certificates related to transportation use and disposal of all cleaning materials to Architect.

1.6 Protection

1.6.1 Submit complete details of all protection measures prior to commencing cleaning for approval by Architect.

1.6.2 Protect the general public and adjacent property from contact with cleaning materials by erecting properly constructed protection, positioned to confine and prevent any overspray of water or chemicals. Provide complete details of such protection for

approval by the Architect.

- 1.6.3 Any materials that may be damaged by the effects of any of the cleaning operations shall be protected as described herein.
- 1.6.4 All windows, including glass, frames and exterior metal shall be protected by painted 6 mm exterior grade plywood sealed at the edges with split closed cell pipe insulation and secured with non-ferrous anchors to prevent penetration of liquids.
- 1.6.5 In addition, employ polyethylene sheet with adhesive tape, strippable latex caulking and closed cell backer rod to protect all other situations as necessary.
- 1.6.6 Protect all other surrounding areas as recommended by the product manufacturer or as directed by the Architect. Such areas include adjacent shrubs and lawns, all non-masonry surfaces and particularly metal surfaces.
- 1.6.7 Operatives shall be aware of hazardous nature of cleaning operations and shall wear appropriate safety clothing at all times during cleaning operations.

1.7 **Schedule**

- 1.7.1 Provide schedule of cleaning operation prior to commencing work for approval by Architect.
- 1.7.2 Provide Architect with minimum 48 hours notice of intent to commence cleaning operations.

2 **PRODUCTS**

2.1 **Materials**

- 2.1.1 Water: potable, clean and free from contaminants.
- 2.1.2 Where water has high iron or other metal content, pre-treat with complexing agents before use to reduce risk of staining.
- 2.1.3 Masking material: Polyethylene and to the approval of the Architect
- 2.1.4 Surfactant: non-ionic detergent suitable for use on masonry.
- 2.1.5 Petroleum based solvents: xylene, toluene, benzene and proprietary asphalt and tar removers.
- 2.1.6 Organic Solvents: methylene chloride.
- 2.1.7 Chemicals: Acids

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- 2.1.7.1 EDTA (Ethylene Diamine Tetra-acetic Acid).
 - 2.1.7.2 Orthophosphonic Acid, or proprietary "ferrous stain remover".
 - 2.1.7.3 Proprietary ammonia-based "copper stain remover".
 - 2.1.8 Poultice medium: absorbent clay medium; attapulgite clay. [Fullers Earth]
 - 2.1.9 Poultice reinforcement and accessories:
 - 2.1.9.1 Fibre reinforcing: fibrillated fibre concrete reinforcement.
 - 2.1.9.2 Plastic mesh reinforcing; alkali resisting.
 - 2.1.9.3 6 mil clear polyethylene film.
 - 2.1.10 Abrasives:
 - 2.1.10.1 Aluminum Oxide
 - 2.1.10.2 Olivine
 - 2.1.10.3 Dolomite
 - 2.1.10.4 All abrasives shall be finer than 100 mesh and to the approval of the Architect.
 - 2.1.11 Biocide: Proprietary biocide, quaternary ammonia or tin based.

2.2 Cleaning Equipment

2.2.1 Water Rinsing Equipment

- 2.2.1.1 Piping and fittings to be plastic or non-ferrous.
- 2.2.1.2 Water pumps to be fitted with accurate pressure regulators and gauges that are capable of being pre-set and locked at maximum specified levels.
- 2.2.1.3 Equipment shall be designed to provide a flow rate of between 18 and 30 litres per minute [4 - 6 g.p.m.] at pressures ranging from 35kPa to 400kPa [50 p.s.i. - 600 p.s.i.].
- 2.2.1.4 When rinsing on masonry or adjacent to masonry, employ pressures below 140kPa and working distances to ensure there is no loss of surface or damage to substrate.
- 2.2.1.5 Equipment shall be equipped to provide heated rinse water at 80°C.

- 2.2.1.6 Spray heads to be equipped with nozzles of the fan type with spray tips of between 15° and 25°.

2.2.2 Tools

- 2.2.2.1 Brushes: soft fibered nylon, natural soft and stiff bristle or phosphor bronze.

- 2.2.2.2 Scrapers: wood, plastic or stainless steel.

- 2.2.2.3 Trowels: corrosion resistant.

2.3 **Abrasive Equipment**

- 2.3.1 Portable light abrasive cleaning machine designed to operate in the 0-35 kpa range controlled at the nozzle by a trigger, and for use with a variety of nozzles from 2-6 mm in diameter. Acceptable products: Clemco 10289 CLR Classic Portable Abrasive Blast Cleaning Machine, complete with remote control valve, air filter, dial pressure regulator, and abrasive metering valve, to permit surge-free cleaning with 70 mesh and finer abrasives and equipped with 2 mm and 3 mm nozzles. Available from Hodge-Clemco Ltd., Orgreave Drive, Sheffield S139NR, UK.

- 2.3.2 Micro-abrasive equipment:

- 2.3.2.1 Laboratory sized

- 2.3.2.2 Electrically operated.

- 2.3.2.3 Specifically designed for use with abrasives of fine flour consistency operating in the 0-35kpa range.

- 2.3.2.4 Able to be fitted with a variety of nozzles from .006" up to .006" by .150".

- 2.3.3 Proprietary cleaning systems based on micro-abrasives and low pressure water delivered by means of various nozzles (including standard, micro and piccolo) producing a rotating vortex process. Equipment should incorporate new Rotec/Quintek nozzles.

- 2.3.3.1 Acceptable material: Jos Cleaning System.

2.4 **Steam Cleaning Equipment**

- 2.4.1 Portable steam cleaning equipment, capable of delivering super heated water up to 150°C at low volume and low pressure through fine nozzles.

3 **EXECUTION**

3.1 Preparation

- 3.1.1 All Methods: Provide protection as required and described herein and obtain approval of Architect.

3.2 Testing

- 3.2.1 Carry out test panels for each technique to determine, detailed optimum procedures for each substrate and level of soiling.
- 3.2.2 Locations of test panels shall be selected by the Architect.
- 3.2.3 If initial methods prove unsatisfactory, combinations of methods shall be tried from acceptable alternatives.
- 3.2.4 Submit written results of tests, outlining methods, materials, concentrations of chemicals, dwell times etc. Obtain approval of Architect before proceeding.

3.3 Cleaning of Pigeon Droppings and Staining

- 3.3.1 The removal of all pigeon soiling is to be carried out wherever present on the building.
- 3.3.2 Using scrapers, remove as much of the soiling as possible.
- 3.3.3 Low pressure, maximum 140 kPa [200 p.s.i.] surfactant cleaning shall be employed to remove all stains. Supplement water washing with bristle brushing where sound substrate exists.
- 3.3.4 Use additional techniques in conjunction with poultices as necessary or as directed.
- 3.4.5 Allow poultice to dry.
- 3.4.6 Carefully scrape residue into plastic bags, seal and remove from site. Dispose of waste in accordance with hazardous waste legislation.
- 3.4.7 Pick up any droppings and dispose of as above.
- 3.4.8 Reapply poultice and repeat process as necessary.
- 3.4.9 Micro-abrasive clean where pigeon repellent has been applied over soiled stone.

3.4 Cleaning of Repellent Gels Caulking and Residual Paint at Window Reveals

- 3.4.1 The removal of all gels caulking and paint is to be carried out wherever present on the

building.

- 3.4.2 Use scrapers to remove as much of the material as possible.
- 3.4.3 Apply methylene chloride in concentrated form.
- 3.4.4 Allow to dwell on masonry for a maximum of 15 minutes.
- 3.4.5 Do not allow solution to dry on surface. Reapply as necessary to keep moist.
- 3.4.6 Thoroughly rinse all traces of cleaning solution from the masonry.
- 3.4.7 Run residues to containers and dispose of in accordance with hazardous waste legislation.
- 3.4.8 Where soiling remains prepare poultice with attapulgate clay and methylene chloride and mix to stiff cream consistency.
- 3.4.9 Trowel apply poultice approximately 12 mm thick over soiled area and leave finished neatly.
- 3.4.10 Apply cover of polyethylene film or sheet tape edges to control rate of drying.
- 3.4.11 Remove plastic after 24 hours.
- 3.4.12 Allow poultice to dry.
- 3.4.13 Carefully scrape residue into plastic bags, seal and remove from site. Dispose of waste in accordance with hazardous waste legislation.
- 3.4.14 Pick up any droppings and dispose of as above.
- 3.4.15 Reapply poultice and repeat process as necessary.
- 3.4.16 Micro-abrasive clean where pigeon repellent has been applied over soiled stone.
- 3.5 **Removal of Creeper**
 - 3.5.1 Remove suckers and remains of creeper during final cleaning of masonry.
 - 3.5.2 Employ plastic scrapers and brushes to remove all traces of creeper.
- 3.6 **Removal of Soluble Salts from Exterior Masonry**
 - 3.6.1 Dry brush wall areas containing salts to remove surface residues. Collect salts in bags and remove from site.

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- 3.6.2 Thoroughly irrigate wall to put salts into solution.
 - 3.6.3 Empty nebulised spray heads arranged to achieve maximum saturation with minimum water run-off.
 - 3.6.4 Construct eavestrough to collect run-off and run to barrels. Remove from site.
 - 3.6.5 Prepare poultice medium from attapulgite clay and clean water to consistency of stiff cream. Reinforce with fibres as necessary.
 - 3.6.6 Trowel apply poultice to contaminated wall areas approximately 12 mm thick and leave finished neatly.
 - 3.6.7 Where appropriate to provide support for the poultice over large areas apply mesh over poultice and secure into mortar joints with stainless steel fasteners.
 - 3.6.8 Apply cover of polyethylene film or sheet and tape edges to control rate of drying.
 - 3.6.9 Remove plastic after 24 hours.
 - 3.6.10 Allow poultice to dry.
 - 3.6.11 Carefully scrape residue into plastic bags, seal and remove from site. Dispose of waste in accordance with hazardous waste legislation.
 - 3.6.12 Pick up any droppings and dispose of as above.
 - 3.6.13 Reapply poultice up to four times as directed by the Architect.
 - 3.6.14 Permit samples to be taken for analysis between applications.
 - 3.7 **Air Abrasive Cleaning**
 - 3.7.1 Air abrasive cleaning is to be employed for the localised removal of soiling including black atmospheric soiling which does not respond to other techniques or where it is more appropriate.
 - 3.7.2 The location of all air abrasive cleaning will be agreed to with the Architect.
 - 3.7.3 Perform cleaning as determined by testing.
 - 3.7.4 Testing will have determined the equipment type, the abrasive, and mesh size, nozzle and venturi combinations, and size where relevant pressure at the nozzle, working distance and level of clean.

3.7.5 Clean without damaging stone.

3.7.7 Perform all cleaning in the presence of the Architect and to the level clean directed on site.

3.7.8 Permit Architect to carry out testing of cleaned stone to ensure compliance with performance standards.

3.7.9 Collect and dispose of cleaning materials from the work area twice daily, at the mid-day break and at the end of the working day.

3.8 Removal of Organic Growth

3.8.1 Remove organic growth as indicated on drawings.

3.8.2 Apply proprietary solution of quaternary ammonium - based biocide in accordance with manufacturer's directions, by hand held spray unit.

3.8.3 Apply as flood coat, allowing solution to penetrate masonry. Mask off and protect all other masonry from treatment.

3.8.4 Contain solution in area of clean. Collect any run off and dispose of in accordance with hazardous waste legislation.

3.8.5 Reapply as necessary.

3.8.6 Where organic growth turns brown where protection has killed it, dry brush or air abrasive clean stone to remove surface residues.

3.9 Removal of Metallic Stains, Bitumens, Tars or Paint

3.9.1 Carry out cleaning employing poultices to remove stains.

3.9.2 Prepare poultice medium mixed with clean water, or solvents and chemicals as appropriate to the nature of soiling.

3.9.3 Mix to consistency of stiff cream.

3.9.4 Pre-wet soiled area with liquid portion of poultice.

3.9.5 Trowel apply poultice approximately 12 mm thick over soiled area and leave finished neatly.

3.9.6 Apply cover of polyethylene film or sheet and tape edges to control rate of drying.

3.9.7 Remove plastic after 24 hours.

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- 3.9.8 Allow poultice to dry.
 - 3.9.9 Carefully scrape residue into plastic bags, seal and remove from site. Dispose of waste in accordance with hazardous waste legislation.
 - 3.9.10 Pick up any droppings and dispose of as above.
 - 3.9.11 Reapply poultice and repeat process as necessary.
 - 3.10 **Steam Cleaning**
 - 3.10.1 Steam Cleaning is to be employed for the localised removal of soiling, including black atmospheric soiling in areas of carved and decorative detail, and to assist in the removal of coatings applied over the surface of stone.
 - 3.10.2 The location of all steam cleaning is to be agreed with the Architect. Perform cleaning as determined by testing.
 - 3.10.3 Testing will have determined equipment type, flow rates, pressure, working distance, supplementary cleaning tools and level of clean.
 - 3.10.4 Clean without damaging stone.
 - 3.11 **Final Clean Down of Building**
 - 3.11.1 Immediately prior to application of cleaning materials pre-wet section of wall to be cleaned using clean water.
 - 3.11.2 Apply sufficient water to surfaces to point where no further water is absorbed.
 - 3.11.3 Apply 5% solution by weight of surfactant.
 - 3.11.4 Agitate on wall to create lather and to remove soiling.
 - 3.11.5 Do not allow to dry out.
 - 3.11.6 Thoroughly rinse all traces of cleaning solution from the masonry.
 - 3.11.7 Reapply as necessary.

End of Section.

MASONRY RESTORATION

Section 04520
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1 GENERAL

1.1 Summary

- 1.1.1 This Section to conform to Division 1, General Requirements.
- 1.1.2 Work Included in this Section:
 - 1.1.2.1 Raking out and pointing of joints in existing brick masonry.
 - 1.1.2.2 Hand grouting voids.
 - 1.1.2.3 Backpointing of joints.
 - 1.1.2.4 Pointing of joints in new and repaired brick masonry.
 - 1.1.2.5 Cutting out and replacement of brick.
 - 1.1.2.6 Repair of brick.
 - 1.1.2.7 Preparation of reglets.
 - 1.1.2.8 Removal of surplus equipment, metal fixings, including pointing of scaffold tie holds.
 - 1.1.2.9 Miscellaneous repairs.

1.2 Related Work Specified Elsewhere

- 1.2.1 Masonry Procedures: Section 04050.
- 1.2.2 Masonry Mortar: Section 04100.
- 1.2.3 Specialty Restoration Mortar: Section 04101.
- 1.2.4 Masonry Accessories: Section 04150.

1.3 Submissions

- 1.3.1 Submit samples, literature and details of tools, machinery and equipment as specified in Section 04050, Masonry Procedures.
- 1.3.2 Execute mock-ups as specified in Section 04050, Masonry Procedures.
- 1.3.3 Prepare materials for testing, in accordance with requirements of Section 01301 – Inspections and Approvals.

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- 1.3.4 As Built Drawings: neatly and accurately record the extent of the restoration work on one set of reproducible drawings provided by the Consultant. Show location of masonry stabilization, replacement and repair.

1.4 **Qualifications**

- 1.4.1 Comply with requirements specified in Section 04050, Masonry Procedures for all aspects of work specified in this section.
- 1.4.2 Restoration: execute work of this section to preserve and restore the aesthetic and historical nature of the building.

1.5 **Sequence of Work**

- 1.5.1 Refer to sequence of work specified in Section 04050, Masonry Procedures.

1.6 **Existing Conditions**

- 1.6.1 Investigate existing conditions before beginning work.
- 1.6.2 Discuss existing conditions and working methods with Consultant.

2 **PRODUCTS**

2.1 **Materials**

- 2.1.1 Materials Specified Elsewhere
- 2.1.1.1 Masonry Mortars: specified in Section 04100.
- 2.1.1.2 Specialty Restoration Mortar: Section 04101.
- 2.1.1.3 Masonry Accessories: specified in Section 04150.

3 **EXECUTION**

3.1 **Preparation**

- 3.1.1 Seal and protect all openings, doors, windows and adjacent areas to prevent damage and the spread of construction dust, water or other materials into the building or onto adjacent sidewalks.
- 3.1.2 All sills and projecting courses are to be covered with rigid protection, secured

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into joints, for the duration of the work.

- 3.1.3 Any part of the scaffolding, hoists or any construction plant shall not directly bear against the masonry. Provide isolating material of lumber or plywood with additional padding as necessary to prevent damage to the existing masonry.
- 3.1.4 Prior to commencing cutting out of any mortar joints, Contractor will remove wood moulding at junction of window frame and brickwork and reinstall moulding on completion of masonry work.
- 3.1.5 Remove any decorative elements and flashing from brick prior to cleaning. Reinstall after work is complete and accepted by Consultant.

3.2 Mortar Removal for Repointing

3.2.1 Generally

- 3.2.1.1 Remove all mortar where Brick replacement, and Brick repair occur.
- 3.2.1.2 Mortar is defective when:
 - .1 It is cracked.
 - .2 It is spalled, chalked, dusted or otherwise crumbling and excessively weathered back.
 - .3 The Consultant states so in writing.
- 3.2.1.3 Where mortar is found to be defective beyond specified raking depths, continue raking until sound mortar is encountered.
- 3.2.1.4 Be aware that additional raking out beyond specified depths will be necessary and that voiding can be expected, requiring alternately backpointing or grouting prior to finish re-pointing.
- 3.2.1.5 If masonry unseats or bond is broken, remove unit and reset.
- 3.2.2 Tools and Techniques
 - 3.2.2.1 Tools for cutting out shall be narrower than the joint.
 - 3.2.2.2 Cutting out of mortar shall be carried out by one of the following techniques:
 - .1 Cutting out with hammer and chisels with dust channels, cutting away from the arrises to prevent spalling of the masonry.

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- .2 Flat-bladed quirks and light hammers, hacksaw blades or similar tools are to be used where fine joints are encountered.
 - .3 Small hand-held low-impact pneumatic carving tools, fitted with appropriate points and chisels to the approval of the Consultant for cutting out rock-faced work only.
 - .4 Hand held rotary saws or any type of grinder or wheel are not permitted on this project.
- 3.2.2.3 Clean joints back for the full specified depth, removing all mortar on the masonry surfaces to a square surface of existing mortar at back of joint.
- 3.2.2.4 Clear out all loose particles with compressed air and leave ready for inspection.
- 3.2.3 Damage
- 3.2.3.1 Take care to prevent damage to masonry units resulting from cutting out operation.
- 3.2.3.2 Damage includes the widening of existing joints, nicks, gouges and chipped or scratched surfaces from cutting out tools, resulting from improper workmanship.
- 3.2.3.3 All damaged units shall be replaced or repaired to the satisfaction of the Consultant, at no change in the contract price or schedule.
- 3.2.4 Inspection
- 3.2.4.1 Provide access, permit inspection, correct any defects and obtain approval of all raked joints prior to commencing pointing.
- 3.2.5 Depth of Raking
- 3.2.5.1 Raking shall be carried out to at least twice the width of the joint to a minimum depth, measured from the arris of the masonry unit, of not less than 20 mm.
- 3.2.5.2 Generally:
- .1 Brick masonry, mortar joints: 30 mm.
 - .2 Brick masonry, special mortar joints: 70 mm.
- 3.3 **Cutting Out and Replacement of Brick**

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3.3.1 Cutting Out of Brick

- 3.3.1.1 Cut out all damaged brick where indicated on the drawings for replacement or repair. Obtain approval of Consultant prior to proceeding.
- 3.3.1.2 Where large blocks are scheduled for replacement, existing brick shall be cut out so that entire blocks may be reclaimed.
- 3.3.1.3 All existing brick removed shall become property of ORC.
- 3.3.1.4 Advise the Consultant of any damaged brick not identified for replacement or repair prior to commencing repair work.
 - .1 Where indenting brick pieces into block slightly undercut vertical beds and allow a few millimetres space at the rear.
- 3.3.1.5 Generally indented brick shall have a minimum bearing of 100 mm on bed.

3.3.2 Setting Brick

- 3.3.2.1 Drench dry bricks with clean water just prior to setting.
- 3.3.2.2 Install anchors, dowels and cramps.
- 3.3.2.3 Set bricks true and in alignment, maintain joint thicknesses with soaked softwood wedges until bedding mortar has set.
- 3.3.2.4 Pack exterior horizontal and vertical joints with plastic foam joint filler and leave ready for pointing.
- 3.3.2.5 Remove wedges when dry without breaking them off.
- 3.3.2.6 Grout vertical joints of projecting course.
- 3.3.2.7 Pack exterior profile of these joints with plastic foam joint filler set to leave 30 mm. from face of joint.
- 3.3.2.8 Fill joints behind packing with liquid bedding mix.
- 3.3.2.9 Sponge off any mortar droppings as work progresses.
- 3.3.2.10 Remove plastic foam joint filler and leave joints ready for pointing.

3.4 Repair of Brick

- 3.4.1 Indenting Brick Pieces into Block [Dutchman Repairs]

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- 3.4.1.1 Select brick to match surrounding colour, free from defects and with bedding to match adjacent work.
 - 3.4.1.2 Cut piece of sufficient surface area to cover the area of damage to be cut away to rectangular or square frame, min. 50 mm deep and rub and finish all bed faces to ensure fine, true, uniform arrises.
 - 3.4.1.3 Transfer outline onto damaged area by scribing.
 - 3.4.1.4 Cut out to scribe lines using tempered chisels by hand ensuring that the edges are not plucked or spalled. Undercut bed joints as described in 3.3.3. above. Obtain approval from Consultant before commencing any cutting on site.
 - 3.4.1.5 Drill the back of the piece and set minimum two stainless steel threaded pins with resin mortar minimum 10 mm, maximum 20 mm, allowing 15 mm projection and allow to cure.
 - 3.4.1.6 Transfer pin location and drill out host brick to receive pins.
 - 3.4.1.7 Grout holes with thixotropic resin mortar.
 - 3.4.1.8 Prepare repair mortar: brick dust mortar and butter cavity to receive piece.
 - 3.4.1.9 Ease piece into cavity, ensuring pins locate into holes and clean off mortar from face.
 - 3.4.1.10 Leave face of piece slightly proud and finish to original profile and finish by rubbing back or tooling as required. Rubbing back marks on existing brick is not permitted.
 - 3.4.2 Repairs to Cracked Brick
 - 3.4.2.1 Repairs In-Situ: Injection of Cracks
 - .1 Remove all existing mortar and filling materials from cracks using hand tools. Do not damage surface of brick during removal.
 - .2 Re-align brick where necessary.
 - .3 Prepare crack for injection by damming along crack with repair mortar, resin: brick dust mix, plasticine or clay to contain resin.
 - .4 Inject low viscosity resin via hypodermic syringe until crack is full.

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.5 Do not allow resin on face of brick. Clean up spills promptly with solvent.

.6 Remove dam and point up crack flush with repair mortar.

3.4.2.2 Repairs In-situ: Filling voids in brick

.1 Remove all existing mortar and filling materials from cracks and voids using hand tools. Do not damage surface of brick during removal.

.2 Build up mortar in void by packing repair mortar in layers not exceeding 15 mm in depth.

.3 Allow mortar to achieve thumb print hardness before applying next layer.

.4 Finish mortar filling by stippling back mortar to compact the joint and finish it just behind the arrises of the brick.

3.4.2.3 Repair of Cracked Brick

.1 Remove brick to be repaired by cutting out mortar around perimeter. Maintain support to surrounding masonry as necessary.

.2 Clean surfaces of brick to be repaired.

.3 Prepare thixotropic resin and resin: brick dust mortar.

.4 Drill holes for stainless steel threaded pins to re-anchor brick together.

.5 Set pins with thixotropic resin mortar.

.6 Apply repair mortar to entire surface of brick to be bonded.

.7 Clamp using softwood shims and allow to set.

.8 Remove any mortar squeezed out of crack promptly to prevent staining.

.9 Re-set repaired brick.

3.4.2.4 Pinning of Fractures

.1 Determine diameter of dowel in conjunction with Consultant.

.2 Drill hole 50% larger than dowel at right angles and across fracture.

.3 Produce matrix of resin and brick dust, at ratio of resin to brick dust of 1:12.

- .4 Clean dust out of hole using acetone and cotton swabs.
- .5 Set ends of dowel only in resin: brick dust matrix.
- .6 Fill remainder of hole with stiff repair mortar.

3.4.2.5 Pinning Back Loose and Friable Brick

- .1 The number of pins and their location shall be agreed with the Consultant prior to commencing work.
- .2 Mask off surrounding areas to prevent spread of dust.
- .3 Drill hole 50% larger than stainless steel pins. Stainless steel threaded pins will range from 2 mm to 5 mm in diameter.
- .4 Clean dust from holes using acetone and cotton swabs.
- .5 Determine dowel length, ensuring sufficient room for mortar plug at surface.
- .6 Run resin into hole in order to set end only of dowel. Where hole is horizontal or inclined use resin: brick dust mix to prevent run back. Place with fine tools or hypodermic syringes.
- .7 Spread resin on dowel and place in hole, plug ends with cotton swabbing as necessary to retain resin in hole.
- .8 Remove swab and when resin set plug holes with repair mortar.

3.4.2.6 Resetting Misaligned Brick

- .1 Where brick is misaligned at voussoir and is scheduled to be re-set, construct centering to arches adequately constructed and braced to resist loads.
- .2 Remove brick units as necessary to reset all brick in true alignment.
- .3 Drill bricks for new dowels across joints and for cramps to tie back brick into core where possible.
- .4 Re-set brick and install dowels and cramps.
- .5 Strike centering.

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3.4.3 Dressing of Brick at Flashing Upstands

3.4.3.1 Where flashings are required to vertical brick surfaces to reglets, prepare brick as follows:

- .1 Determine the location of all such situations and agree requirement for dressing of brick with Consultant prior to proceeding.
- .2 Dress irregular brick surfaces to smooth face to accommodate flashing upstand dressed back against brick.
- .3 Use hand-held low impact pneumatic brick-carving chisels only.
- .4 Dress surfaces to smooth and true face.

3.4.4 Rubbing Back Brick

3.4.4.1 Where indicated on drawings rub back friable brick to remove loose detail only.

3.4.4.2 Agree all locations with Consultant. Prepare sample etc. as below.

3.4.4.3 Rub back with sandbrick blocks to prevent marking of brick.

3.4.5 Dressing Back Brick

3.4.5.1 Where indicated on drawings dress back brick.

3.4.5.2 Agree all locations with Consultant. Prepare sample for approval by Consultant prior to commencing work.

3.4.5.3 Dress back loose and friable brick using hand tools only.

3.4.5.4 Leave brick without ledges which will trap moisture.

3.4.6 Cutting Drips in Brick

3.4.6.1 At locations indicated on the drawings cut drip in soffit of brick.

3.4.6.2 Mount guide to ensure accurate cuts.

3.4.6.3 Cut drip using grinder, stopping short of ends.

3.4.6.4 Finish ends by hand.

3.4.7 Removing Cement and Resin from Brick

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- 3.4.7.1 Remove all cement and resin patches and previous filling of cracks and repairs on surface of brick.
 - 3.4.7.2 Tools and technique for removal shall be agreed with Consultant. Prepare sample for approval by Consultant prior to commencing work.
 - 3.4.7.3 Removal shall be carried out using a combination of hand and power tools to minimise damage to surface.
 - 3.4.7.4 Where voids or cracks remain in brick as a result of removal of cements and resins, fill brick as described in 3.4.2.2 above.

3.5 **Hand Grouting**

- 3.5.1 Hand grout voids that cannot be successfully filled by backpointing procedures. Obtain Consultant's acceptance of voids and damming procedures prior to commencing grout operations.
- 3.5.2 Prior to grouting, ensure that grout will not penetrate into intentional cavities in walls by examining site conditions at back faces of voids and joints. Report findings to the Consultant. Grouting may occur only where intentional cavities cannot be filled by grouting operations. Take all measures required to contain grout in voids and joints to be grouted using temporary damming materials, and as specified below.
- 3.5.3 Carefully flush out joints and voids to be grouted to remove all loose materials and prewet backup materials. Do not oversoak wall, and ensure water does not penetrate to the interior, damage interior finishes, or flood intentional cavities.
- 3.5.4 Pack solid faces of joints to be grouted with non-staining, non-oily, plumbers hemp or other acceptable damming material to a minimum depth of 20 mm, so that grout will be contained in the joint or void, and the void can be filled solid. Where required to keep grout from intentional cavities in the walls, install temporary dams to back face of joint.
- 3.5.5 Form grout cup on wall at top of void or joint to be grouted using non-staining, non-oily, potters clay or other acceptable material to direct grout into voids without staining walls. Keep clay cups damp to prevent drying and cracking. Other methods of directing grout into voids and joints will be acceptable upon Consultant's approval.
- 3.5.6 Pour grout into joint or void via clay cup, until voids filled. Do not exceed one metre lifts or one vertical joint at any one time.

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- 3.5.7 Continually observe interior and exterior faces of wall at grouting during grouting operations. Cease grouting if leaks occur at interior. Seal all leaks, and make good all damage caused to the satisfaction of the Consultant.
- 3.5.8 Remove any grout spills immediately, using clean water and non-metallic bristle brushes to wash surfaces.
- 3.5.9 Allow grout to set for 24 hours, then remove hemp packing, temporary dams, grout cups, and other grouting aids.
- 3.5.10 Allow grout and wall to fully dry, minimum 3 weeks, before commencing finish pointing.
- 3.6 **Backpointing**
 - 3.6.1 Obtain acceptance of raked out work prior to commencing pointing operations.
 - 3.6.2 Where cut out joints are deeper than raking out depths specified above, backpoint joints to bring mortar face to specified depth for raked out joints, in preparation for finish pointing. Where voids exist that conventional backpointing cannot fill, grout voids in accordance with 3.4 Hand Grouting above.
 - 3.6.3 Immediately prior to pointing, thoroughly wet joints in order to control absorption.
 - 3.6.4 Allow water to soak into masonry and mortar, leaving no standing water but remaining wet.
 - 3.6.5 For backpointing, fill all joints full with pointing mortar, compacting mortar firmly into joints to ensure positive adhesion to all inner surfaces. Place mortar in layers, maximum 30 mm thick, minimum 12 mm thick, allowing each layer to set to thumbprint hard before placing next layer. Bring face of mortar in backpointed joint to specified depth for raked out joints, measured from the arris of the masonry unit, leave ready for final pointing.
 - 3.6.6 Prevent mortar from being placed or smeared onto face of brick to prevent mortar staining of masonry faces during backpointing.
 - 3.6.7 Keep work clean, remove all droppings as work proceeds, and again at the end of each day.
- 3.7 **Pointing of Joints**
 - 3.7.1 General

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- 3.7.1.1 Obtain Consultant's acceptance of raked out, backpointed, and grouted work prior to commencing pointing operations.
 - 3.7.1.2 Prevent mortar from being placed or smeared onto face of brick to prevent mortar staining of masonry faces during pointing.
 - 3.7.1.3 Allow water to soak into masonry and mortar, leaving no standing water but remaining wet.
 - 3.7.1.4 Fill all bed and head joints full with pointing mortar, compact joints firmly to ensure positive adhesion to all inner surfaces.
 - 3.7.1.5 Thoroughly compact mortar into joint.
 - 3.7.1.6 At initial set, finish joints with stripping action using a short stout bristle brush to compact the joint further and produce a textured finish, exposing the aggregate. Do not project the mortar past the arrises or feather the mortar.
 - 3.7.1.7 On the rock faced work keep joints back approximately 3 mm behind arrises. On the cut brick and decorative work keep joints back approximately 1 mm behind arrises.
 - 3.7.1.8 Keep work clean, remove all droppings and clean faces of masonry units as work proceeds and again at the end of each day.
 - 3.7.2 Preparation and Pointing of Special Joints
 - 3.7.2.1 General: Work described here is for the removal of existing sealant, cutting out of remaining mortar and the application of new jointing materials.
 - 3.7.2.2 Remove existing sealants employing solvents and plastic tools to prevent damage to masonry.
 - 3.7.2.3 Remove mortar to required depths specified in 3.2.5 above.
 - 3.7.2.4 Repoint as previously described with the following exception.
 - 3.7.2.5 At projecting brick courses identified on the drawings to be special joints, are to be repointed with sealant, mortar combination.
 - 3.7.2.6 Deep rake joints to 70 mm.
 - 3.7.2.7 Apply backer rod.

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3.7.2.8 Gun apply sealant to within 20 mm of face.

3.7.2.9 Tool surface smooth with spatula dipped in solvent.

3.7.2.10 Allow curing.

3.7.2.11 Point with minimum 20 mm mortar as specified above.

3.7.3 Protection on Completion

3.7.3.1 Protect newly laid mortar from frost, rainfall or rapid drying conditions for three weeks.

3.7.3.2 Protect newly laid mortar from frost until mortar is fully cured; minimum 3 weeks.

3.7.3.3 Provide burlap enclosure and misting for minimum 48 hours to prevent initial shrinkage of mortar.

3.8 Preparation of Reglets

3.8.1 Cut and prepare reglets for all flashings where required.

3.8.2 Cut reglets 12 mm high and 25 mm deep for copper flashings and cut reglets 20 mm high and 30 mm deep for lead flashings. Obtain approval of Assembly Designee before cutting any brickwork. Remove all loose mortar or brick to clean, square face at the back of the reglet.

3.8.3 Use straight edges to maintain accurate cuts.

3.9 Removal of Surplus Equipment and Metal Fixings, Including Pointing of Scaffolding Tie Holds

3.9.1 Remove all metal fixings, brackets, wires, bolts, nails, screws and shields from masonry.

3.9.2 Remove any anchors or plugs by coring to ensure their complete removal.

3.9.3 Repoint where removed from mortar joints and at fixings on striking the scaffold.

3.9.4 Where removed from masonry unit and masonry unit will not be replaced patch hole with repair mortar.

3.9.5 Finish flush with face of masonry unit.

3.9.6 Do not permit this matrix to spread onto face of masonry.

3.10 **Cutting Out and Replacement of Deteriorated Brick**

3.10.1 Cut out all damaged back up brick and prepare for replacement with new brick.

3.10.2 Brick is damaged when:

3.10.2.1 It is cracked, chipped or spalled.

3.10.2.2 The outer face of the brick is hollow, detached or missing.

3.10.2.3 The Consultant states so in writing.

3.10.3 Maintain stability of structure at all times.

3.11 **Localized Replacement of Bricks**

3.11.1 Bond, coursing and jointing to match existing.

3.11.2 Dampen back up masonry thoroughly and evenly; allow surface to dry.

3.11.3 Set bricks in full bed of mortar true to line and level with adjacent units.

3.11.4 Ensure cavity to rear of brick is filled solidly with mortar.

3.11.5 Fill and compact bed and vertical joints until filled solidly with mortar.

3.11.6 Tool joints flush to match existing.

3.12 **Rebuilding Areas of Brickwork**

3.12.1 Carry out work all as described in 3.4.2. above. In addition the following requirements apply:

3.12.2.1 Where replacing in excess of four bricks in one area, install masonry ties to bond facing with back up wythes of masonry.

3.12.2.2 Masonry Tie to be Rap-Tie System by Fero, complete with V-Tie and insulation support. Provide lateral tie system to connect V-Tie to continuous 1/16" diameter stainless steel wire. V-Tie to be of length to provide placement of V-Tie legs at centre of solid unit veneer. All components to be stainless steel. Space Rap-Ties at maximum 16" o.c. horizontally and vertically. Provide Rap-Ties at maximum 12" from edge of openings, wall ends, top of walls and bottom of walls. Provide 2 fasteners per Rap-Tie.

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3.12.2.3 Ensure ties are solidly set in back up wythe.

End of Section.

PART ONE - GENERAL

1.1 DESCRIPTION

- 1.1.1 Furnish all labour, materials, equipment and services specified, indicated or required to supply, install and complete all structural steel and open web steel joists (OWSJ).

1.2 RELATED WORK DESCRIBED ELSEWHERE:

- .1 Section 03300 - Grouting under column bases and bearing plates
- .2 Section 05500 - Miscellaneous Metals

1.3 SUBMITTALS

- 1.3.1 Comply with the pertinent provisions of Section 01300.
- 1.3.2 Erection diagrams and shop drawings shall be consistent with the design drawings prepared by the Consultant. Submit copies of erection diagrams to the Consultant for review before preparation of shop drawings. Submit shop drawings to the Consultant for general review of arrangement of details and type of connections before commencing fabrication. Furnish copies of erection diagrams and shop drawings to the Consultant for distribution. The Consultant's review of these shop drawings will not relieve the Contractor of responsibility under the Contract.
- 1.3.3 Shop drawings shall show the size, spacing, and location of structural steel and joists and all connections, attachments, reinforcing and anchorage. Diagrams shall include all necessary plans, elevations and details. Identify each member by a standard mark, to be listed in the schedule shown on the fabricator's erection drawings and placed legibly on each unit at the time of fabrication.
- 1.3.4 Shop drawings shall show the seal and signature of a Professional Engineer, registered in the Province of Ontario, responsible for the design of the OWSJ and its ability to meet the design criteria shown on the drawings and/or OBC requirements. Maximum live load deflection for all open web steel joists is $L/360$ unless noted otherwise on the drawings. Camber joists for dead load.
- 1.3.5 Shop drawings of structural steel shall show the seal and signature of a Professional Engineer, registered in the province of Ontario, for design of connections.

1.4 DEBRIS

- 1.4.1 Promptly, as the work proceeds and on completion, clean up and remove from the site all rubbish, surplus materials and equipment.

1.5 STANDARDS

- 1.5.1 All Codes and Standards referred to herein are to be latest edition.

1.5.2 Applicable Codes and Standards governing the work of this Section:

- .1 CAN/CSA S16 - Limit States Design of Steel Structures.
- .2 CAN/CSA - G40.20 - General Requirements for Rolled or Welded Structural Quality Steel.
- .3 CAN/CSA - G40.21 - Structural Quality Steels.
- .4 CSA-W59 - Welded Steel Construction (Metal Arc Welding)
- .5 CSA-W47.1 - Certification of Companies for Fusion Welding of Steel Structures.
- .6 CSA - W48 Series Latest Editions - Welding Electrodes.
- .7 ASTM-A325M - High-Strength Bolts for Structural Steel Joints.
- .8 CAN/CGSB-1.40 - Primer, Structural Steel, Oil Alkyd Type
- .9 Current Ontario Building Code

1.6 CUTTING AND PATCHING

- 1.6.1 Make all necessary adjustments and cut and fit to suit adjacent work of other Sections. Make good all finishes after installation has been completed.

1.7 INSERTS AND OPENINGS

- 1.7.1 Supply anchor bolts, loose base plates and other items when required for setting by other Sections. Provide holes and openings required in the work of this Section for the work of the Sections.

1.8 DIMENSIONS AND FIELD MEASUREMENTS

- 1.8.1 Check all dimensions before commencing shop drawings, fabrication, and installation and report all discrepancies to the Consultant. Where dimensions are not available before work is commenced, the dimensions required shall be agreed upon between the various trades concerned and approved by the Consultant.
- 1.8.2 Before commencing operations, verify the location and obtain all necessary measurements of structures which might affect the work of this Section. Before commencing erection verify the location and elevation of all anchor bolts for columns and verify that the foundations or piers are at the proper elevation and ready to receive the base plates. Check any existing floor levels for the proper alignment of new floors.

1.9 WORKMANSHIP

- 1.9.1 The work of this Section shall be done in accordance with the best practice by skilled labour.

1.10 INSPECTION AND TESTING

- 1.10.1 An inspection and testing company may be appointed and paid by the Owner to inspect the work of this Section. Give full cooperation to the Inspectors and the Consultant in the making of inspections and tests at all places where work is being done or stock is piled. The Inspector will report to the Consultant the

progress of the work, the manner of procedure, the quality of the materials and workmanship and the compliance with the Contract Documents.

- 1.10.2 The Inspector will call to the attention of the Contractor or his representative any improper workmanship or defective materials and it is understood and agreed that the Inspector shall have authority to direct stoppage of any improper practices until the Consultant has investigated the matter and made his decision. The Inspector will give his instructions directly to the Contractor or his representative on the job; he is not authorized to give orders to any other employees of the Contractor. Inspectors are not authorized to change, enlarge or diminish the provision in the Contract Documents in any degree whatsoever.

PART TWO - PRODUCTS

2.1 MATERIALS

- 2.1.1 Structural steel shall be new material of the sizes and shapes indicated on the drawings and all W-shapes & S-shapes sections shall conform to ASTM A992 & ASTM A572 Grade 50 $F_y=345\text{MPa}$, all C-shapes sections & Angles shall conform to G40.21-350W $F_y=350\text{MPa}$, all HSS hollow structural sections shall conform to G40.21-350W Class C $F_y=350\text{MPa}$, all others (plates, rods) shall conform to G40.21-300W $F_y=300\text{MPa}$.
- 2.1.2 Welding materials shall comply with CSA W59.
- 2.1.3 High strength bolts, nuts and washers shall comply with ASTM A325M.
- 2.1.4 Bolt heads shall be identified on the top of the head by three radial lines, the legend "A325" and the manufacturer's mark.
- 2.1.5 Standard primer for shop paint and touch-up in the field shall comply with CISC/CPMA Standard 1-73a One-Coat Paint and CISC/CPMA Standard 2-75 Primer.

PART THREE - EXECUTION

3.1 FABRICATION

- 3.1.1 Use shop and field connections indicated on the structural drawings. In the absence of such indication, comply with current CAN/CSA S16.
- 3.1.2 Trim and cut top plates to shape by machine gas cutting or carefully guided manual gas cutting to avoid rough or damaged edges caused by shearing. Accurately cut beams and plates which are exposed in the finished work to avoid excessive widths of welds forming connections. Continuously weld and

weatherproof connections which will be exposed on the exterior of the building in the finished work. Grind all such welds to present true and straight lines.

- 3.1.3 Cut steel members in the field only when directed by the Consultant, who may direct that holes be suitably reinforced with welded steel plates.
- 3.1.4 At any time before the detailed drawings are completed and approved, if requested, provide punched holes up to 20mm diameter for the convenience of other trades in attaching wood or other materials to structural members. Place holes for connections, wood lagging or for other purposes so as not to cause any appreciable reduction in the strength of members. Provide holes for services and reinforce as indicated on the structural drawings.

3.2 DESIGN OF CONNECTIONS

- 3.2.1 If requested by the Consultant, or the local authority having jurisdiction over the work, submit structural calculations and such further proof as may be called for to show that the design, fabrication and erection of the work of this Section complies with the specifications, drawings, local by-laws and all relevant codes and standards.
- 3.2.2 Design the minimum connections for beams in accordance with CISC framed beam connection details based on 20mm high strength bolts to develop the stated reaction or the full uniform-load capacity for the given span or the **50%** of maximum full shear capacity of the member, whichever is greater. Use double angle connections where possible.

3.3 WELDING

- 3.3.1 Welding shall comply with CSA W59. Any fabricator undertaking to weld under this contract shall be fully approved by the Canadian Welding Bureau, under the requirements of CSA W47, Division 1 or 2.1.
- 3.3.2 Do not field weld during rain, snow or sleet. Drive off moisture from dew or fog by heat before welding commences. Provide windbreak protection to protect the work area from direct wind. Do not weld when the air temperature is below -18°C (0°F). If the air temperature is above -18°C (0°F), but is cold enough to prevent the welder from producing sound work then welding will not be permitted.
- 3.3.3 Prepare ends of beams, girders, and other members to be welded by gas cutting in the shop, taking into account the relative position of the member in the finished structure, and the grade, camber or curvature of the member.
- 3.3.4 Minimum pre-heat and interpass temperatures, within 75mm of the location of weld deposits, shall be in accordance with good welding practice. Form welds with sound clean metal completely fused to the base metal. Ensure complete penetration of the joint. Gouge out and re-weld all welds which show inclusions, porosity, lack of fusion, poor penetration or uneven contour, sagging or overlapping parent metal. Clean welds between passes and at completion and remove slag with a descaling tool and wire brush. Where welds show

undercutting run in a small stringer bead along the toe of the undercut using a smaller diameter electrode than that used for the original weld. Fill weld craters flush with weld metal. Check root passes for penetration and cracks from the back side of the joint. Gouge out any crack, regardless of size, 50mm beyond each end of the crack and reweld.

3.3.5 Before final acceptance of welding make a thorough check to ensure that all welds required have been made. Check all fillet welds with a gauge to determine that none are undersize or short in length.

3.3.6 Check welds for cleanliness before painting.

3.4 ERECTION

3.4.1 Make adequate provision for erection stresses and for temporary bracing to keep the structural steel frame plumb and in true alignment during construction of the building. Bracing members shown on the drawings are required for the finished structure and it is not to be assumed that they are adequate for construction purposes. It shall be the sole responsibility of the Contractor to make proper and adequate provisions for erection stresses and for temporary bracing.

3.4.2 Plumb and level individual pieces of the structural frames to a tolerance not exceeding 1 to 500, except that for exterior columns the tolerance shall not exceed 1 to 1000.

3.4.3 Straighten small bends and kinks received during transportation before members are erected. At the discretion of the Consultant replace all members seriously damaged. Provide any temporary beams required for erection purposes, and remove them when no longer required. Set column bases on steel shims or concrete screeds ready for grouting by the Concrete Section. Use wooden mallets for driving or hammering steel members into position. Do not use steel or iron sledges. Take every care to prevent the structural members from falling or being subjected to heavy shock or impact from other members being swung into position.

3.4.4 Report to the Consultant every failure of fabricated materials to fit together properly before taking any corrective measures.

3.4.5 Unless noted otherwise high-strength bolts shall be tightened in accordance with Turn-of-nut method specified in CAN/CSA S16 Design of Steel Structures.

3.5 SHOP PAINTING

3.5.1 Before commencing shop painting, clean all steel surfaces by wire brushing to remove loose mill scale, rust, oil, dirt, and other foreign matter. Clean welds prior to painting, by wire brushing and washing down with clean water, to remove the chemical residues left by the welding electrodes. Material to be painted shall be completely dry, shall be painted under cover and shall remain under cover until the paint is thoroughly dry. Apply shop paint only when the air and steel surface temperatures are above 5°C (40°F). Do not paint the following surfaces:

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- .1 Steel to be encased in concrete or to receive **contact-type** fireproofing such as intumescent fireproofing or cementitious fireproofing.
 - .2 Surfaces and edges to be field welded. If painted, remove paint for field welding for a distance of at least 50mm on all side of the joint.
 - .3 The contact surfaces of connections assembled by high-tensile bolts within friction type joints.
- 3.5.2 Apply one coat of the specified prime paint by dipping, brushing or spraying.
- 3.5.3 Work paint into all joints and open spaces.
- 3.5.4 After erection spot paint with the specified prime paint, field bolt heads and nuts, field welds and any abrasions, rust or damage to the shop coat of paint.
- 3.5.5 All steel exposed to exterior environment shall be hot dipped galvanized in accordance with CSA G164. This will include interior lintels that are connected to steel exposed to the exterior environment (i.e. a combined lintel for brick and block).

END OF SECTION

PART ONE -GENERAL

1.1 SECTION INCLUDES

- 1.1.1 Structural steel roof deck.

1.2 RELATED SECTIONS

- .1 Section 03300 - Cast-In-Place Concrete: concrete topping over metal deck.
- .2 Section 05120 – Structural Steel.
- .3 Section 07500 - Membrane Roofing: installation of acoustic deck insulation.
- .4 Section 07250 - Applied Fireproofing: cementitious fireproofing.

1.3 REFERENCES

(All Codes and Standards referred to herein are to be latest edition.)

- .1 ASTM A446: Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
- .2 CAN/CSA-S136: Cold Formed Steel Structural Members.
- .3 CSA W47.1: Certification of Companies for Fusion Welding of Steel Structures.
- .4 CSA W55.3: Resistance Welding Qualification Code for Fabricators of Structural Members Used In Buildings.
- .5 CSA W59: Welded Steel Construction (Metal Arc Welding).
- .6 Canadian Institute of Steel Construction: Handbook of Steel Construction.
- .7 CSSBI 101: Specification for Zinc Coated Structural Quality Steel Sheet for Roof and Floor Deck.

1.4 SYSTEM DESCRIPTION

- 1.4.1 Design metal roof and hi-bond floor deck to CSA-S136.
- 1.4.2 Design deck units to span continuously over 3 spans, supplied in proper length for support conditions. Roof deck is designed as a diaphragm.
- 1.4.3 Maximum Live Load Deflection: 1/360th of span.

1.5 SUBMITTALS

- 1.5.1 Submit erection and detail shop drawings to requirements of Section 01310.
- 1.5.2 Indicate decking plan, support locations, projections, openings and reinforcement, outlet box locations, pertinent details and accessories.
- 1.5.3 Design deck layout, spans, fastening, joints, and openings under the direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the Province of Ontario. Deck drawings shall be stamped by the Professional Engineer responsible for the direct supervision.

1.6 QUALITY ASSURANCE

- 1.6.1 Welding: undertaken only by organizations fully approved by the Canadian Welding Bureau, meeting the requirements of CSA W47.1 and CSA W55.3.

1.7 DELIVERY, STORAGE AND HANDLING

- 1.7.1 Transport and store the fabricated metal deck at the Site in such a manner as to ensure the panels are not bent, warped or subject to corrosion.
- 1.7.2 Damaged material will be rejected.

PART TWO - PRODUCTS

2.1 MATERIALS

- 2.1.1 Steel Roof Deck, Type B Deck: 0.91mm thick, 38mm deep; fluted steel roof deck to ASTM A653M SS Grade 275 ($F_y = 275$ MPa) galvanized steel with a zinc coating of ZF75 Galvanneal, flutes spaced at 150mm centers c/w interlocking male and female side laps. Canam **P-3615 (1.5BI)** or approved equal.
- 2.1.2
- 2.1.3
- 2.1.4 Sound Attenuating Insulation: mineral fiber sound attenuating insulation strips, shaped to fill acoustic flutes; Owens-Corning AF110.
- 2.1.5 Cover Plates, Cell Closures and Flashings: steel sheet; 0.76mm thick; ZF75 zinc coating.
- 2.1.6 Closures to External Walls: neoprene or polyvinyl chloride, closed cell type.
- 2.1.7 Sealant: as specified under Section 07900.

PART THREE - EXECUTION

3.1 EXAMINATION

- 3.1.1 Verify that field conditions are acceptable and are ready to receive work.
- 3.1.2 Ensure openings in deck required by others have been designed for.
- 3.1.3 Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

-
- 3.2.1 Erect metal decking to requirements of CSSBI standards.
 - 3.2.2 Erect decking on support surfaces with 50mm minimum bearing. Align and level.
 - 3.2.3 Fasten deck to steel support members at ends and intermediate supports with 19mm OD puddle welds at 300mm OC maximum, Marginal (perimeter) welds at 150mm OC maximum unless note otherwise, refer to deck fastening pattern schedule on drawings.
 - 3.2.4 Mechanically clinch male/female side laps at 600mm OC maximum unless noted otherwise, refer to deck fastening pattern schedule on drawings.
 - 3.2.5 Cut and structurally reinforce openings in the deck as shown and to requirements of the approved shop and erection drawings.
 - 3.2.6 Structurally reinforce openings 300mm square or smaller, but larger than 150mm square or 150mm round. Openings smaller than outlined above need not be reinforced.
 - 3.2.7 Do not allow additional openings in deck without prior written approval by Consultant.
 - 3.2.8 Install 150mm minimum wide sheet steel cover plates, of same thickness or decking, where deck changes direction. Fusion weld at 300mm OC maximum.
 - 3.2.9 Make connections and deck alignment neat and to the approval of the Consultant. Replace dented, damaged, or weld-perforated deck.
 - 3.2.10 Install wet concrete stops at floor deck edge, upturned to top surface of slab. Provide stops of sufficient strength to remain stationary without distortion during concrete pours.
 - 3.2.11 Install enclosures and angle flashings to close openings between deck and walls, columns and openings, as described below:
 - .1 Where fluted end of metal decking rests on exterior masonry walls, fill web spaces with closed cell neoprene or polyvinyl chloride closures as recommended by manufacturer.
 - .2 Where deck flutes are perpendicular to exterior walls, and decking exposed on underside extends beyond these walls, caulk interlocking side laps of decking for 400mm immediately over walls. Install interior and exterior closures. Caulk exterior closures to prevent air infiltration and interior closures to prevent water vapour exfiltration. Provide Section 07500 with sufficient quantity of closures to close off topside flutes directly over face of wall.
 - .3 Where flutes run perpendicular to interior partitions, install double run of steel closures as recommended by manufacturer.
 - .4 Where flutes are parallel to interior partitions, install steel closure flashings to provide neat juncture between two materials, as recommended by manufacturer.
 - .5 Closures are not required between interior partitions and underside of

decking in areas designated to receive suspended ceiling.

3.2.12 Provide sound attenuation strips to Section 07500 for installation in acoustic flutes.

3.3 FIELD QUALITY CONTROL

3.3.1 Field inspection and testing will be performed under Section 01410.

3.3.2 Inspect steel deck welds for structural integrity.

3.4 ADJUSTING

3.4.1 After erection and anchorage, grind smooth all welds and make good zinc coating wherever scratched, chipped or damaged.

3.4.2 Fill all holes blown through the deck during welding with weld metal.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One, General Requirements, is a part of this section and shall apply as if repeated here.

1.2 SHOP DRAWINGS

1. Submit shop drawings in sepia form in accordance with General Conditions of CCDC Document 2-2020.
2. Submit shop drawings for review by the Architect prior to fabrication.
3. Design Criteria-Applicable Standards:
 1. All standards in accordance with latest issue.
 2. CSA Standard CAN3-S16.1-M, "Steel Structures for Buildings" Limit States Design.
 3. CSA Standard W59, "Welded Steel Construction" (Metal Arc Welding).
 4. CSA Standard W.55.2, "Resistance Welding Practice."
 5. CSA Standard W55.3, "Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings."
 6. CSA Standard W.47, "Certification of Companies for Fusion Welding of Steel Structures."
 7. CSA Standard S.136, "Cold Formed Steel Structural Members".
 8. Current Ontario Building Code.
4. Certificates:
 1. Provide a certificate signed and sealed by the licensed/registered professional engineer responsible for the stair designs and the detailed steel connections (including guards) stating that the stairs and connections have been designed, detailed and fabricated in accordance with the applicable standards.
 2. Certification must bear the original seal and signature of the engineer and be dated. Photocopies are not acceptable.
3. Clearly indicate construction details, sizes of steel sections, thickness or

gauge of steel sheet, connections, joints, method of anchorage, number of anchors, supports, reinforcement and accessories. Confirm all dimensions on site.

1.3 STANDARDS

1. Materials and workmanship shall conform to the requirements of the Ontario Building Code - 1990, as currently amended.
2. Do welding work to CSA W59, unless specified otherwise. Welders to qualify under CSA W47, CSA 55.2 and CSA W55.3.
3. Design of steel fabrications, unit stresses and workmanship to conform to CSA CAN3-S16 1-M.

1.4 DESIGN CRITERIA

1. Design stair: landing construction; guards and railings and connections to conform to the Ontario Building Code.
2. Design detail and fabricate in general to CSA CAN3-S16 1-M.

1.5 QUALITY ASSURANCE

1. Welding Applicable Standards:
 1. CSA Standard W59, "Welded Steel Construction" (Metal Arc Welding).
 2. CSA Standard W.55.2, "Resistance Welding Practice."
 3. CSA Standard W55.3, "Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings."
 4. CSA Standard W.47, "Certification of Companies for Fusion Welding of Steel Structures."
 5. Fabrication and erection of **ALL** components to be by companies holding current C.W.B. Certification as Division 1 or Division 2.1. All welding by welders holding current certification for the required welding positional.

1.6 SCOPE

1. Supply and install steel bollards.
2. Supply all miscellaneous steel angles, plates, lintels, etc., indicated on the architectural drawings & not indicated on the structural drawings or noted

on the structural drawings by others. Size according to loads, set plumb and true and securely fix. Continuously weld and grind smooth exposed connections. Others may be welded or bolted.

3. Provide: lateral support for masonry, bench and shelf supports, hot dipped galv. Security gates, supports for hollow metal, supports for parapet where required, steel parapet curb where required, bent metal cavity closures at all exterior wall openings, bent metal firestop cavity closures where required.
4. Provide all miscellaneous metals (including aluminium) items as detailed and noted under other sections.
5. Provide all steel items where detailed on the Architectural drawings but not indicated on the Structural Drawings.
6. See also Fabrication in the Section.

PART 2 PRODUCTS

2.1 MATERIALS

1. Ferrous Metals:
2. Unless otherwise indicated, hot rolled mild steel in .15% to .25% carbon range.
3. Steel sections and plate: CSA G40.21-/M1987, minimum 260W grade.
4. Square steel tube: CSA G40.21-/M1987, Grade 350W.
5. Steel pipe: ASTM A53-76, Type E, Grade A.
6. Sheet Steel: hot dip galvanized, cold rolled, with stretcher level degree of flatness to ASTM A526; zinc coating designation Z275.
7. Aluminum: CSA HA Series - M1980 for aluminum and aluminum alloys, Alcan 50S Alloy.
8. Prime Paint: Zinc Chromate, rust inhibitive primer conforming to CGSB-1-GP-18M or oil alkyd type (shop coat) conforming to CGSB-1-GP-40M. Colour to be grey.
9. Expansion Joints: as specified.
10. Welding Materials: CSA W59-1984.
11. Bituminous Enamel: Alkali resistant asphaltic coating conforming to CGSB1-GP-108M.

12. Non-shrink Grout: Por-Rok by Hallemite Products Ltd., or SET 15 Minute Anchoring Cement by SET Products Ltd.
13. Galvanized Touch-Up Paint: Zinc rich, Galvafrid by W.R. Meddows of Canada Ltd. or approved equal.
14. Hot Dipped Galvanizing: conform to CSA G164-M1981.
15. Bolts and Anchor Bolts: to ASTM A307-82a.
16. Stainless Steel:
 1. Handrails to have brushed finish, Type 304 finish to be ornamental grade AISI No.4.
17. Stainless Steel for Millwork : To have brushed finish for Type 304 and Type 316; finish to be ornamental grade AISI No.4.
 1. To be used for toe kicks, trims, and baseboards where indicated.
 2. Heights as indicated on drawings

2.2 FABRICATION - GENERAL

1. Fabricate components in the shop in largest size practicable to minimize field jointing.
2. Fabricate components square, straight, true, free from warpage and other defects. Accurately cut, machine file and fit joints, corners, copes and mitres.
3. Reinforce fabricated components to safely withstand expected loads.
4. Make joints in built-up sections with hairline joints in least conspicuous locations and manner.
5. Make allowance for thermal expansion and contraction when fabricating exterior work.
6. Joints shall be welded unless otherwise indicated and unless details of construction do not permit welding. Exposed welds shall be continuous and shall be ground smooth.
7. Close exposed open ends of tubular members with welded on steel plugs.
8. Where work of other Sections is to be attached to work of this section, prepare work by drilling and tapping holes, as required to facilitate installation of such other work.

9. Work of this Section, supplied for installation under other Sections, shall be prepared as required ready for installation by: drilling, countersinking and tapping holes, forming shapes and cutting to required sizes.
10. Grind off mill stampings and fill recessed markings on steel components left exposed to view.
11. Make workmanship of best grade of modern shop and field practice known to recognized manufacturers specializing in this work. Fit joints and intersecting members accurately. Make work in true plumb, true, square, straight, level, and accurate to sizes and shapes detailed, free from distortion or defects detrimental to appearance or performance.
12. Insulate metals where necessary to prevent corrosion due to contact between dissimilar metals and between metals and masonry, concrete or plaster. Use bituminous paint, butyl tape, building paper or other approved means.
13. Supply all fastenings, anchors and accessories required for fabrication and erection of the work. Make exposed metal fastenings and accessories of same material, texture, colour and finish as base metal on which they occur unless otherwise shown or specified. Keep exposed fastenings to an absolute minimum and inconspicuous, spacing them evenly and setting them out neatly. Make fastenings of permanent type.
14. Draw mechanical joints to hairline tightness and seal countersunk screws and access holes for locking screws with metal filler where these occur on exposed surface.

2.3 FINISHES

1. Thoroughly clean steel of loose scale, rust, oil, dirt and other foreign matter. Suitably prepare steel surfaces by power tool cleaning to receive specified finishes.
2. Grind smooth sharp projections.
3. Remove oil and grease by solvent cleaning.
4. Apply coatings in the shop and before assembly. Where size permits, galvanize components after assembly.
5. Shop apply coat of primer to interior components after fabrication except where galvanized finish and stainless steel is required.
6. Hot dip galvanize exterior components and other components, where so indicated, after fabrication in accord with requirements of CSA Standard G164-M1981.
7. Apply coat of bituminous enamel to contact surfaces of metal components in

contact with cementitious materials and dissimilar metals.

8. After erection and installation, thoroughly clean the work and apply field touch up of same formula as shop coat to all damaged or unpainted surfaces. Work all paint well into all joints, crevices and open spaces.

PART 3 EXECUTION

3.1 INSTALLATION

1. Install components plumb, square, straight and true to line. Drill, cut and fit as necessary to attach this work to adjoining work.
2. Provide temporary supports and bracing required to position components until they are permanently anchored in place.
3. Securely anchor components in place; unless otherwise indicated, anchor components as follows:
 1. To concrete and solid masonry with expansion shields and bolts.
 2. To hollow construction with toggle bolts.
 3. To thin metal with screws or bolts.
 4. To thick metal with bolts or by welding.
 5. Fill space between railing members and sleeves with non-shrink grout.
 6. To wood with bolts or lag screws.
4. Provide all components required for anchoring. Make anchoring in concealed manner wherever possible. Make exposed fastenings, where approved by Architect neatly and of same material, colour, texture and finish as base metal on which they occur. Keep exposed fastenings evenly spaced.
5. Dissimilar metals and metals in contact with cementitious elements shall have contact surfaces coated with bituminous paint or be isolated by other means as approved by Architect.
6. After installation, clean and refinish injured finishes, welds, bolt heads and nuts. Refinish with zinc rich paint or primer to match original finish.

3.2 LATERAL SUPPORT FOR MASONRY

1. Provide deflection and lateral support angles for non-loadbearing masonry walls.

Coordinate with structural drawings for details and locations of structural steel joists & beams and locations of structural steel deck.

3.3 BENCH AND SHELF SUPPORTS

1. Provide all metal angles and brackets to wood benches and coat hook brackets for extent indicated. Refer to drawings and details for size and shapes. Provide 1/4" (6.5 mm) thick aluminum brackets for benches where shown on drawings.
2. Bench brackets are required in Change Rooms. Refer to 9 series drawings for locations of benches. Refer to drawings for details.
3. All items to be primed for paint after fabrication.
4. Prepare all metal work, ready to receive wood members by Section 06200 Finish Carpentry.

3.4 SECURITY GATES

1. Provide hot dipped galvanized security gates where shown on drawings.

3.5 MISCELLANEOUS ITEMS, STEEL BRACKETS SUPPORTS AND ANGLES

1. Supply for installation by respective trades, steel brackets, supports, and angles as indicated on drawings. Drill for countersunk screws and anchor bolts. Prime paint for interior, galvanize for exterior.
2. Provide support brackets for vanities and counters, cabinets and storage units as indicated.
3. Provide other metal fabrications which are not a part of a manufactured item or covered under another section in Division 5. Refer to drawings.

3.6 STEEL FOR HOLLOW METAL SCREEN/PARAPET WALL

1. Provide support steel for hollow metal work, refer to drawings. Provide for all support steel including overhead bracing for hollow metal screens where not indicated by structural drawings.

3.7 BOLLARDS

1. Supply and install hot-dipped galvanized steel bollards as shown on Drawings. Bollards shall be 150 mm x 9.5 mm thick wall x height as noted on drawing, seamless steel pipe as detailed on drawings. Install 1200 mm into a concrete foundation. Fill bollard with 25 MPa concrete and round top. Round top of footing also. Location of Bollards: as indicated on drawings and on Site Plan.

3.8 BENT METAL CAVITY CLOSURES / COMPARTMENTALIZATION CLOSURES

1. Bent Metal Closures: 12 gauge 304 stainless steel with 2B finish cold rolled formed to suit continuous bent closure profile:
 1. Around all window and curtain wall openings;
 2. Around all door openings;
 3. Around all other misc. openings through exterior cavity wall;
 4. At expansion joints and control joints.
2. Compartment Control Joint (CCJ): 12 gauge 304 stainless steel, 2B finish cold rolled formed, complete with ss reinforcing wire @ 400 o/c through slotted holes.
 1. Exterior wall locations. Install CCJ at:
 1. All exterior corners, 300mm from corner on both sides;
 2. All interior corners
3. Max. 20m horizontally on walls and wherever indicated on the drawings.

3.9 BENT METAL CAVITY FIRE STOP CLOSURES

1. Bent Metal Fire Stop Closures: 12 gauge hot dipped galvanized continuous angle. Angle dimensions to suit specific condition. Refer to Drawings for locations.

END SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One, General Requirements, is a part of this Section and shall apply as if repeated here.

1.2 STORAGE

1. Materials shall be protected from damage and kept dry during delivery and while stored at job site.
2. Do not store materials in areas where glazing is not complete or concrete completely dry.

1.3 STANDARDS

1. Materials and workmanship shall conform to the requirements of the Ontario Building Code as currently amended.

PART 2 PRODUCTS

2.1 MATERIALS

1. Sawn lumber shall be No. 2 spruce, pine or fir of best merchantable lumber, straight and sized, shaped to the correct dimensions from the nominal sizes noted on the drawings and specified herein. Lumber shall be well-seasoned stock, free from large loose resinous knots, shake, waned edges, splits, dry rot or other defects which would impair its strength or durability.
2. Moisture content of all lumber for rough carpentry, at time of building-in, shall not exceed 17%.
3. Wood Preservative: C.C.A. (chromium copper arseniate) by "Wolmanized".
4. Rough Bucks, Battens, Blocking, Framing: Eastern Spruce, Jack Pine or Fir No. 2 or better.
5. Exterior Rough Bucks Batten Blocking, Framing and Plywood and Interior Wood Attached to Masonry or Concrete: Jack Pine No. 2 or better "Wolmanized" pressure treated wood conforming to C.S.A. 081.1-M1983. Sizes as indicated on drawings and/or as required. All pressure treated lumber shall bear the trademark "Wolmanized" and bear a mark certifying conformance with AWPB Standard LP-2 or LP-22.
7. Fire Retardant Lumber: to be CSA 080.20 DRICON FRT Lumber and plywood distributed by J. Brewer (Canada) Ltd; (519) 621-7701. Sizes as indicated on drawings and/or as required.
8. Grounds, Nailing Strips, Strapping, Furring: Eastern Spruce or Jack Pine

Construction Grade allowing 10% to 15% standard grade.

9. Plywood Sheathing: Construction grade and paint grade good one side fir plywood sheathing, exterior type, conforming to C.S.A. 0121-M1978. Square edge or T&G as required.
10. Galvanized Nails and Spikes, Carriage Bolts, Screws and Washers: Hot dipped galvanized nails and spikes for exterior work and mill galvanized for interior work.
11. Nails, Spikes and Staples: To C.S.A. B111-1974, plain finish. Use spiral thread nails.
12. Adhesive: Waterproof wood adhesive.

PART 3 EXECUTION

3.1 WORKMANSHIP

1. Work shall be executed by skilled mechanics according to best practice, as specified herein and indicated on drawings.
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.
3. Bore holes for bolted work true to line and same size as bolts, drive into place for snug fit, use plate or washer to prevent nut from bearing directly on wood, and turn up nuts, bolts and lag screws tight at time of installation and again immediately before being concealed with other work or at completion of work.
4. Give painter sufficient notice so that untreated or unprimed carpentry items or materials shall be primed immediately upon delivery to site.
5. Co-operate with others engaged in work on the building to the end that proper unity of action will assure the orderly progress of the work. Do necessary boxing and protecting of sills, jambs, corners, and the like. Construct scaffold, ramps, and other temporary staging necessary.

3.2 WOOD PRESERVATIVE

1. Treat fresh cut ends of pressure-treated Jack Pine with two coats of end preservative.

3.3 ROUGH HARDWARE

1. Supply rough hardware such as nails, bolts, nuts, washer, screws, clips, strap iron, and hardware for temporary enclosures.

3.4 ROOF CURBS, BASES AND SUPPORTS

1. Construct pressure treated wood roof curbs for ventilation ducts, fan bases, etc., as detailed or required by other trades. Construct suitable approved pads to receive duct supports. Note tops of all curbs for roof top units shall be a minimum 14" (350 mm) above finished roof surface.

3.5 ROUGH BUCKS, GROUNDS, BLOCKING, STRAPPING, FURRING

1. Furring, blocking or strapping indicated is not to be regarded as exact or complete. Location and methods of securing these pieces to option of Contractor. Provide adequate nailing.
2. Cut grounds and screeds in long lengths as practical with square ends. Erect to create true, plumb planes and fasten rigidly in place.
3. Provide minimum 2" x 4" (38 mm x 89 mm) blocking as necessary for attachment of base, trim, cabinets, fixtures, hardware, miscellaneous specialties, equipment and the like unless indicated otherwise. Cut ends square and fasten rigidly to building structure.
4. Rough bucks shall be minimum 2" (38 mm) thick wood of width indicated, set straight, true and plumb, braced and fastened securely in place.
5. For general strapping, set treated wood strips vertically spaced 16" (400 mm) on centre, unless otherwise indicated. Shim so faces form a true plane. Provide intermediate horizontal strapping at all joints to wall finishes applied over grounds.

3.6 FRAMING

1. Frame walls, partitions, roofs, platforms, etc., as indicated. Note: metal studs supplied and installed under Section 09110 – Metal Stud and Ceiling Suspension Systems.

3.7 BLOCKING

1. Provide minimum 2 x 4 (38 mm x 89 mm) blocking or size as required for secure attachment of base, trims, cabinets, fixtures, miscellaneous specialties, equipment etc. and the like unless specified otherwise. Cut ends square and fasten rigidly to building structure. Coordinate blocking requirements with work of sections listed in 1.4 of this section.

3.8 PARAPETS (Typical)

1. Supply and install pressure treated wood block and framing as detailed, and exterior grade pressure treated plywood at parapets, and include blocking to allow ventilation from masonry cavity over exterior masonry allowing ventilation behind parapet flashing. Create vented space using 1" x 3" (19 mm x 75 mm) cutouts in blocking at 16" (400 mm) o.c. for ventilation. All cut ends to be primed with 2 coats of end cut wood preservative. Co-ordinate installation of air/vapour barrier membrane at back

and top of parapets with roofing and masonry trades. Installation of membrane by masonry/air barrier trade. Refer to drawings for typical detail. Secure parapet wood frame blocking to block and brick securely with tapcon type fasteners into masonry with a min. of two fasteners for each wood member at every 16" o.c.

3.8 FIRE RETARDANT WOOD

1. Electric and Telephone Backboards and Panel Boards: Supply and install 19 mm thick backboards and panel boards, fire pressure treated, fir plywood. Consult electrical drawings for locations and requirements. Provide wood strapping as required. Fasten to wall using fasteners and spacing suitable to wall type to provide secure, sturdy installation which will carry equipment load without damaging.

3.9 WINDOWSILLS

1. Supply and install first layer of plywood (pressure treated at windowsills). Second layer, nosing and plastic laminate by Finish Carpentry. Refer to drawings for detail and locations.

END OF SECTION

PART 1 GENERAL

1. GENERAL REQUIREMENTS

1. Division One - General Requirements, is a part of this Section, and shall apply as if repeated here.

2. REFERENCE STANDARDS

1. Standard of finished carpentry, metal work and cabinet work in accordance with the "Architectural Millwork Standards" of the Architectural Woodwork Manufacturers Association of Canada (AWMAC).
2. Refer to the Waterloo Region District School Board Millwork Standards for materials, details and general dimensions.

3. QUALIFICATIONS

1. The work of this trade shall be executed by a company having adequate equipment and skilled personnel. Refer to Instructions to Bidders for list of Prequalified Trades.

4. SCOPE OF WORK

1. Miscellaneous finish carpentry and installations as required for the final fit and finish of all work where not provided by the General Contractor or other Trades.
2. All trims, copings, and cappings to ensure a finished installation of all work, including transitions between existing and new work.
3. Installation of hollow metal doors.
4. The General Contractor shall have final determination of the scope of this section and coordinate the scope with the requirements of all other Trades.

5. SHOP DRAWINGS

1. Submit Shop Drawings in electronic PDF format.
2. Before Shop Drawings and fabrication are started, take critical measurements at the site to facilitate installation and fitting of work.
3. Design Criteria - Applicable Standards:
 1. All standards in accordance with latest issue.
 2. Ontario Building Code
 3. Refer to the Waterloo Region District School Board Millwork Standards for materials, details and general dimensions.

4. Certificates:

1. Provide a certificate signed and sealed by the licensed/registered professional engineer responsible for the Lobby Ceiling Feature designs and the detailed wood and steel connections stating that the feature and connections have been designed, detailed and fabricated in accordance with the applicable standards.
2. Certificates must bear the original seal and signature of the engineer and be dated. Photocopies are not acceptable.
5. Indicate construction details, sizes and wood and steel sections, thickness or gauge of wood and steel sheet, connections, joints, method of anchorage, number or anchors, supports, reinforcement and accessories. Confirm all dimensions on site.

6. DELIVERY AND STORAGE

1. Give Painter sufficient notice so that untreated or unpainted carpentry items or materials can be primed immediately upon delivery to site.
2. No equipment shall be delivered to the site until a portion of the building in which it is to be installed is completely ready for equipment as approved by the Architect.
3. Store finished work properly and keep under cover both in transit and at site. Finish woodwork shall not be delivered to site until concrete and masonry work has dried out.
4. Cover all plastic laminate and melamine faces at shop with heavy Kraft Paper.
5. Check access clearance at site before assembling.

7. SAMPLES

1. Submit duplicate 12" x 12" (300 mm x 300 mm) samples of each type of panelling and each type of solid wood or plywood to receive stain or natural finish.
2. Submit duplicate 12" (300 mm) long samples of each type of moulding.
3. Submit samples of construction methods and all hardware.

8. WARRANTY

1. The warranty period stipulated in the General Conditions of the Contract shall be extended five (5) years in writing against defects.

9. MOISTURE CONTENT

1. Finish material to be dried to a uniform maximum moisture content of 12% for exterior work and 6% to 8% for interior work.

PART 2 PRODUCTS

1. MATERIALS

1. Materials used for finish work shall be sound, free from defects that would mar finished appearance, well seasoned and air dried and of good quality for intended purposes. Wood laminates pressure bonded.
2. Plywoods: shall be rift cut or quarter sawn Oak and/or plain sliced Maple architectural grade "AA" No. 1 Face Grade and shall comply to C.S.A. 0115-M1982, with plywood core, laminated with waterproof adhesive. Plywood shall be good both sides.
3. Hardwoods - Shall be solid selected Oak / Maple Architectural Grade 'AA'. Wood shall be selected for uniform colours and graining when at stained and varnished items. Finger jointed woods will not be accepted.
4. Framing Lumber - No. 2 or better spruce, pine or fir best mercantile lumber.
5. Penetrating Sealer - "Penetrim" by Tremco Mfg. Co. (Canada) Ltd., or "1402" by MacNaughton Brooks Ltd.
6. Painted Hardwood: American Poplar ("White Wood") "C" select grade.
7. Adhesive: As recommended by manufacturer for required application and to conform to C.S.A. 0121-M1978.
8. Nails, Spikes and Staples: To C.S.A. B111-1974, plain finish nails. Use spiral thread nails and barbed staples.
9. Pressure Treated Wood: Conforming to Section 06100, sizes as indicated and detailed. **NOTE**: Warped, twisted, loose or missing knots in wood will not accepted.
10. Exposed fasteners: All exposed fasteners to be stainless steel. At exposed screw locations use stainless steel screws and cup washers.
11. Refer to drawings and details for complete list of materials to be installed.
12. Refer to the Waterloo Region District School Board Millwork Standards for materials, details and general dimensions.

PART 3 EXECUTION

1. WORKMANSHIP

1. Work shall be executed by mechanics skilled in their respective trade,

according to best practice, or specified herein and indicated on drawings.

1. Check job dimensions and conditions and notify the Architect in writing of unacceptable conditions. Do not proceed until remedial instructions are received. Commencement of work will imply acceptance of site conditions and re-working or modification of the work as deemed necessary by the Architect will be done at no extra cost to the Owner.
2. As far as practical, assemble work at the shop and deliver to the job ready for installation. Leave ample allowance for fitting and scribing on the job.
3. Fabricate work square and to the required lines.
4. Lay out work carefully as indicated 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.
5. Use treated lumber for studs, blocking nailers, furring and other wood permanently installed in building. Brush coat freshly cut ends with two coats of concentrated form of preservative.
6. Recess and conceal fasteners and anchor heads. Fill with matching wood plugs. Set nail heads and fasteners occurring within exposed interior carpentry work.
7. Provide wood members free from bruises, blemishes, mineral marks, knots, shake and other defects and select for uniform colour grain and texture. Machine and hand sand surfaces exposed in the finished work to an even, smooth surface free from defects detrimental to appearance.
8. Provide running members in the maximum lengths obtainable. Provide thickness of members in maximum dressed size of standard lumber. Where thickness of width indicated is not available in hardwoods, use glue laminations to obtain sizes required. Provide unexposed backs of veneers having the same physical characteristics as the face veneer.
9. Give painter sufficient notice so that untreated or unprimed carpentry items or materials can be primed immediately upon delivery to site. No exposed end grain of plywood shall be permitted; edging shall be solid 3/8" (10 mm) wide by thickness of plywood and of same species of wood. Finger jointed edging will not be accepted.
10. Co-operate with others engaged in work on the building to the end that proper unity of action will assure the orderly progress of the work. Do necessary boxing and protecting of sills, jambs, corners and the like. Construct scaffold, ramps, and other temporary staging necessary.

11. Chamfer edges of plastic laminate to avoid chipping.

2. INSTALLATION

1. Deliver Finish Carpentry to the site. Provide units of such sizes as will not present difficulty of entry to the place of installation. Where units are shipped in knock-down forms, provide clear instructions for assembly.
2. Install Finish Carpentry items plumb, square, true, rigid and secure with concealed fastening at exposed areas and with stainless steel screws and cup washers where secured inside of millwork units.

END OF SECTION

1. GENERAL

1. GENERAL REQUIREMENTS

1. Division One, General Requirements, is a part of this Section, and shall apply as if repeated here.

2. REFERENCE STANDARDS

1. Standard of finished carpentry, metalwork and cabinet work in accordance with the "Millwork Standards" of the Architectural Woodwork Manufacturers Association of Canada (AWMAC).

3. QUALIFICATIONS

1. The work of this trade shall be executed by a company having a minimum of 5 years proven first class experience in this type of work and having adequate equipment and skilled personnel. Contractor to be from pre-approved list.

4. WORK INCLUDED

1. Provide prefinished cabinets, display cases, shelving units, counters, vanities, and similar items where shown on drawings and as specified herein, and as needed for a complete and proper installation.
2. Provision of rough hardware, including fastening devices required to secure in place items of carpentry and millwork.
3. Supply and installation of finishing hardware for millwork by this millwork contractor Section 06400 – Architectural Woodwork.
4. Supply and installation of grilles, etc. on millwork items.
5. Installation of all miscellaneous metals for millwork items by Section 05500 Miscellaneous Metals.
6. Supply and installation miscellaneous trims, scribes, filler panels.
7. Provide cutouts in the counter tops for the sinks, electrical outlets and all other necessary cutouts regarding the millwork.

5. SHOP DRAWINGS

1. Submit Shop Drawings in accordance with Section 01300 – Submittals.
2. Before shop drawings and fabrication is started, take critical measurements at the site to facilitate installation, fitting of work and access required to move millwork into final location. Take such

measurements prior to fabrication of the Work of this Section and in ample time to avoid delays in the work.

3. Draw Shop Drawings in related and/or dimensional positions with sections. Scale minimum 1:10. Shop drawing detail numbering to be same as Architectural Drawing detail numbering.
4. Shop Drawings shall show fabrication details, materials, jointing, description of anchorage and hardware.

6. DELIVERY AND STORAGE

1. Give Painter sufficient notice so that untreated or unprimed carpentry items or materials can be primed immediately upon delivery to site.
2. No equipment shall be delivered to the site until portion of the building in which it is to be installed is completely ready for equipment as approved by Architect.
3. Store finished work properly and keep under cover both in transit and at site. Finish woodwork shall not be delivered to site until concrete and masonry work has dried out.
4. Cover all plastic laminate and prefinished top surfaces at shop with heavy Kraft Paper.
5. Carefully protect from damage of any kind.

7. SHOP FINISH

1. All cabinet work, to be shop finished by this Section as per Section 09900 – Painting and Finishing.

8. SAMPLES

1. Submit duplicate 12"x12" (300 mm x 300 mm) samples of each type of paneling (plastic laminate, melamine c/w edging) and each type of solid wood or plywood to receive stain or natural finish.
2. Submit duplicate 12" (300 mm) long samples of each type of moulding.
3. Submit samples of construction methods and of all hardware.

9. INTENT

1. The intent of this Section is that the majority of the casework is to be constructed of melamine composite panels as detailed on the drawings. Some items require hardwood veneer plywood construction as detailed on the drawings. All casework shall be manufactured in transportable

sections and finished at the plant, delivered to the Site and immediately installed by this Section including provision of necessary strapping, backings, bearers, rough hardware and finish hardware and miscellaneous support metals and stainless steel metal components. Touch up finish immediately prior to completion of the Work and leave in perfect condition.

10. CO-OPERATION

1. Water, drainage and air piping, faucets, traps, ventilation ducts, sinks, electric receptacles and wiring are supplied and installed by the Mechanical and Electrical Sections at all rooms. Co-ordinate the work with these trades and make provision in the construction of the fitments to accommodate this work. Methods of construction shall be such as to permit mechanical and electrical work being concealed in the fitments, cut and frame accordingly, provide removal access panels in the units or provide proper access for installation and repairs.
2. Cabinet hardware, pilaster strips, locks, finishing hardware and miscellaneous metals will be supplied by this Section.
3. Woodwork, not shop primed, will be primed and back painted as per painting section immediately upon delivery to the site. Care shall be taken that all surfaces cut after priming are brush coated with an approved primer before installation. This section to ensure that woodwork and trim which are to be installed directly against masonry are back painted with one coat of priming paint before installation.
4. Work of this Section shall be coordinated with work of other sections where such work is adjacent to or dependent on the placement of the Work of this Section. Review all drawings for all such related work and coordinate scheduling, sizes, mounting location, required cutouts, clearances, etc. required for proper installation of all related work. Modification of the Work of this Section due to lack of coordination will be done at no extra cost to the Owner.

11. MAINTENANCE

1. Provide Owner with printed instructions for "Care and Maintenance of Plastic Laminate" and millwork finishes.

12. WARRANTY

1. Warranty workmanship against manufacturing defects, including warpage or delamination, for a period of five (5) years from date of acceptance of the completed installation. Make good or replace work showing defects in this period, as requested, at no expense to the Owner.

2. PRODUCTS

1. MATERIALS

1. Finishing Work: Materials used for finish work shall be sound, free from defects that would mar finished appearance, seasoned and air dried and of good quality for intended purposes. Wood laminates pressure bonded.
2. **WD1** - Hardwood Veneer Plywoods:
 1. Select Quarter Sawn Oak architectural Grade 'A' No. 1 Face grade (varnish grade) as in compliance with C.S.A. 0115-M1982 with a minimum 5 ply plywood veneer waterproof core, **stained to match MEL1.** Plywood shall be good both sides except where concealed by construction. Exposed faces to be natural grade per AWMAC. Interior of doors to be classified as exposed.
3. Plywoods:
 1. Select Plain Sliced Maple architectural Grade 'A' No. 1 Face grade (varnish grade) as in compliance with C.S.A. 0115-M1982 with a minimum 5 ply plywood veneer waterproof core, laminated with waterproof adhesive. Plywood shall be good both sides except where concealed by construction. Exposed faces to be natural grade per AWMAC. Interior of doors to be classified as exposed.
4. Hardwood: shall be selected Clear Maple, all shall be Architectural Grade (knots will not be accepted). It shall be selected for colours and graining when used for stain work.
5. Wood Edging: 1/8" (3 mm) hardwood to match plywood unless indicated otherwise (if maple, use hard maple).
6. **MEL1** - Melamine Faced Particle Board: to CAN3-0.188.1-M78, grade "R" particle board sanded faces, 13 mm, 16 mm, 19 mm, 28.6 mm and 32 mm thickness, faced with laminated plastic. Melamine resin impregnated cover sheet with coloured and/or patterned paper inner layer. Melamine shall be thermally fused to rigid particle board substrate. Melamine faces shall be 130 Gram Weight Paper. Maximum three colours/patterns to be chosen by Consultant from manufacturer's full range. The majority of the millwork colour will be Mojave L546 (A) as manufactured by Tafisa
7. Melamine Faced Particle Board Edge Banding: solid polyvinylchloride (PVC), 3 mm thickness x full width of board. PVC to be wood grain type to match melamine face by Canada Wood tape or approved colour equal. Edging rigid PVC with a measured degree of hardness of "95 shore D" and thickness of "3mm (+0.15mm, -0.2mm)" with the primer side having a concave measuring 0.10 to 0.25mm. All edges and all corners of this 3mm PVC edge banding are to be machined to a 3mm radius for all cabinet parts

Edging adhesive: ethylene vinyl acetate thermal set adhesive with a temperature resistance of not less than 100 degrees C; A Processing range of 190 degrees - 200 degrees C and natural in colour.

Edging is to be applied using only equipment designed for the application of thick PVC in strict accordance with the specifications of both the thick PVC and hot-melt adhesive manufactures.

Care should be taken during application to achieve the thinnest glue line consistent with a good bond without causing skips or unspread areas. Colour to be "Hardrock Maple" unless otherwise noted.

8. Plywood Concealed by Construction: Douglas Fir plywood shall be veneer core, waterproof, bonded, sanded, complying with C.S.A. 0121-M1978. Solid grade where concealed by construction.
9. Concealed Framing Lumber: N.L.G.A.C. select eastern white pine, kiln dried to a 5% moisture content.
10. Unexposed Plywood for Framing: Waterproof fir plywood minimum 1/2" (12.7 mm) thickness unless indicated otherwise.
11. Adhesive:
 1. Waterproof synthetic resinous glue of approved general type conforming to C.S.A. 0112.
 2. For plastic laminate - as recommended by plastic laminate manufacturer and to conform to C.S.A. 0120-M1978.
 3. Approved waterproof type.
12. Plastic Laminate:
 1. Laminated Plastic for Flatwork: .062" (1.6 mm) thick decorative surfaced, high pressure laminated plastic sheeting to conform to CAN3-A172-M1979 Grade G.P., Type 1. Manufacturer shall thoroughly sand back of sheet to form a homogeneous bonding surface. Plastic laminates shall be as manufactured by Arborite, Formica, Wilsonart or Nevamar. Backing sheet .020" (.5 mm) thick, sanded one side. Products may be selected based upon manufacturer's full standard range of colours, patterns and textures. Allow for 8 different colours, Architect to confirm final selection. Alternates for below colours are not acceptable.
 2. Laminated plastic for postforming work and preforming work: to CAN3-A172-M79 Grade P.F., Type 3, .050" (1.25 mm) thick, based on standard colours with suede finishes as selected by Architect. Plastic laminates shall be as noted in 1.

13. Nails and Staples: To C.S.A. Bill-1974. Use spiral threaded nails and barbed staples.
14. Architectural Woodwork Finish: Refer to Section 09900 – Painting and Finishing.
15. Shelves: adjustable shelves longer than 950 mm and fixed shelves without centre supports longer than 950 mm to be 28.6 mm thick wood veneer plywood detailed. Shelves shorter than lengths specified above are to be 19 mm thick melamine composite panels. Front and rear edges of adjustable shelves to have solid wood edges if plywood construction. Front edges of fixed shelves to have solid wood edges, rear edge to be secured to cabinet back panel.
16. Miscellaneous Metals: Miscellaneous angles, tubes, brackets, supports, etc. as noted/ detailed on drawings or as required for complete and proper installation. provided by Section 05500 – Miscellaneous Metals.
17. Egg Crate: 12mm x 12mm x 12mm deep chrome finished plastic egg grate louvre in display cabinet, complete with chrome finished support angle trim equal to standard Acoustic Ceiling corner angle.
18. Glazing: Doors shall be Oldcastle Glass Entrance System and shelves 6mm tempered clear glazing, complete with CRL Viennig 045 Series Chrome 135° Glass to Glass hinge swinging doors complete with locks. Glass to conform to Glass and Glazing Section 08800.
19. Aluminum Angles: 50 mm x 50 mm x 3 mm aluminum angles for vertical corners at mobile storage units where indicated on drawings.
20. Exposed Fasteners: All millwork units secured to walls shall be secured with stainless steel screws and cup washers. All specialty fasteners such as acorn head bolts shall be supplied and installed by this section. Submit samples for Architect's approval. All exposed fasteners to be stainless steel.
21. Aluminum Grilles: Brush finished aluminum size as indicated on drawings.
22. Toe Kicks: All toe kicks to be 3/4" (19mm) veneer core waterproof fir or spruce plywood

2. HARDWARE

1. The cabinet work manufacturer shall furnish and install cabinet hardware. Finish of hardware shall be used US26D or US28 depending on base

material. Hardware shall be manufactured as follows or approved equal:

1. Hinges: Cupboard doors 3/4" (19mm) - Hettich - Selekt Pro 2000 - 270E Degrees opening.
2. Cabinet locks:
 0. Cupboard doors: 3/4" (19mm) - Hafele Lock two way latch.
 1. Cupboard drawers: 3/4" (19mm) - Hafele Lock.
 2. All cupboard doors in a room to be keyed the same. Each room to be keyed different. Provide 6 master keys for cupboard locks.
3. Pulls (door/drawers): Richelieu #BP245a70, 170 Finish or approved equal.
4. Drawer Slides: Hettich full extension ball bearing slide KA 5632
5. Display Case hanging shelves & cables:
 1. CR Laurence Floor to Ceiling Cable Kit for 10mm tempered glass shelves, length to suit glass shelf width & height as shown on details (approx. 720mm x 1620mm); item #Y0001CR. Stainless steel aircraft cable and nickel plated components including tensioner, adapter, cable holders and cover disks, hanger bolts, threaded studs and shelf connectors to provide a complete system.
6. Display Case Door Hardware
 1. CRL Chrome - Free Swinging Offset Pivot Hinge, item #FA-044CH, 180° Glass to Wall hinge. Glass to conform to Glass and Glazing Section 08800.
 2. CRL Brushed Nickel Cam Lock with offset cam for hinged glass doors; item #D805BN, keyed alike.
7. Computer Grommets: Standard recessed 3" (75mm) diameter. Colour as selected by Architect.
8. Slide Bolts: Gallery 73 - 3" (75 mm).
9. Shelf Standards: Knappe & Vogt #255.
10. Shelf Clips: Knappe & Vogt #256 - for pre-drilled 32mm spaced holes in all gables.

11. Shelf Brackets (fixed shelves): 8 x 10 Knappe & Vogt or Stanley.
12. Silencer bumpers: mechanically fastened rubber or neoprene bumper (at all cupboard door and drawer fronts).
13. Coat Rods: Heavy duty stainless steel.
14. Coat hooks: Kitchener Forging 209 zinc plated model.
15. Teachers Closets/Storage Cabinet Doors hardware:
 1. Keyed cylinder for both doors: provided by Section 08700 - Finish hardware and installed by this Section.

3. FABRICATION

1. General

1. Fitments shall be machined, assembled in mill where possible and delivered to job in units. Construct in accordance with details using first class cabinet construction with joints dowelled, glued and properly fastened.
2. Check job dimensions and conditions and notify the Architect in writing of unacceptable conditions. Design construction methods for expansion. Do not proceed until remedial instructions are received.
3. Deliver work to the job ready for installation. Leave ample allowance for fitting and scribing on the job. Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings, Design units to fit together if site assembly is required.
4. Fabricate work square and to the required lines. Recess and conceal fasteners and anchor heads. Fill with matching wood plugs.
5. Comply with glue manufacturer's recommendations for lumber moisture content, glue life, pot life, working life, mixing spreading, assembly time, time under pressure and ambient temperature.
6. The interior of counters, cupboards, shelving units, desks, shall be considered "exposed". Counter tops which are to receive plastic laminate coverings may be 3/4" (19 mm) thick sanded veneer core plywood. Plywood platewood core shall be used for shelving and gables, countertops and high moisture areas unless specifically called for as solid material. Provide biscuit wafers fully glued at all counter top butt joints c/w two draw bolts Richelieu 516-2G.

7. Refer to Drawings and Architectural Detail Sheets for location, details, number of units required and location of fittings.
8. Interior fitments shall be complete in every respect with special fittings required and hardware.
9. Provide exposed end grain of solid members and edges of exposed plywood with matching solid hardwood edging at least 1/4" (6.4 mm) thick and thicker where specified. At melamine faced particle board provide 3 mm P.V.C. edging complete with 3 mm radius on all exposed edges and corners. Edging to melamine faced particle board shall be applied with an Edge-Bander using hot melt adhesive.
10. Make all necessary cut-outs in the furniture for sinks, appliances, and electrical switch and outlet boxes and pre-drill all mounting holes for faucets, fittings and outlet boxes. Refer to electrical and mechanical drawings and specifications.
11. Provide and install pipe covers, scribing pieces, top, bottom and/or closures and filler panels where necessary, including wherever units require furring out or blocking to existing conduits, pipes, etc.
12. Service cover panels to be provided at all kneehole drawer units, kneehole front rails and knee drawer table assemblies. End closing panels to be provided at all exposed ends of service strips and island/peninsula assemblies. Front filler panels to be provided where called for on Drawings and as required by field conditions.
13. Telephone and electrical receptacles and wiring are specified under Electrical Division. Co-ordinate work of this trade, make provision to accommodate this work and cut tops for and provide wood bearers for support.
14. Cooperate with others engaged in work on the building to the end that proper unity of action will assure the orderly progress of the work. Do necessary boxing and protecting of sills, jambs, and the like. Construct scaffold, ramps, and other temporary staging necessary.
15. Provide 3/4" (19 mm) plywood adjustable or fixed shelving where detailed. Maximum unsupported span for shelving shall be 3'-0" (900 mm). Fixed shelves shall be housed into gables and divisions. Where adjustable shelves are set on angle clips on metal pilaster strips occurring on both sides of a divider, they shall be staggered. **NOTE:** All adjustable shelves on metal pilasters shall have pilaster recessed flush with face of the gables. Where shelves are set on clips only, gables shall be drilled 32 mm o.c. for total height of gables. Provide 3 rows of holes and clips for shelves deeper than 400 mm.

16. The plywood used in interior fitments throughout regardless of whether for paint or stain finish, shall have exposed edges edged with solid strips 1/4" (6 mm) wide, unless noted otherwise by full thickness of plywood. No exposed edges of plywood will be permitted. Strips shall be glued and accurately fixed to edges. Adjustable shelves shall have strips applied to front edge.
17. Exposed framing members and trim shall be solid hard maple or birch.
18. Plastic laminate coverings to fitments, cupboards and counters shall be in colours selected by Architect, and applied in accordance with manufacturer's directions. Where plastic laminate occurs, exposed edges and edges around cut-outs such as sinks shall be edged in the same material. Where tops and splashbacks are indicated, the laminate backing sheets shall be used on back face of material on which plastic laminate facing sheets are applied to minimize twist. Bond plastic laminate using waterproof glue. Self edging shall be 1/16" (1.5 mm) material electro pressure sealed and with edges beveled. Joints will not be permitted except in lengths exceeding 8'-0" (2400 mm) in length. Butt joints tightly together. Chamfer edges of plastic laminate to avoid chipping. Apply backing sheet to plywood. Seal remaining exposed edges of surfaces with heavy Kraft paper prior to shipment. Paper shall not be removed until final cleaning. When cutting holes in plastic laminate work, corners shall be rounded and filed smooth.
19. When cutting holes in plastic laminate work, corners shall be rounded and filed smooth.
20. Protection erected by this trade shall be removed, damage to this work and adjoining work due to the lack or failure of such protection, made good and debris, surplus materials, plant and equipment removed and premises and the whole left clean and tidy to Architect's satisfaction.
21. Fabricate all plywood and melamine faced particle board backs, gables and bottoms of millwork units together by means of 8 mm x 25 mm hardwood dowels or with hardwood biscuits. All backs to be 5/8" (16 mm) stock. Dowel all panel cabinet components using 5 mm x 25 mm hardwood dowels or biscuits at maximum 4" (100 mm) o.c. All drawer bottoms and backs are 2" stock or greater. All exposed edges to be at least 1/4" (6.4 mm) thick matching hardwood edge banding at Maple units and thicker where specified. At melamine faced particle board (alternate price) provide 3 mm P.V.C. edging complete with 3 mm radius on all exposed edges and corners. Kick material for normal application shall be 3/4" (19 mm) waterproof fir plywood to be

used. Resilient base by Section 09650 and quarry tile base by Section 09300.

2. Cupboard Doors

1. Doors at teacher's closets and as noted on drawings shall be 44mm thick solid core wood doors stained to match MEL1.
2. Cabinet doors shall be 3/4" (19 mm) thick europly core veneer plywood. Doors shall be flush, slab type, accurately fitted, free of warp and twist. Care must be taken in sawing and assembling so that there is no splintering of finish face. Splintered doors that mar the appearance will be rejected by the Architect.
3. Provide two door silencers/bumpers per panel mechanically fastened to the cabinet frames.

3. Drawers

1. Fronts, sides and backs shall be solid. Fronts 3/4" (19 mm) thick, sides and backs 1/2" (13 mm) thick. Drawer bottoms shall be 1/4" (6 mm) thick plywood, grooved into sides and front and nailed to underside of drawer backs. Sides shall be fitted to fronts with dovetail joints, grooved to receive backs.
2. Fronts to match cupboard doors finish.
3. Provide all drawers with spring hinged stops to prevent accidental removal.
4. Provide two drawer silencers/bumpers per drawer panel mechanically fastened to the cabinet frame.

4. Counters, Cupboards, Shelving, Reception Desk etc.

1. Frame as detailed:
 1. with 3/4" (19 mm) thick, or as noted otherwise, plywood gables, backs, tops and bottoms. House intermediate dividers and plywood backs, into gables and top and bottom shelves, for all fitments. Plywood shall be birch or maple as called for in this Section unless otherwise indicated.
 2. Counter tops with sinks to be 3/4" (19 mm) waterproof fir plywood post formed with solid bullnose & coved backsplash and plastic laminate finish as specified herein.

2. Cut countertops for sinks and provide bearers. Provide splashback at back of sink for entire length of the unit and at return ends where walls occur.
3. Countertop and splashback will be plastic laminate unless noted otherwise.
4. Provide removable plywood access panels, screwed in place, where necessary for access to concealed wiring.
5. Fit trim and scribe moulds to fitments as shown and as required to hide voids at walls, partitions and ceilings.
6. Provide cut-outs for inserts, outlets, grilles, appliances, etc. occurring in fitments.
7. Bottom of units blocked up to form a 4" (100 mm) high x 3" (75 mm) deep toe space and fabricated with waterproof plywood tenoned to gables (for melamine units as well).
8. Fit fillers between fitments, of same material as fitments, where necessary to fill voids between fitments and walls.
9. Corners of countertops that do not butt against a wall or fixed object, shall be rounded with 1" (25 mm) radius corners.
10. Lighting fixtures and outlets to be supplied and installed under Electrical Sections. Provide all necessary cutouts, clearances, etc. for work by Electrical Sections.
11. Provide cutouts and access panels where required for Mechanical Sections and covers over ductwork (stove exhaust fans) or piping that run exposed above counters and upper shelves. Coordinate with Mechanical Sections for locations and quantities.
12. Provide extended top, bottom, and exposed gables where furring out of upper cupboards is required due to pipes, conduits, and the like behind to provide a flush face at walls.
13. Side splash at counter tops required only when the distance between the side of a sink and the adjacent vertical surface is less than 400mm.
14. Plastic Laminate Work:
 1. Comply with CAN3-A172-M79, Appendix "A".
 2. Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Provide cores of

not less than 3/4" (19 mm) nominal thickness solid face Douglas Fir.

3. Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.
4. Use straight self-edging laminate strip .062" (1.6 mm) thick for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 deg. Do not mitre laminate edges. Curved self edging shall be postformed material or bending grade.
5. Apply laminate backing sheet to reverse side of core of plastic laminate work. Provide backing sheet of sufficient thickness to compensate for stresses caused by the facing sheet.
6. Locate joints where indicated, where not indicated at approximately 8'-0" (2440 mm) or 12'-0" (3660 mm) centres also include joints at corners, and changes in superficial area.
7. Accurately fit decorative laminate together to provide tight, flush, butt joints. Joints in cored panels shall be made with 3" (6 mm) blind splines and draw bolts, one draw bolt for widths up to 6" (150 mm), two or more draw bolts at maximum 18" (450 mm) o.c. for widths exceeding 6" (150 mm).
8. Keep joints min. 2'-0" (300 mm) from sink cutouts.
9. Seal the core at joints and exposed edges with sealer.

4. EXECUTION

1. PREPARATION AND PROTECTION

1. Protect work of other trades from damage.
2. Make good any resulting damage, to the satisfaction of the Consultant, at no additional cost to the owner.

2. WORKMANSHIP

1. Fabricate and install work in accordance with the best practice. Finished work shall be free from drag, feathers, slivers or roughness of any kind. Remove machine marks by sanding. Give finished work smooth surfaces, ready for painting or varnish application.

2. Mortise and tenon joints shall be glued and pinned. All panels shall be secured together with specified glued and dowelled method. Glue blind screw all fabricated component work unless otherwise specified. Set surface nails and plug countersunk screws with matching wood plugs. Use screws with cap washers where units with doors are secured to walls behind.
3. Finished woodwork shall be free from bruises, blemishes, mineral marks, knots, shakes and other defects.
4. All metal items such as grilles, tracks, supports, legs, brackets, etc. supplied by other trades shall be built into fitments, panelling, wood doors, etc., in strict accordance with directions of trades supplying such.
5. Furnish rough hardware, nails, expansion shields, screws, brackets and incidentals required to assemble and install the fitments in their proper locations.
6. Fit small scribe moulds or fillers of same materials as fitment to hide or fill voids at walls, partitions ceilings, furrings, exposed tops of millwork units, at base locations where rubber base occurs.
7. Support for Hanging Cabinets and Shelves: All cabinets and shelves shall be supported 1" x 3" (65 mm) hardwood bearers and prevented from tipping with steel angles fastened to top of cabinet or shelf, spaced 36" (900 mm) O.C. and lagged into wall surface. 1" (19 mm) x 2" (44 mm) hardwood rails shall be at top and bottom of cabinet or shelf unit, secured into gables of units and fastened to supporting wall with expansion shields and lag screws. Where bulkheads occur over cabinets, upper framing shall be secured to the ceiling.

3. MILLWORK WORKMANSHIP

1. Fitments shall have joints dowelled and all joints shall be glued and nailed or screwed. All cabinet bases shall be of 3/4" plywood, blocked 3'-0" O.C. maximum and at corners.
2. All plywood used in millwork shall be maple and birch faced graded for stain finish. Counter tops shall have splash backs where sinks occur.
3. Shelving shall be 3/4" (19 mm) plywood, adjustable or fixed as detailed. Maximum unsupported span for shelving shall be 3'-0" (900 mm). Adjustable shelves shall be set on angle clips on metal pilaster strips. Loose shelves shall have hardwood edges on all edges.
4. Laminates shall be pressure bonded to back-up board. Counter tops shall be self edged and have plastic laminate covered back splash. Back-up material for counter tops shall be waterproof plywood core.

5. Plastic laminate surface shall be level, without bubbles and core ghosting. Core edges in counter cut outs shall be sealed with asphalt compound. All exposed plastic edges shall be matched and sanded.

4. INSTALLATION

1. Installation and assembly work on the job shall be executed by skilled forces under supervision of a competent joinery foreman.
2. Furnish rough hardware, nails, expansion shields, screws, brackets and incidentals required to assemble and install fitments in proper locations. Units shall be adequately fastened and secured in place with concealed fixings wherever possible. Include grounds and furring where required.
3. Fitments shall be installed level, plumb and true and complete in all respects.
4. Provide smooth surfaces with fastenings sunk and filled over to receive stain and sealer.
5. Use draw bolts in countertop joints. Two per joint to be Richelieu 516-2G.
6. At junction of plastic laminate counter, back splash and adjacent wall finish, apply small bead of silicone sealant as per Section 07900 in colour as selected by Architect.
7. Apply water resistant building paper over wood framing members in contact with masonry or cementitious construction.
8. Commencement of installation implies acceptance of adjacent site conditions and coordination of related work of other sections.

5. HARDWARE INSTALLATION

1. Locate hinges in accordance with manufacturer of hinge and with best standard practice. Set knobs, locks, and cylinders square with doors and escutcheons plumb. Apply accurately and neatly, to operate quietly and smoothly. Knobs shall turn easily, bolts slide freely and smoothly.
2. All cupboard doors and drawer locks except as noted below, shall be keyed alike in each room unless otherwise stated. All such keys shall be labeled as to their lock location and shall be turned over to the Owner. All locks, slide bolts, etc. shall be supplied with the appropriate strikes and screws. Provide slide bolts at all locked pair of doors on interior side of door leaf without lock.
NOTE: No locks on doors below sink units.
3. All pilaster strips, where specified, shall be recess mounted and installed with the numbers on the pilaster at equal heights.

4. All drawers shall be fitted with side mounted ball bearing drawer slides and spring hinged stops to prevent accidental removal.
5. At completion of the work, moving parts shall be gone over, made to work easily, smoothly and efficiently. Work carefully cleaned down and left in complete and finished condition satisfactory to Architect.
6. FLOORING BASE
 1. Supply and installation of Resilient Base at millwork units as indicated is by Section 09650 for rubber base locations and Section 09300 for porcelain tile locations.
 2. Provide hardwood base to match millwork where rooms are finished with wood base.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One, General Requirements, is a part of this Section and shall apply as if repeated here.

1.2 WORK INCLUDED

1. Materials and installation methods for self adhered sheet applied air barrier located within cavity wall construction on warm side of cavity insulation as detailed around window and door openings; at control joint and expansion joint locations; over roof parapets and curbs.
2. Materials and installation methods for air/vapour barrier located in the non-accessible part of non masonry walls, such as roof tie-in to curtain wall and tie in over parapets and roof curbs on to roof deck.
3. Materials and installation to bridge and seal openings and penetrations of window frames, fasteners, ties, roof deck, structural steel and similar leakage paths in the wall.

1.3 QUALITY ASSURANCE

1. All Air/Vapour Barrier products shall be applied by a contractor currently approved by Air/Vapour Barrier manufacturer and with mechanics with a minimum 5 years' experience with the installation of this specified system. Provide written evidence of approval.

1.4 SUBMITTALS

1. Product Data: Provide data on material characteristics, performance characteristics, limitations and independent air leakage, sustained wind load and gust wind test data.
2. Submit shop drawings indicating all details of connections to roof decks and masonry flashings.
3. Submit samples of air/vapour barrier membrane which has the factory applied identification of the manufacturer clearly marked on it.

1.5 DELIVERY AND STORAGE

1. Deliver materials in original unopened packaging with all labels intact.
2. When stored at the job site, materials shall be protected from the weather by the proper use of raised platforms and waterproof coverings. Pallets of membrane shall not be double-stacked on the job site. Materials should not be stored at

continuous temperatures above 38 deg. C. (100 deg. F.). Consult precaution statements on product label before use.

1.6. MOCK-UP

1. Construct typical exterior wall sample panel 4'-0" (1200mm) long by 4'-0" (1200mm) wide, incorporating frame, insulation and junction with roof membrane, illustrating materials interface and seals.
2. Locate where directed.
3. Allow 48 hours for inspection of mock-up by Architect before proceeding with air/vapour barrier work.

1.7. PRE-INSTALLATION CONFERENCE

1. Convene two weeks prior to commencing work of this Section on date of bi-weekly construction meeting with the Architect present.

1.8. ENVIRONMENTAL REQUIREMENTS

1. Ensure application temperature and humidity recommended by material manufacturer is maintained before, during and after installation.

1.9. SEQUENCING

1. Sequence work to permit installation of materials in conjunction with related materials and seals.

1.10. COORDINATION

1. Coordinate work of this section with all sections referencing this section.

1.11. WARRANTY

1. The product manufacturer shall provide a certificate certifying the performance of his products for a period of 5 years from date of acceptance.
2. The installation contractor shall provide a certificate certifying all work shall remain in place as installed free from any membrane defect for a period of 5 years from acceptance.

PART 2 PRODUCTS

2.1. MATERIALS

1. Air/Vapour Barrier: (torch applied) Bakor "Blueskin TG" SBS modified bitumen, reinforced thermofusible membrane, with an average thickness of 100 mils. Membrane is a torch applied membrane.

2. Transition Membrane: Same as Air/Vapour barrier, Bakor Blueskin SA may be used in heat sensitive areas and if weather permits on other areas of the building. Blueskin SA is not appropriate for general use during winter conditions or wet conditions.
3. Primer for "Blueskin TG": Bakor 930-18.
4. Air barrier sealant: Bakor Air Bloc 21 or 230-21 Adhesive.
5. Air Barrier sheet membrane: Bakor Blueskin VP 160 peel and stick membrane. Approved alternate: SRP AirOutshield SA 280.
6. Substrate Cleaner: Mineral spirits or xylol.
7. Liquid Sealant (Around Openings, Pipe Penetrations Prior to Membrane Installation): Bakor Air Bloc 21.
8. End of Membrane Sealant: Bakor Air Bloc 06.
9. Alternates: Air-Shield and Air-Shield LM by WR Meadows.

PART 3 EXECUTION

3.1 EXAMINATION

1. Verify that surfaces and conditions are suitable prior to commencing work of this section. Notify Architect in writing of any discrepancies.
2. Commencement of work or any parts thereof will imply the acceptance of the substrate by the installer.
3. Ensure that:
 1. Surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants.
 2. Concrete surfaces are cured and dry, smooth without large voids, spoiled areas or sharp protrusions.
 3. Masonry joints are flush and completely filled with mortar, and all excess mortar sitting on masonry ties has been removed.

3.2 PREPARATION

1. Remove loose or foreign matter which might impair adhesion of materials.
2. Fill any voids with mastic substrate filler.

3. Clean and prime substrate joint/connection surfaces to receive transition strip in accordance with manufacturer's instructions.

3.3 INSTALLATION OF PRIMER

1. All surfaces required by manufacturer to receive air/vapour barrier must be completely primed by lambs wool roller, brush or spray equipment.
2. Apply at a rate of 4m²/L (200ft²/gal) depending on porosity and texture of surface or as directed by manufacturer.
3. Primed surfaces not covered during the same working day must be reprimed.

3.4 INSTALLATION OF AIR/VAPOUR BARRIER AND TRANSITION MEMBRANE

1. Install membrane horizontally with the sheet starting at the bottom and work progressing up the wall in an overlapping shingle fashion.
2. Position membrane for alignment. When membrane is in place, cut for ties or projections. When membrane is in place, apply heat to the underside of the membrane by propane torch at the point of contact with the substrate. Apply sufficient heat to make the bitumen tacky and firmly press membrane onto substrate to ensure complete contact and bond for the full extent of the membrane with no air bubbles.
3. Overlap all joints in membrane a min. 2" (51 mm) and use a heated trowel to fully seal laps with no air bubbles.
4. All inside corners shall be double covered with initial strap of 12" (300 mm) width centred.
5. Construction and control joints, double ply covered with initial strip of 6" (150 mm) width and second strip of 18" (460 mm) width.
6. Areas around drains, piping, vents, etc. shall be liberally coated with Air Bloc 21 for radius of 6" (150 mm) around drain hub piping vents, etc. before and after application of membrane.
7. Seal around any openings with Air-Bloc 21 with a minimum 2 ½" (64mm) overlap.
8. Seal end of membrane where it meets the substrate at the end of the days' work with Air-Bloc 21.
9. At all detail areas ensure continuity of air/vapour barrier to ensure continuous air tightness without gaps or air bubbles, especially at all corners, junctions, window and door locations. In corners and difficult areas, use "Vedatex Adhesive" to allow for sealing and application of reinforcing pieces of membrane.

10. Mechanical attachment must be made at windows, doors, louvres and curtain walls as per manufacturer's recommendations.
11. Install membrane down over metal through wall flashings (by Section 04200) with a min. 2" (50 mm) overlap at end joints.
12. Ensure all projections, including wall ties, are properly sealed by using a heated trowel to butter compound at the interface.
13. No gaps or air bubbles will be accepted. Remove and reinstall at Architects discretion where required.

3.5 PRECAUTIONS

1. Do not leave membrane exposed for more than 6 weeks. Install insulation as soon as possible to protect the membrane from damage by other trades.
2. Provide support for air/vapour barrier system on back and/or bottom side where it crossed over gaps such as masonry wall cavities, etc. Use copper flashing to support air/vapour barrier at gaps.

3.6 JOB COMPLETION

1. The contractor shall inspect the completed membrane and correct all defects to meet the specification.
2. Clean up all debris, excess materials and equipment and remove from site.
3. Any drippage or spills of coating sealant, mastic or primers shall be cleaned.
4. The General Contractor shall restrict construction traffic and equipment movement near the completed air barrier to only essential related trades. For trades continuing to work near the completed air barrier, appropriate protection shall be provided.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One, General Requirements is part of this Section and shall apply as if repeated here.

1.2 SCOPE OF WORK

1. Supply and install rigid insulation at top and side of roof parapets; roof curbs and foundation upturn, and high wall/low roof conditions below through wall flashing; below grade insulation at perimeter walls; below interior floor slabs, at exterior entrance concrete slabs, and elsewhere where indicated on drawings.
2. Refer to Division 7 for roofing insulation.

1.3 SUBMITTALS

1. Submit shop drawings and samples in accordance with CCDC Document 2-2020 for items 2 below.

PART 2 PRODUCTS

1.1 INSULATION

1. Below Grade foundation Locations: To conform to CAN/ULC S701 Type 4, ship lapped / square edged – buttered with waterproofing membrane backup, extruded polystyrene rigid insulation to be "Styrofoam SM" with RSI 0.87 (R-5.0) minimum thermal resistance values per inch by Dow or equal.
2. Below Grade Cavity Wall Locations: Shipped lapped / square edged – buttered with waterproofing / air/vapour barrier retarder backup, ultra extruded polystyrene rigid insulation to be "Styrofoam Cavitymate Ultra" (Grey) with RSI 0.97 (R-5.6) minimum thermal resistance value per inch by Dow or equal.
3. Below Grade, Slab on Grade, Frost Slab, Door Threshold Locations: To conform to CAN/ULC S701 Type 4, square edge, extruded polystyrene rigid insulation to be "Styrofoam SM" with RSI 0.87 (R-5.0) minimum thermal resistance values per inch by Dow or equal.
4. Parapets: Ship lapped / square edged – buttered or air retarder backup, ultra extruded polystyrene rigid insulation to be "Styrofoam Cavitymate Ultra" (Grey) with RSI 0.97 (R-5.6) or "Styrofoam SM" with RSI 0.87 (R-5.0) minimum thermal resistance values per inch by Dow or equal – less than 1 permeance.
5. Foam Insulation: Sprayed polyurethane foam to flame spread rating of less than 500, min. RSI 1.05 (R 6/1") at density of 32.8 kg/cu.m (2lb/cu.ft). Spray foam at voids and broken areas in the rigid insulation. Spray foam is for repairs only.

1.2 ADHESIVE

1. Cavity wall insulation board perimeter buttered edges: "Air-Bloc 21" by Bakor (air/vapour retarder, both)
2. Adhesive for perimeter insulation below grade: to be CGSB 71-GP-24m equal to Bakor 230-3J.

PART 3. EXECUTION

3.1 WORKMANSHIP

1. Work shall include rigid insulation in cavity walls, clear storey walls; roof parapets, roof curbs, below grade foundation perimeter and below concrete entrance slabs.
2. Surfaces to receive rigid insulation shall be clean, free of grease and oil, and reasonably smooth with no mortar or concrete pin projections.
3. Install insulation after building substrate materials are dry.
4. Prime surfaces before using asphaltic type adhesives.
5. Install all materials using adhesive or fasteners in strict accordance with manufacturer's installation instructions unless otherwise specified herein.
6. Ensure a uniform, continuous thermal barrier effect. Where insulation is to be provided under other Sections, co-ordinate the work such that the thermal barrier continuity is achieved.
7. Install insulation to maintain continuity of thermal protection to building elements and spaces.
8. Fit insulation closely around electrical boxes, plumbing and heating pipes and ducts, and other protrusions.
9. Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from damaged or broken edges. Use longest possible lengths to reduce number of joints. Keep insulation minimum 3" (75 mm) from heat emitting devices such as recessed light fixtures, and a minimum 2" (50 mm) from sidewalls of CAN4-S604 Type "A" chimneys and CAN1-B149.1 and CAN1-B149.2 Type "B" and "L" vents.
10. In multiple layer applications offset both vertical and horizontal joints.
11. Do not enclose insulation until it has been inspected.

3.2 BELOW GRADE FOUNDATION WALL LOCATIONS – WITH BELOW GRADE FLOOR LEVEL / BASEMENT

1. Install 75mm (3") minimum rigid insulation using below grade adhesive (fasteners not to be used as this will puncture the waterproofing membrane already adhered

to the concrete foundation system) dabbed on as required to hold insulation in place prior to installing waterproofing drainage bubble board over. Backfill gently at below grade perimeter foundation locations.

2. Repair all open joints and damaged edges with foam spray insulation to fill voids.

3.3 BELOW GRADE CAVITY WALL LOCATIONS

1. Install 75mm (3") minimum rigid insulation using below grade adhesive (fasteners not to be used as this will puncture the waterproofing membrane already adhered to the concrete foundation system) dabbed on as required to hold insulation in place prior to installing solid masonry over.
2. This is typically two courses below floor level datum without a below grade floor level / basement, or 4 courses below floor level datum with below grade floor level / basement overlapping below grade exterior foundation wall insulation by two courses – 4x overlapping.
3. Repair all open joints and damaged edges with foam spray insulation to fill voids.

3.4 BELOW GRADE – EXTERIOR HARD SURFACE LOCATIONS

1. Install 100mm (4") for 1220mm (4') minimum rigid insulation out below / underside all hard surface materials from building perimeters.
2. Repair all open joints and damaged edges with foam spray insulation to fill voids.

3.5 BELOW SLAB ON GRADE – AT CHILDCARE

1. Install 75mm (3") x 915mm (36") vertical (on inside of foundation) and 75mm (3") x continuous horizontal (underside slab on grade) minimum rigid insulation around building perimeters.
2. Repair all open joints and damaged edges with foam spray insulation to fill voids.

3.6 BELOW SLAB ON GRADE – INTERIOR NON-HEATED SLABS

1. Install 50mm (2") x 610mm (24") vertical (on inside of foundation) and 75mm (3") x 610mm (24") horizontal (underside slab on grade minimum rigid insulation around building perimeters.
2. Repair all open joints and damaged edges with foam spray insulation to fill voids.

3.7 BELOW GRADE FROST SLAB LOCATIONS

1. Install 100mm (4") thick for 1220mm (4') horizontal out from all exterior frost slab foundation systems, then 50mm (2") for 1220mm (4') out from 4" thick insulation horizontal at all hard surface locations. Coordinate with typical frost slab plan detail.

2. Repair all open joints and damaged edges with foam spray insulation to fill voids.

3.8 BELOW GRADE INSULATION AT DOOR THRESHOLDS

1. Install 50mm (2") x 200mm (8") minimum vertical rigid insulation below door thresholds between interior slab on grade and exterior frost slabs at every door threshold location.
2. Repair all open joints and damaged edges with foam spray insulation to fill voids.

3.9 ABOVE GRADE CAVITY WALL LOCATIONS

1. Install 75mm (3") minimum rigid insulation using above grade adhesive dabbed on as required to hold insulation in place prior to installing fasteners with enlarged plastic washer heads for final anchorage / fastening (there is no air/vapour barrier membrane adhered / fastened to the wall substrate system to puncture, only an air barrier as the wall substrate cavity has more insulation to fill the void along with an air/vapour barrier on the interior side.
2. Repair all open joints and damaged edges with foam spray insulation to fill voids.

3.10 ABOVE GRADE ROOF PARAPETS AND CURBS

1. Cut and fit 75mm (3") minimum rigid insulation at tops and sides of roof parapets and curbs as detailed on drawings.
2. Repair all open joints and damaged edges with foam spray insulation to fill voids.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One, General Requirements is part of this Section and shall apply as if repeated here.

PART2 PRODUCTS

2.1 INSULATION

.1 Batt and Blanket Mineral Fibre Insulation (Exterior Wall -Stud Cavity):

1. Rockwool ComfortBatt mineral wool semi-rigid batt insulation with flexible edge. Thickness is to fill wall cavity solid unless specified / shown otherwise on wall types.

Typical thicknesses of 92mm – R14.5 and 140mm - R22.5
(provide minimum value of R13 as required to comply with OBC SB-10)

.2 Batt insulation at cavity wall (Mineral Wool Cavity Insulation):

1. Rockwool Cavityrock DD rockwool insulation board. 127mm
(provide minimum value of R19 continuous insulation as required to comply with OBC SB-10)

.3 Acoustic Sound Batt Insulation (Interior Wall Systems (Stud Cavity) & Sound Proofing Above Ceilings):

1. Rockwooll Acoustical Fire Batt (AFB) mineral wool insulation for fire rated assemblies and Rockwool Safe 'n' Sound for non-fire-rated assemblies. Thickness is to fill wall cavity solid unless specified / shown otherwise on wall types.
2. Rockboard 60 with foil face (facing upward into plenum) at sound rated ceiling systems where ceiling spaces are used for plenums.

.4 Curtain Wall Insulated Panel:

Rockwool Curtain Rock mineral fibre insulation with 'R' value of 4.2 / inch. 152 curtain wall framing to receive 114mm (4.5") thick insulation, 190mm curtain wall framing to receive 152mm (6") thick insulation. Other conditions (different size back mullions which create different size sealed metal backpans) to receive insulation to fill entire void of sealed metal backpan from back side of exterior veneer sealed in curtain wall caps to face of back panel infill typical.

.5 Floor Slab Edges / Termination:

Rockwool Safe mineral fibre insulation to be installed at edge of floor slab / slab termination to back side of vertical curtain plane to fill the remaining installation / deflection void to maintain fire resistance rating of the floor system. Install finish floor cap over & under to hold in place.

- .6 Requests for approved alternative products must include technical information and be submitted not later than 7 days prior to tender closing.

2.2 ACCESSORIES

- .1 Staples: ½" (13 mm) minimum leg.

PART 3 EXECUTION

3.1 INSULATION INSTALLATION

- .1 Install insulation to maintain continuity of thermal protection to building elements and spaces. Insulation to be friction fit between studs, joists or furring members.
- .2 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- .3 Do not compress insulation to fit into spaces.
- .4 Do not install insulation in any part of the building where protection against inclement weather has not yet been provided and where the insulation could thereby be wet or damaged.
- .5 Provide and install supports as required to keep insulation in place at soffits with floor above and around ducts in attic space.
- .6 Keep insulation a min. 3" (75 mm) from heat emitting devices such as recessed light fixtures.

3.2 LOOSE FIBRE INSULATION

- .1 Pack loose mineral wool insulation in crevices around lintels, frames, beams, around ducts at holes and other places where shown or required to minimize air infiltration.
- .2 Pack loose mineral wool into voids around mechanical and electrical pipes and ducts where they pass through non-fire rated wall, floors and ceilings.

3.3 FIRE RATED MINERAL WOOL INSULATION

- .1 Supply and install mineral wool (SAFB) at fire separations and where indicated on drawings.
- .2 Refer to Section 07270 - Firestopping and Smoke Seals for mineral wool work by that Section.

3.4 SOUND INSULATION

- .1 Fill all cavities full of mineral wool sound insulation where sound insulation is indicated on drawings.
- .2 Sound insulation above acoustic tile ceilings supplied and installed by Section 09500 – Acoustical Treatment as per this Section.

3.5 BATT INSULATION

- .1 Install mineral wool batt insulation at exterior or air/vapour barrier walls, ceiling spaces, between floor joists at perimeter wall locations and all other locations shown on drawings.
- .2 Place batts in close contact with vapour barrier or air/vapour barrier facing the interior.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One, General Requirements, is a part of this Section, and shall apply as if repeated here.

1.2 DESCRIPTION

1. Description of Work:
 1. The work of this section shall be comprised of the fabrication, supply and installation of prefabricated Aluminum Architectural panel system as indicated on drawings and as specified herein. The specifications and drawings pertaining to this section's work are to portray the general design and particular building requirements. The Contractor will be responsible to ensure that the finished insulated metal wall system product meets or exceeds the general design requirements and finished usage of the building as specified herein.
2. The Contractor in conjunction with the Aluminum Architectural panel system Manufacturer will be required to ensure that the Aluminum wall cladding and their components are designed, engineered, adapted as required to satisfy the general design as indicated herein without significantly altering details, measurements, clearances, etc., while allowing for the proper installation of work of all other sections.
 1. Work Included:
 1. Preformed Aluminum Architectural Panel System cladding, fascia, closures, flashings, miscellaneous trim
 2. All subgirts (singular and bi-directional), support framing back to structure, spacers, clips, and fasteners.
 3. Sealants.

1.3 SUBMITTALS

1. Shop Drawings:
 1. Submit shop drawings in accordance with GC 3.11 of the General Conditions as per CCDC 2 2020 .
 2. Indicate dimensions of panel system, attachment methods, details of subgirts, anchorage details , framed openings, accessories, schedule of wall elevations, trim and closure pieces, loadings, fasteners, and related work.

3. Indicate arrangement of panel system including joints, types and location of supports, fasteners, and any special shapes. Provide engineered support system where required.
 4. Fully detail membrane air/vapour barrier, thermal barrier, insulation, corner details, flashings at top and bottom of walls, and all other components in the system.
 5. Indicate detailed description of mechanical, electrical, and other systems in work.
 6. Describe requirements of other systems of components related to this work but provided by others. Obtain necessary information required to detail this work including methods of integration and securing
 7. Design loading and accommodation for thermal expansion.
 8. Each shop drawing shall be stamped by a Professional Engineer licenced in the Province of Ontario.
2. Samples:
1. Submit samples according to Section 01300 and as follows:
 2. Submit preliminary 8" x 12" (200mm x 300mm) or larger colour sample of each prefinished aluminum panel.
 3. Submit interlocking panel assembly approximately 3'-0" x 3'-0" (900 mm x 900 mm) in size of all fabricated materials forming a part of the panel system. Show weatherproof sealed exterior and interior joints.
 - 1.
 4. Mock-Up
 1. Provide a 1200mm x 2400mm (4'-0" x 8'-0") mock-up indicating panel colour, finish, joints, end conditions, connections, fastening, corner conditions and openings' conditions.

1.4 STANDARDS, DESIGN AND PERFORMANCE REQUIREMENTS

1. Design and test cladding system in accordance with the current edition of :
 1. ASTM E283 "Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Door Under Specified Pressure Differences Across the Specimen".
 2. ASTM E330 "Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference"

3. ASTM E331 "Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference".
4. CAN3 S157 "Strength Design in Aluminum"
5. Canadian Steel Sheet Building Institute (CSSBI) recognized member.
6. CSA S136-94 "Cold Formed Steel Structural Members".
7. National Building Code of Canada
8. Deflection of the individual panels is not to exceed 1/180th of the span for the specified wind forces acting on it.
- 9.. Design panels as a floating system to accommodate thermal movement caused by ambient temperature range without causing deterioration of the cladding.
10. Design expansion joints to accommodate movements in cladding and between cladding and structure to prevent permanent distortion or damage to the cladding.
11. Design wall system as pressure equalized open "Rain Screen System". The panel system shall have internal drainage paths to collect moisture and direct it via weep holes or openings to the exterior.
12. All fasteners on typical joints to be hidden from view where possible. Where fasteners must be exposed, heads must be countersunk.
13. Design wall system to maintain the following erection tolerances:
14. Maximum variation from plane or location shown on shop drawings 20mm/10m.
15. Maximum offset from true alignment between two adjacent members abutting end to end in line: 1.0mm minimum normal thickness of 6mm.

1.5 QUALITY ASSURANCE

1. Qualification of Manufacturer

1. Standard for appearance and performance of rainscreen cladding system as per "System R4-300 Dry Joint Pressure Equalized Rainscreen" by Riverside Group or approved equal.
 1. Contact Information:
www.riversidegroup.net
7675 Tranby Avenue

Windsor, ON N8S 2B7
519.945.1321

2. Manufacturer of cladding system and installer shall demonstrate at least five (5) year's experience in projects similar in scope.
3. This section establishes the standard of quality required for the cladding system. Proposed substitutions must meet this standard and will be considered as follows:
 1. A written request for approval of a substitution is received at least ten (10) days prior to tender closing.
 2. The request includes a complete item-by item description comparing the proposed substitution to the specified system, together with manufacturer's literature, samples, test data, engineering standards and performance evaluation indicating comparable standards to those specified.

2. Requirements of Regulatory Agencies

1. In addition to requirements of authorities having jurisdiction, carry out insulated metal wall system work in accordance with the latest edition of the following specific applicable requirements of following:
 1. Latest edition of Ontario Building Code, as currently amended
 2. CAN 3-S157 strength design in Aluminum
 3. CAN 3-136 Cold formed Steel Structural Members
 4. ASTM E330; E283 and E331

1.6 WARRANTY

1. Warrant work of this section against defects or deficiencies for a period of five (5) years from date work is certified as substantially performed in accordance with General Conditions of CCDC-2 2020.
2. The Contractor hereby warrants for twenty (20) years from substantial performance that system is covered against failure of factory applied finish, colour, that the panel system enclosure will be water and weather tight, structurally sound and free from distortion; that the exterior finish will not craze, peel, corrode or discolour; that the exterior cladding will not develop excessive fading or non-uniformity of colour, and will be free from blemishes or distortion due to thermal movement of the wall or normal movements of the building structure; that the gaskets, tape and sealants will be free from deterioration from sunlight, weather or oxidation and from permanent deformation and free from leaks under load.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

1. Provide necessary crating or bundling for shipment of components to site including protection against weather.
2. Mark and identify parts of panel system before shipping.
3. Protect prefinished panel system during fabrication, transportation, site storage and installation.
4. Store materials in accordance with manufacturer's recommendations and protected from the elements at Site under protection to prevent staining from the ground or from collection of water on material, or both; and secure against wind damage. Provide air circulation around finished metal surfaces.
5. Handle and protect galvanized materials from damage to zinc coating.

1.8 TESTING

1. Reports to cover tests described below shall be submitted. All test shall be conducted or witnessed by an independent agency without any financial or business interests in the wall system supplier. Testing on reasonable similar systems will be considered acceptable.
2. The largest typical panel size shall be tested in both pressure and suction based on procedures shown in ASTM E330, procedure "B". The support system for the panel shall mimic the intended use for the project. Panel deflection under design load shall not exceed L/90. Panel ultimate strength shall be a minimum of two times the design load.
3. Air leakage of the air barrier shall be tested based on ASTM E283. The air barrier shall have penetrating fasteners to match the highest typical density to be used on the project. Air leakage should not exceed 0.02 L/(s • m²) @ 75 Pa (0.004 cfm/ft. @ 1.57 lb./ft.²)

PART 2 PRODUCTS

2.1 MATERIALS

1. Aluminum Composite Panels
 1. Fabricated panels from aluminum alloy 3105-H14 or 3003-H14 with minimum nominal thickness of 6mm factory formed.

2.2 BASIS-OF-DESIGN

1. Subject to compliance with requirements, provide the specified products and/or materials from indicated manufacturers. Other comparable products may be submitted as substitution requests eight (8) days prior to bid for Architect and/or Owner's review and approval.

2. Requests for substitutions will be considered in accordance with provisions of Section 01500 - Substitutions.
3. Manufacturer: Kanalco Ltd. with PPG, Duranar 2-coat Color Coating Dry Joint System.
 1. Aluminum Composite Panels Color Coating:
 2. Duranar Coating (2-coat system). Base Colour Selection:
 1. 2. Solid colour - Colourweld 500XL "Titanium"
Solid colour - Colorweld 500 "Pure White"
Cross feature color - Colorweld 500 "right Red"
 3. Colours to be confirmed prior to ordering of any material
4. Approved Alternative:
 1. Dri-Design Wall panel System
 2. Emburite
 3. Alpolic
 4. Vic-West
5. Finishes: All to be EcoClean
 1. Aluminum Composite panels with UC50958XL Silver Gray Duranar XL primer and fluoropolymer thermal setting three coat system by PPG Canaga Inc. in thickness as recommended by manufacturer after factory forming of panels. Provide and install at locations indicated on architectural drawing A3.1. Coordinate final colour selection with Architect prior to ordering.
 - .2 Reynobond "Wood Grain" Aluminum Composite Panels Finish with "Duragloss 5000" two part polymer based system consisting of a prime coat and a finish coat. Nominal dry film thickness is 1.50 mils. Colour to be selected by architect from the manufacturer's standard Wood Grain colours. Provide and install at locations indicated on architectural drawing A3.1. Coordinate final colour selection with Architect prior to ordering.
6. Colour to be selected / confirmed by architect from the manufacturer's full range / specialty / premium / solid / metallic / patterns / designs and colours. Thickness as recommended by manufacturer after factory forming of panels.
 1. Sheets are to be formed into a pan like profile complete with welded corners excluding 1.905mm aluminum panel which are

stiffened by in clips and sealed. Welded corners are to be suitably ground to allow a smooth finish for painting.

2. Panels are to be stiffened with z-shaped aluminum stiffeners with a maximum spacing of 610mm.
7. Extrusions: Fabricated from aluminum alloy 6063, temper T54 with minimum thickness of 2mm (0.080") or as required for structural adequacy.
8. Subgirts, Clips, Spacers: minimum 1.2 mm (0.048") thick formed galvanized steel; ASTM 653M Grade 230 with Z275 coating.
9. Supporting Girts for Aluminium Composite Panel System: aluminum extrusions of manufacturer's proprietary design, shaped, and sized to suit panel sizes and location of supporting substructure.
10. Fastening Systems:
 1. Fasteners connection aluminum components to aluminum or galvanized steel be 304 stainless steel.
 2. Other fasteners to be stainless steel.
 3. Insulation: Vapour Barrier and sprayed foam insulation/air barrier at back up block by Section 04200 masonry contractor supplied and installed as per section 07214.
 4. Closures: Flashing and Trim: Fabricate to profiles indicated on shop drawings or as required to meet performance requirements. Material to match panels in exposed locations, galvanized material in concealed locations.
 5. Bituminous Paint: Best grade, quick drying, non-staining alkali resistant asphalt utility enamel
11. Sealants:
 1. Concealed Locations: tape or compound, non-skinning, non-drying, butyl rubber.
 2. Exposed Locations: one part silicone to CGSB CAN 2-19.13.
 3. Primer: as recommended by sealant manufacturer.

2.3 FABRICATION

1. Spacer of Girt System: galvanized steel girt anchor or clip system designed to meet performance requirements specified. Design system to minimize direct heat transfer; avoid direct metal to metal contact wherever possible.
2. Fabricate wall components to comply with dimensions, thickness and details as shown on the shop drawings, including fascia and soffit panels and all companion flashing.
3. Fabricate all components of the system in the factory, ready for field installation.
4. Tolerances of the finished panels shall meet the following limitations.
 1. Maximum variation from specified length and width of panel measure at perimeter:
 2. +/-0.8mm up to 1219mm
 3. +/-1.6mm up to 3048mm
5. Maximum variation from theoretical diagonal of finished panel is 5mm.
6. Maximum out of flatness (bow) of finished panel surface is 1/360 times longest dimension up to a maximum of 6.4mm for panels up to 3 square meters and 12.7mm for panels up to 9 square meters.
5. Flashings, Trim, Closures: fabricated to profiles indicated and as required to meet design and performance requirements. Use preformed corner pieces only. Use same material as exterior skin where exposed. Use galvanized sheet steel in concealed locations. Double back exposed edges.

PART 3 EXECUTION

3.1 PREPARATION

2. Prior to start of erection, examine existing work and report to Architect any unsatisfactory conditions.
3. Provide secondary steel framing for support of panel system, where such framing is required but not provided by structural steel Section. Install secondary framing in accordance with applicable requirements of CAN3-S16.1 and CAN3-S136.

3.2 ERECTION

4. Install panel system in accordance with manufacturer's directions and as detailed on drawings.

5. Prior to installing subgirts/spacers to support work, Spray-on insulation/air vapour barrier Contractor to install air barrier membranes. (by Sections 07214 and 04200)
6. Fasten subgirts/spacers to supporting work. Provide additional framing at terminations, openings and penetrations.
7. Allow Spray foam insulation/air vapour barrier Contractor to install spray foam insulation/air vapour barrier prior to installing exterior skin.
8. Install exterior wall panel system with vertical and horizontal joints accurately aligned and tight fitting to conform with system tolerances.
9. Provide sealants, flashings, closures, covers and trim as indicated and as required to render work complete and finished in accordance with specified requirements. Install sealants in accordance with Section 07900, Sealants.
10. Coordinate installation of panel system with all other Trade Contractors working in the surrounding area.

3.4 TOUCH-UP AND CLEANING

1. Touch-up minor paint abrasions with matching touch-up paint.
2. Installer shall clean panel surfaces by dry wiping in the course of product installation.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One, General Requirements, is a part of this Section, and shall apply as if repeated here.

1.2 DESCRIPTION

1. Description of Work

1. The Work of this Section shall be comprised of the fabrication, supply and installation of pre-fabricated metal wall cladding system as indicated on drawings and as specified herein. The specifications and drawings pertaining to this section's work are to portray the general design and particular building requirements. The Contractor will be responsible to ensure that the finished insulated metal wall system product meets or exceeds the general design requirements and finished usage of the building as specified herein.
2. The Contractor in conjunction with the metal wall cladding system Manufacturer will be required to ensure that the metal wall cladding and their components are designed, engineered, adapted as required to satisfy the general design as indicated herein without significantly altering details, measurements, clearances, etc., while allowing for the proper installation of work of all other sections.

3. Work Included

1. Preformed Metal wall cladding, caps, fascia, closures, flashings, miscellaneous trim
2. All subgirts (singular and bi-directional), support framing back to structure, spacers, clips, and fasteners.
3. Sealants.

1.3 RELATED SECTIONS

1. Unit Masonry - Section 04200
2. Rough Carpentry - Section 06100
3. Air/Vapour Barrier - Section 07195
4. Rigid Insulation - Section 07211
5. Mineral Fiber Insulation - Section 07213
6. Caulking of Insulated Metal Wall System by this Section as per Section 07900
7. Refer to Mechanical Sections
8. Refer to Electrical Sections

1.4 SUBMITTALS

1. Shop Drawings

1. Submit shop drawings in accordance with the General Conditions of CCDC-2 2020 and Section 01300 – Submittals.
2. Indicate dimensions, siding and soffit profiles, attachment methods, anchorage details for preformed insulated metal wall system, framed openings, accessories, reveals and control joints, schedule of wall elevations, trim and closure pieces, loadings, fasteners and related work.
3. Indicate arrangement of prefinished metal cladding sheets including joints, types and location of supports, fasteners, and any special shapes.
4. Fully detail membrane air/vapour barrier, thermal barrier, insulation, corner details, flashings at top and bottom of walls, and all other components in the system.
5. Indicate detailed description of mechanical, electrical and other systems in work.
6. Describe requirements of other systems or components related to this work but provided by others. Obtain necessary information required to detail this work including methods of integration and securing.
7. Design Connections and material gauge to be submitted and signed by Professional engineer for applicable OBC loads.

2. Samples

1. Submit samples according to Section 01300 and as follows:
 1. Submit preliminary 8" x 12" (200mm x 300mm) or larger colour sample of each prefinished metal panel.
 2. Submit interlocking panel assembly approximately 3'-0" x 3'-0" (900 mm x 900 mm) in size of all fabricated materials forming a part of the insulated metal wall system. Show weatherproof sealed exterior and interior joints.

1.5 DESIGN AND PERFORMANCE REQUIREMENTS

1. Appearance: exposed fasteners approved by the Architect; exposed surfaces free of distortion, twist, waves, and buckles.
2. Structural Loads: resist positive and negative wind pressures expected in this geographical area with a maximum allowable deflection of 1/180 of span. Components shall not vibrate when subjected to the effects of wind.

3. Moisture Control: prevent infiltration of water and snow into siding system. Provide means of draining space between insulation and exterior skin, in accordance with NRC Rain Screen Principles and drawing details.
4. Thermal Movement: accommodate expansion and contraction of component parts without causing buckling, failure of joints seals, undue stress on fasteners and other detrimental effects.
5. Structural Movement: accommodate movement between siding system and building structure caused by structural movement, without permanent distortion, racking of joints, breakage of seals or water penetration.

1.6 QUALITY ASSURANCE

1. Qualification of Manufacturer

1. Preformed metal shall be installed by manufacturer's construction forces or by an accredited erector under direct control and responsibility of manufacturer.

2. Requirements of Regulatory Agencies

1. In addition to requirements of authorities having jurisdiction carry out insulated metal wall system work in accordance with the latest edition of the following specific applicable requirements of following:
 1. Latest Ontario Building Code, as currently amended,
 2. CAN 3-S136
 3. Applicable publications by Canadian Sheet Steel Building Institute.

1.7 WARRANTY

1. Warrant work of this section against defects or deficiencies for a period of five (5) years from date work is certified as substantially performed in accordance with GC 24 of General Conditions of the contract.
2. The Contractor hereby warrants that the metal wall system enclosure will be water and weathertight, structurally sound and free from distortion; that the exterior finish will not craze, peel, corrode or discolour; that the exterior cladding will not develop excessive fading or non-uniformity of colour, and will be free from blemishes or distortion due to thermal movement of the wall or normal movements of the building structure; that the gaskets, tape and sealants will be free from deterioration from sunlight, weather or oxidation and from permanent deformation and free from leaks under load.

1.8 PRODUCT DELIVERY, STORAGE AND HANDLING

1. Provide necessary crating or bundling for shipment of components to site including protection against weather.
2. Mark and identify parts of metal roofing before shipping.
3. Protect prefinished steel sheet during fabrication, transportation, site storage and installation in accordance with CSSBI Sheet Steel Fact #3, January 2017.
4. Store materials flat at Site under protection to prevent staining from the ground or from collection of water on material, or both; and secure against wind damage. Provide air circulation around finished metal surfaces. Store insulation and adhesives in dry areas, heated as required to prevent damage to adhesives.
5. Handle and protect galvanized materials from damage to zinc coating.

PART 2 PRODUCTS

2.1 MATERIALS

1. Prepainted Sheet Steel:
 1. Base metal: hot dipped zinc coated (galvanized) sheet steel meeting requirements of ASTM A653.
 2. Four (4) Colours to be Vic West – 57619 Imperial White, 56082 Regent Grey, 56162 Antique Linen, 56081 Royale Blue. Confirm color with Architect prior to ordering material. Provide two (2) samples for each colour for verification. One sample for the specified colour and one sample for an alternate shade of that colour.
 3. Siding profile: Vicwest AD300 profile installed Vertically.
 5. Subgirts, Clips, Spacers: minimum 1.2 mm thick formed galvanized steel; ASTM 446 Grade A, zinc coating designation Z275.
 6. Fastening Devices: stainless or cadmium plated; colour match exposed fasteners with metal on which they occur.
 7. Closures: as recommended by manufacturer at all exposed locations.
 8. Bituminous Paint: Best grade, quick drying, non-staining alkali resistant asphalt utility enamel.
 9. Sealants:
 1. Concealed Locations: tape or compound, non-skinning, non-drying, butyl rubber.

2. Exposed Locations: Spectrem 1 by Tremco or approved equal one part silicone sealant to CGSB 19.13-M87.

3. Primer: as recommended by sealant manufacturer.

2.2 FABRICATION

1. Unless otherwise indicated use minimum 0.030" (0.76mm) core thickness sheet metal, tension levelled.
2. Spacer of Girt System: galvanized steel girt anchor or clip system designed to meet performance requirements specified. Design system to minimize direct heat transfer; avoid direct metal to metal contact wherever possible.
3. Wall Cladding Profiles: AD300 installed vertically by Vicwest or approved alternate.
4. Finished exposed surfaces shall be prepainted steel, smooth and plain.
5. Flashings, Trim, Closures: fabricated to profiles indicated and as required to meet design and performance requirements. Use preformed corner pieces only. Use same material as exterior skin where exposed. Use galvanized sheet steel in concealed locations. Double back exposed edges.

PART 3 EXECUTION

3.1 PREPARATION

1. Prior to start of erection, examine existing work and report to Architect any unsatisfactory conditions.
2. Provide secondary steel framing for support of metal siding and soffit system, where such framing is required but not provided by structural steel Section. Install secondary framing in accordance with applicable requirements of CAN3-S16. 1 and CAN3-S136.

3.2 ERECTION

1. Install siding system in accordance with manufacturer's directions and as detailed on drawings.
2. Prior to installing subgirts/spacers to support work, air vapour barrier Contractor to install vapour barrier and air barrier membranes.
3. Fasten subgirts/spacers and suspended metal soffit furring to supporting work. Provide additional framing at terminations, openings and penetrations.
4. Allow Insulation Contractor to install cavity insulation prior to installing exterior skin.
5. Install exterior wall and soffit skin with all joints accurately aligned and tight fitting.

6. Provide sealants, flashings, closures, covers and trim as indicated and as required to render work complete and finished in accordance with specified requirements. Install sealants in accordance with Section 07900, Sealants.
7. Coordinate installation of metal siding and soffit with all other Trade Contractors working in the surrounding area.
8. Leave metal siding and soffit systems in clean and neat condition.

3.3 TOUCH-UP AND CLEANING

1. Touch-up minor paint abrasions with matching touch-up paint.

END OF SECTION

1. GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Division One, General Requirements, is a part of this section and shall apply as if repeated here.

1.2. INTENT

- 1.2.1. Provide for the proper and complete installation of all roofing and flashings as required to prevent entry of moisture into the insulation and structure below the roofing and flashing.

1.3. QUALIFICATIONS

- 1.3.1. Work shall be executed by an applicator who has adequate plant, equipment and skilled tradesmen to perform this work expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past five years. Likewise applicator must be a member of the C.R.C.A. and a member in good standing with the appropriate provincial roofing contractors association.
- 1.3.2. Applicator must be approved by the Consultant, Owner and the roofing material manufacturers.
- 1.3.3. Applicator shall provide a list of a least five (5) projects available for inspection employing same roofing system within 200km. radius of the project.
- 1.3.4. The intent is to have a complete roofing system provided by one manufacturer. The following manufacturers are considered to have equivalent systems/products suitable for use on this project; Siplast, Garland, Tremco, Soprema, IKO, Bakor.

1.4. PREQUALIFIED ROOFING CONTRACTORS

Flynn Canada Ltd.
6435 Northwest Drive
Mississauga, ON L4V 1K2
905-671-3971

H & N Roofing & Sheet Metal Ltd.
29 Bayview Crt.
London, ON N5W 5W5
519-453-1720

Nedlaw Roofing Limited
232-B Woolwich St. S.
Breslau, ON. N0B 1M0

519-648-2218

Smith-Peat Roofing & Sheet Metal Ltd.
152 Thames Road West
Exeter, ON N0M 1S3
519-235-2802

Solar Roofing & Sheet Metal Ltd.
3 Miller Street
Toronto, ON M6N 2Z6
416-658-6045

Specified Roofing Contractors Inc.
99 Englehard Drive
Aurora, ON L4G 3V1
905-727-0079

Trio Roofing
243 Advance Blvd.
Brampton, ON L6T 4J2
905-456-1688

Triumph Roofing
1 Connie St.
Toronto, ON M6L 2H8
416-534-8877

Semple Gooder Rfg Corp.
1365 Martin Grove Rd.
Toronto, ON M9W 4X7
416-743-5370

Dean Chandler Roofing
275 Comstock Rd.
Scarborough, ON M1L 2H2
416-751-7840

Bothwell Accurate Co.
6675 Rexwood Rd.
Mississauga, ON L4V 1V1
905-673-0615

Schrieber Bros Roofing
50 Hockley Dr.
Hamilton, ON L8E 3P1
905-561-7780

Atlas Apex Rfg.
65 Disco Road

Toronto, ON M9W 1M2
416-421-6244

Provincial Industrial Rfg.
166 Bowes Rd.
Concord, ON L4K 1J6
905-669-2569

Topline Rfg.
1325 Fewster Dr.
Mississauga, ON L4W 1A2
905-602-0760

BML Roofing Systems Inc.
15 Ryan Place
Brantford, ON N3S 7S1
519-751-0953

1.5. REFERENCES

- 1.5.1. CSA - Canadian Standards Association
- 1.5.2. CGSB - Canadian General Standards Board
- 1.5.3. ULC - Underwriters Laboratories of Canada
- 1.5.4. FM - Factory Mutual Engineering Corporation
- 1.5.5. CRCA - Canadian Roofing Contractors Association
- 1.5.6. Canadian Construction Documents Committee (CCDC), CCDC 2-2020 Stipulated Price Contract.
- 1.5.7. ASTM – Standards Test Methods for Sampling and Testing Bitumen Saturated Felts and Woven Fabrics for Roofing and Waterproofing.

1.6. ADMINISTRATIVE

- 1.6.1. Submit to the Consultant submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- 1.6.2. Work affected by submittal shall not proceed until review is complete.
- 1.6.3. Present shop drawings, product data, samples and mock-ups in SI Metric

units.

- 1.6.4. Where items or information is not produced in SI Metric units converted values are acceptable.
- 1.6.5. Review submittals prior to submission to the Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.
- 1.6.6. Notify the Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- 1.6.7. Contractor is responsible to verify field measurements and all site conditions including adjacent properties and roof areas.
- 1.6.8. Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.
- 1.6.9. Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by the Consultant's review.
- 1.6.10. Keep one reviewed copy of each submission on site.

1.7. SHOP DRAWINGS & PRODUCT DATA

- 1.7.1. The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of the Work.
- 1.7.2. 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.
- 1.7.3. Allow 7 days for Consultant's review of each submission.
- 1.7.4. 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 the Consultant prior to proceeding with Work.
- 1.7.5. Make changes in shop drawings as the Consultant may require, consistent with Contract Documents. When resubmitting, notify the Consultant in

writing of any revisions other than those requested.

1.7.6. Accompany submissions within 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.

Submissions shall include:

1. Date and revision dates.
2. Project title and number.
3. Name and address of:
4. Subcontractor.
5. Supplier.
6. Manufacturer.
7. Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
8. Details of appropriate portions of Work as applicable:
9. Fabrication.
10. Layout, showing dimensions, including identified field dimensions, and clearances.
11. Setting or erection details.
12. Capacities.
13. Performance characteristics.
14. Standards.
15. Operating weight.
16. Wiring diagrams.
17. Single line and schematic diagrams.
18. Relationship to adjacent work.

1.7.7. After Consultant's review, distribute copies.

1.7.8. Submit 3 prints of shop drawings for each requirement requested in specification Sections and as Consultant may reasonably request.

1.7.9. Submit 3 copies of product data sheets or brochures for requirements requested in Specification. Sections and as requested by the Consultant where shop drawings will not be prepared due to standardized manufacture of product.

1.7.10. Delete information not applicable to project.

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

1.7.12. If, upon review by the 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.

- 1.7.13. The review of shop drawings by the Consultant is for sole purpose of ascertaining conformance with general concept. 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 all requirements of construction and Contract Documents. 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 all sub-trades.

1.8. HANDLING & STORAGE OF MATERIALS

- 1.8.1. Handle and store materials carefully to prevent damage. Manufacturer's labels, seals and identification shall remain intact. Store containers upright and roll materials on end to prevent flattening. Protect materials from moisture at all times.
- 1.8.2. Deliver materials in sufficient quantities to allow for continuity of work.
- 1.8.3. Co-ordinate delivery with Owner.
- 1.8.4. Store materials marked "keep from freezing" in areas where temperatures will remain above 4°C (40°F).
- 1.8.5. Contractor shall assume responsibility for the protection and safekeeping of products stored on the job site.
- 1.8.6. Provide a continuous fence at grade level around all machinery, material and equipment 7'6" in height with welded mesh and welded tubing that includes a gate/door with locking gate to meet or exceed manufacturer's recommendations.
- 1.8.7. The Contractor's materials and equipment shall be kept orderly and shall not encumber operations of facilities. Job site shall be maintained free of marketing signage.

1.9. INSPECTION & TESTING

- 1.9.1. Roofing shall be completed in strict accordance with specifications, conforming to best trade practice and to the satisfaction of the Owner or his authorized representative. Afford facilities and access for inspecting the

work as required and immediately act upon instructions given.

- 1.9.2. Notify inspection authority minimum two working days in advance of commencing work and provide further notification as required due to temporary postponement of work, etc.
- 1.9.3. Make and repair all cut tests for testing purposes at locations requested. Cut tests will be made during progress of work or on completion of work. Wherever possible, tests will be made before workmen have left the site, all at no additional cost to the contract.
- 1.9.4. Samples of roof membrane from cut tests and samples of material taken from containers may be kept by the Consultant. These samples may be submitted to an independent laboratory for testing purposes. Cut test locations should be reinstated with material and installation as specified immediately after cut tests have been provided.
- 1.9.5. Should test results prove that a material is not functionally equal to specified material:

Contractor shall pay for all testing. Roofing installed and found not to comply with the specifications shall be removed and replaced at no change in the contract price.

- 1.9.6. Membrane manufacturer to inspect installation to ensure compliance with product application requirements. It is the Contractor's responsibility to arrange with the manufacturer's representative to provide inspections. The manufacturer's representative shall visit the project during the course of roofing work often enough to ensure that the work is being undertaken in accordance with the manufacturer's written recommendations. The Consultant shall be notified of all such visits in writing.
- 1.9.7. When all work is substantially completed the Roofing Contractor shall arrange for an inspection. At this time the Roofing Contractor's superintendent and foreman should be present. The Roofing Contractor should also arrange for the manufacturer's representative of the roof membrane to be in attendance.
- 1.9.8. If work is deemed incomplete or discrepancies are found by the Consultant, complete the outstanding items and rearrange for a further inspection.
- 1.9.9. The Roofing Contractor shall correct all deficiencies before a date agreed upon by the Consultant and Owner.
- 1.9.10. The inspection and testing service does not relieve the Contractor's responsibility for quality control of production and for errors made the Contractor.

1.10. REJECTED WORK

- 1.10.1. 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.
- 1.10.2. Make good other Contractor's work damaged by such removals or replacements promptly.
- 1.10.3. If in opinion of Consultant it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Consultant.

1.11. EXAMINATION

- 1.11.1. Prior to commencement of work, examine surfaces and ensure that defects of level or construction are corrected before proceeding with work. Commencement of work shall imply acceptance of surfaces.

1.12. WORK RESTRICTIONS

- 1.12.1. Do not load or permit any part of the structure to be loaded with a weight that will endanger its safety. Questions of structural loading as part of construction means and methods shall be addressed by a licensed Structural Engineer engaged by the Contractor.

1.13. CO-ORDINATION

- 1.13.1. Co-ordinate work with other trades and ensure all openings, drains pipes, sleepers, etc., are installed and flashed at the appropriate time.
- 1.13.2. Co-ordinate progress of the work, progress schedules, submittals, use of site temporary utilities and construction facilities.
- 1.13.3. The Contractor shall have a competent foreperson or superintendent on the job site at all times during the execution of the contract when work is in progress. This foreperson shall not be changed without permission unless the Consultant deems that this foreperson is unsatisfactory to carry out the work, or if the foreperson's employment is terminated. This foreperson shall represent the Contractor for each specific phase and any minor direction given this foreperson will be held as being given to the Contractor.
- 1.13.4. It shall be the responsibility of the Contractor's foreperson to inform General Contractor which areas are to be worked upon and to determine what

measures may be necessary to limit disruption of the building activities to a minimum.

1.14. PROTECTION

- 1.14.1. Protect the building and work of other trades from soiling and other damage. Damage to the building as a result of this work shall be repaired as instructed, all at no extra cost to the contract. Protect the interior of the building as required and directed.
- 1.14.2. Contractor shall be responsible for protection of property during course of work. Lawns, shrubbery, paved areas and building including interior shall be protected from damage. Repair damage at no extra cost to contract.
- 1.14.3. Roof installation shall be scheduled in such a manner that traffic over new roofing is eliminated. Wherever traffic cannot be avoided, adequately protect roof areas with plywood sheathing, etc. Damage to roofing shall be repaired as instructed by the Owner or authorized representative at no extra cost to the contract.
- 1.14.4. Arrange work sequence to avoid using newly constructed roofing for storage, walking surface or equipment movement.
- 1.14.5. Protect building surfaces at set-up areas with tarpaulin and secure tarpaulin. Spilled or scattered debris shall be cleaned-up immediately. Removed material to be disposed from roof as it accumulates.

1.15. PROJECT MEETINGS

- 1.15.1. The Consultant will call an initial project meeting. The Roofing Contractor must invite the superintendent and foreman to fully participate in this initial briefing meeting.
- 1.15.2. The agenda of the briefing meeting will include:
 1. Introduction all key personnel participating in the project.
 2. Establishing limits on work hours, access, movements on site, etc.
 3. Reviewing the approved work schedule.
 4. Establishing all administrative and procedural matters.
 5. Providing all procedural forms and communication routing.
 6. Establishing regular periodic project meetings throughout the progress of work.
 7. Provide physical space and make arrangements for meetings.
 8. Chair the meeting and record the minutes. Include significant proceedings and decisions. Identify actions by parties.
 9. Reproduce and distribute copies of minutes within three days after each meeting and transmit to meeting participant, affective parties not in attendance, the Consultant and Owner.

1.16. CONSTRUCTION SAFETY MEASURES

- 1.16.1. Observe construction safety measures of Provincial Government, Workers'/Workmen's Compensation Board and municipal authority provided that in any case of conflict or discrepancy more stringent requirements shall apply.
- 1.16.2. In event of conflict between any provisions of above authorities the most stringent provision will apply.
- 1.16.3. The Contractor shall comply with the safety regulations presently in effect in this Province and shall provide such supervision and apparatus necessary for the safety of all concerned.
- 1.16.4. All application, material handling, and associated equipment shall conform to and be operated in conformance with the guidelines as outlined by the "Workplace Hazardous Materials Information System" (WHMIS), the Ministry of Labour, the Occupational Health and Safety Act (OS) and the "Foreman's Safe Roofing Guidelines".
- 1.16.5. The Contractor must follow the Ministry of Labour's guidelines and recommendations. The Consultant is to receive a copy of this document.
- 1.16.6. Comply with federal, provincial, local and Owner's fire and safety requirements.
- 1.16.7. Maintain fire extinguisher equipment in sufficient quantity and size as per Provincial Health and Safety Regulations and within easy access whenever power tools, roofing kettles and torches are being used.
- 1.16.8. Ensure that no part of the building is subject to a load, which will endanger its safety or cause permanent deformation.
- 1.16.9. The Contractor will adequately train and instruct workers in accordance with WHMIS requirements and will provide the Owner with detailed information with respect to the training provided to workers, the language in which instructions are given and a copy of training manuals used.
- 1.16.10. The Contractor will consult with the Consultant and if required further consult with Ministry of Labour co-ordinator regarding the physical set up of the job site and comply with any orders of the co-ordinator in that regard.
- 1.16.11. The Contractor will supply the Consultant with a list of hazardous materials to be used and "Material Safety Data Sheets" for them to be kept, in a readily accessible location for the duration of the project.

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- 1.16.12. The Contractor will not bring any controlled products onto the Owner's property that are not labelled in accordance with WHMIS requirements.
 - 1.16.13. The Ministry of Labour co-ordinator is permitted to inspect the work site at any time and to speak to workers to determine the adequacy of their safety knowledge if they consider it necessary. Any violation of Ministry of Labour requirements may result in work being stopped until they are rectified. Repeated or serious violations may result in cancellation of the contract.
 - 1.16.14. The Contractor will indemnify the Owner for any costs the Owner incurs as a result of his failure to comply with Occupational Health and Safety Act.
 - 1.16.15. Provide and maintain protection and warning signs at all areas, which may be dangerous to the occupants or the public.
 - 1.16.16. Remove all ladders from the building at the end of each working day to prevent unauthorized access to the building and cause possible damage.
 - 1.16.17. Disconnect propane burners from bottles at the end of each working day. Store propane bottles in protected area away from ignition source and building.
 - 1.16.18. Contractor's workers shall be properly protected and use all required protective clothing including face masks, goggles and gloves, etc.
 - 1.16.19. Assume complete responsibility for construction strength, packing, anchoring and operation of derricks, cranes, hoists and other mechanical contrivances used for work; and ensure that loads carried thereon can be safely supported and be free from accidents to all persons.
 - 1.16.20. Have hoist capacities, with regard to anticipate loads, verified by a Professional Engineer registered in this province.
 - 1.17. ENVIRONMENTAL
 - 1.17.1. Apply only dry materials and apply only during weather that will not introduce moisture into roofing system. Do not apply material during inclement weather or over damp, frozen or unsuitable substrate.
 - 1.17.2. Do not install materials marked "keep from freezing" when daily temperatures are scheduled to fall below 4°C (40°F).
 - 1.17.3. Do not perform masonry work below 2°C (35°F). Make proper provisions to protect work from freezing forty-eight (48) hours after layer if work is

performed between 2°C (35°F) and 7°C (45°F).

- 1.17.4. Store solvent-soaked cleaning rags in approved containers in a location to prevent a threat to fire safety or health of the building occupants or workmen. Dispose from site daily.

1.18. MATERIALS SOURCE SEPARATION PROGRAM

- 1.18.1. Separate building materials for recycling that are to be removed from site.
- 1.18.2. Provide containers to deposit reusable and/or recyclable materials.
- 1.18.3. Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
- 1.18.4. Locate separated materials in areas which minimize material damage.
- 1.18.5. Collect, handle, and transport off-site, salvaged materials in separate condition. Transport to an appropriate recycling facility

1.19. WORKFORCE

- 1.19.1. Once roofing commences, work shall not be postponed for any reason other than weather. Roofing crew shall consist of qualified and experienced personnel and/or more if required due to size and/or schedule of completion. The workforce shall not be changed without written permission from the Consultant.

1.20. GUARANTEE / WARRANTY

- 1.20.1. The Contractor represents that the Contractor has the special qualifications for doing the Work and that the plans and specifications are, in the Contractor's opinion, appropriate and adequate for the construction and/or renovations set out therein.
- 1.20.2. The Contractor and Subcontractor hereby jointly and severally warrant the work of this section, including roof membrane, vapour retarder, insulation and sheet metal work against any actual leakage for a period of two [2] years from the date of substantial performance, and agree to make good promptly any defects which occur or become apparent within the warranty period, such defects to include but not be restricted to leaking, failure to stay in place, undue expansion, lifting, deformation, loosening or splitting of seams, joint declaration, failure to adhere, deterioration, blisters, etc.
- 1.20.3. The Contractor shall furnish the guarantee/warranty in writing, on a form satisfactory to the Owner or the authorized representative signed.

- 1.20.4. The guarantee/warranty period shall commence from the day of substantial performance.
- 1.20.5. The specified roofing membrane system shall carry a manufacturer's extended limited warranty. The length of the warranty period shall be for a period of **ten [10] to thirty [30] years** from the date of substantial performance for materials, including labour, to repair leaking membrane and maintain the roofing membrane in a watertight condition.
- 1.20.6. The Contractor's guarantee and the manufacturer's extended warranty are to exclude: normal wear and tear, damage caused by neglect, carelessness of vandalism caused by the installation or removal of any equipment and or material built into or part of the roofing membrane system, damage caused by excessive traffic over the roofing membrane, or use of the roof area for the purpose that is was not intended, or damage structure building components and finishes or building contents.
- 1.20.7. The shipment of and arrival on the site of the manufacturer's materials will constitute the manufacturer's agreement to warrant the roof in accordance with the conditions as outlined above.
- 1.20.8. The Owner's representatives are to conduct an inspection of the project 60 days prior to the expiration of the two [2] year roofing guarantee. The Contractor will be contacted at the time if any deficiencies related to the guarantee and/or long-term warranty are evident and will require attention. The Contractor will correct the deficiencies before the expiration of the Contractor's guarantee or make arrangements for the correction.

1.21. COMPLETION

- 1.21.1. Clean-up and remove all debris, surplus materials, tools and equipment, etc., upon completion of work to the satisfaction of the Consultant.

1.22. WORKMANSHIP

- 1.22.1. Workmanship shall be of the highest quality. Use competent trades people and execute work in accordance with contract documents.
- 1.22.2. Regard manufacturer's printed recommendations and latest literature as the minimum requirement for materials, method and procedures.
- 1.22.3. Notify the Consultant should the specifications conflict with the manufacturer's recommendations, otherwise it will be assumed that the Contractor and manufacturer are in agreement with procedure outline.
- 1.22.4. Advise the Consultant of adjustments to specified roofing procedures recommended by manufacturers caused by weather and site conditions. Make adjustments to specified procedure only after review with the

Consultant, and receive approval in writing.

- 1.22.5. When roofing operations require open torch operation advise Roofing Consultant of nature of work. In such cases higher safety and insurance limits may be imposed. Any additional cost to meet these requirements will be at the Contractor's expense.
- 1.22.6. Unsuitable or damaged materials shall immediately be removed from the site.
- 1.22.7. Wherever two or more plies of membrane are applied, the second ply, etc., shall extend minimum 6" (150mm) beyond the termination of the previous ply of membrane.
- 1.22.8. Roof curb and sleeper heights shall be minimum 12" (300mm) measured from the surface of the completed roof system to the top. This applies to prefabricated curbs and sleepers as well as those provided by the carpenters.
- 1.22.9. Inspect the underside of the deck to ensure fasteners will not be visible or damage the structure, interior surfaces or affect electrical and mechanical services. Investigate the location of all hidden services which include mechanical, electrical, cable, security, fire alarms which may be installed under the deck.

1.23. INSPECTION & DECLARATION

- 1.23.1. Contractor's Inspection: Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents. Notify the Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made. Request Consultant's Inspection.
- 1.23.2. Consultant's Inspection: Consultant and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
- 1.23.3. Completion: submit written certificate that following have been performed: Work has been completed and inspected for compliance with Contract Documents. Defects have been corrected and deficiencies have been completed. Equipment and systems have been tested, adjusted and balanced and are fully operational. Operation of systems have been demonstrated to Owner's personnel. Work is complete and ready for Final Inspection.
- 1.23.4. Final Inspection: when items noted above are completed, request final inspection of Work by Consultant, and Contractor. If Work is deemed incomplete by Consultant, complete outstanding items and request re-inspection.

1.24. SHEET METAL WORK

- 1.24.1. Sheet metal work shall be of the highest quality installed in accordance with best trade practice and to the following requirements.
- 1.24.2. Apply two coats of bituminous back paint to all surfaces of metal in contact with masonry, concrete or dissimilar metals.
- 1.24.3. Seams shall be of the "slip lock type" that permit adequate movement without resulting in deformation or loosening of metal flashings. Lapped joints or exposed raw edges will not be accepted. Exposed edges shall be "doubled back" at least 1/2" (12.5mm). At eaves, parapets, etc., metal shall be hooked over continuous starter strips minimum one gauge thicker than the metal used for flashing. Secure starter strips at 12" (300mm) on centre or closer as required.
- 1.24.4. Fabricate all possible work in shop in maximum 8' (2450mm) lengths by brake forming, bench cutting, drilling and shaping. On vertical sections or horizontal planes greater than 30" (750mm) install metal in 4' (1200mm) section unless otherwise specified or shown.
- 1.24.5. Space joints evenly where exposed. When flashing is being installed in more than one piece, offset joints in adjacent flashings by approximately 50%.
- 1.24.6. Form inside and outside corners by means of standing seams.
- 1.24.7. Slope all metal to interior to maintain minimum 8% slope. Do not form metal in a manner where water will pond on top of metal flashing.
- 1.24.8. Where metal terminates under fascia boards, secure metal at 24" (600mm) on centre using specified fasteners. At curbs to openings or at sleepers, etc., provide locked or standing seams at corners.
- 1.24.9. Where metal flashings enter reglets, ensure reglet is minimum 3/4" (18.75mm) deep and minimum 3/8" (9.37mm) wide. Metal flashing portion that enters reglet shall extend the full depth and be complete with a 3/8" (9.37mm) return upstand to permit proper securement in the reglet. Secure metal flashings in reglets at 24" (600mm) centres and further secure metal to vertical surface at locks.
- 1.24.10. At reglets wider than 3/8" (10mm) and deeper than 3/4" (19mm) provide polyethylene rod, 25% wider than joint width.
- 1.24.11. All flashings shall be installed in perfectly straight lines. Irregular or badly fitted work will not be accepted. Exposed fastenings will only be

permitted where concealed fastening is impossible. Provide neoprene washers at exposed fastenings.

- 1.24.12. Where sheet metal counter-flashings are the only form of waterproofing, provide waterproofing underlayment prior to installing metal. Overlaps of underlayment shall be minimum 2" (50mm) and end laps minimum of 6" (150mm).

1.25. SAMPLES OF SHEET METAL FLASHINGS

- 1.25.1. Install mockup samples of metal flashings indicating method of joints, fastening, seams, expansion joints and stiffeners for approval by Consultant or Owner prior to fabrication.
- 1.25.2. Commencement of metal flashing installations implies that this Contractor has accepted the surfaces as satisfactory and accepted responsibility for appearance of completed work.

1.26. SCOPE OF WORK

- 1.26.1. Unless specified otherwise supply and install sheet metal counter-flashings at perimeters, walls, parapets and curbs, etc., as required and directed.
- 1.26.2. Unless specified otherwise supply and install wood sleepers, to support equipment at locations directed, complete with wood blockings and cant strips minimum 12" (300mm) high measured from surface of completed roof. Sleepers shall be covered with membrane flashings and metal counter flashings. Construct sleepers using continuous 2 x 6 (50mm x 150mm) wood blockings.
- 1.26.3. Unless specified otherwise supply and install "stack jacks" specified. Trim height of existing pipes as required and/or extend existing pipes as required and directed. Maintain a minimum height of 12" (300mm) above the completed roof surface.
- 1.26.4. Unless specified otherwise supply and install spun aluminum chimney stack base flashing complete with aluminum collars, etc., minimum 12" (300mm) in height.
- 1.26.5. Unless specified otherwise install roof drains supplied and specified by **Division 15 – Mechanical**.
- 1.26.6. Install Torch Safe strips at junction of vertical surfaces.
- 1.26.7. All conduits, piping, etc., that pass through sleeves and curbs to roof openings, etc., shall be installed by using products specified.
- 1.26.8. Parapet shall be totally covered with membrane flashings and sheet

metal counter-flashings.

- 1.26.9. Unless specified otherwise supply and install gasline supports as specified. Provide 1/4" (6.25mm) space between the gasline clamp and the pipe itself. Gasline piping not in use shall be removed. All work relating to gaslines is to be completed by a licensed gas fitter. All gaslines are to be cleaned and painted.
- 1.26.10. Unless specified otherwise provide MERS-800A duct supports supplied by Thaler Metal Industries Ltd.
- 1.26.11. Unless specified otherwise install specialty supports for outside lighting supplied and specified by **Division 16 – Electrical**.
- 1.26.12. Where ductwork passes through the top of roof curbs provide tapered wood blockings surfaced with 1/2" plywood covered with membrane flashings extending minimum 12" up the vertical surface of the ductwork.
- 1.26.13. Where ductwork passes through walls extend modified membrane onto ductwork approximately 12" and ensure tapered insulation of ductwork slopes away from wall.
- 1.26.14. Where several pipes pass through the top of a large roof curb provide metal base flashings including metal cover and provide tapered wood blockings surfaced with 1/2" plywood completely covered with membrane flashings.
- 1.26.15. Where gaslines pass through the top of a roof curb, the roof curb is to be extended in height minimum 6" above gaslines where the gaslines will pass through the side of the curb.
- 1.26.16. Install all patio slabs for walkways as specified.
- 1.26.17. Supply and install scupper drains.
- 1.26.18. Supply and install fully tapered 2% polyisocyanurate insulation specified and provide additional slope if required to achieve positive drainage. Roofing Contractor is responsible to ensure positive drainage.
- 1.26.19. Unless specified otherwise where rigid electrical conduits pass through roof supply and install electrical outpost supplied by Lexcor; where flexible conduits pass through the roof provide wire outlet post supplied by Lexcor.
- 1.26.20. Small mechanical units are to be supported on top of patio slabs as specified work walkways.

- 1.26.21. Configure roof curbs to suit cover of the exhaust fan units.
- 1.26.22. Provide high temp caulking sealant where hot pipes pass through top of curbs and base flashings and around collars.
- 1.26.23. Coordinate with requirements for installation of skylight, by Section 08452, and / or install tubular daylighting devices provided by Section 08625.

2. PRODUCTS

- 2.1. Products shall conform to the requirements of jurisdictional authorities, to C.S.A and C.G.S.B. specification number named including all revisions to date.
- 2.2. Products substituted without prior written approval shall be removed from the site and areas disturbed shall receive specified products.
- 2.3. Compatibility of roof system components is essential and this shall be confirmed by the applicator.
- 2.4. Product data sheets and material data sheets shall be issued to the Consultant prior to ordering materials.
- 2.5. Submit sample of products prior to ordering and do not order products or start work before receiving Owner's written approval.
- 2.6. Asphalt primer – PA-917 LS primer conforming to C.G.S.B. specification #37-GP-9A.
- 2.7. Adhesive – Parafast or Millenium Adhesive supplied by Siplast.
- 2.8. Steel deck overlayment – 5/8" (16mm) prime glass-faced gypsum roof board (Dens-Deck prime), supplied by Georgia-Pacific Corporation.
- 2.9. Vapour retarder and reinforcement - applicable to steel deck overlayment – Paradiene 20 TG, 2.32mm modified membrane conforming to CGSB 37-G-56M supplied by Siplast.
- 2.10. Vapour retarder and reinforcement - applicable to cementitious deck - Paradiene 20 TG, 2.32mm modified membrane conforming to CGSB 37-G-56M supplied by Siplast.
- 2.11. Roof membrane composition - modified bituminous base sheet membrane 2.32mm Paradiene 20 TG EG surfaced with a modified cap sheet membrane 3.94mm Paradiene 30 TG Bright White (BW) with publish SRI 90 granular cap supplied by Siplast.
- 2.12. Membrane Flashings - modified bituminous base sheet membrane 2.32mm Paradiene 20 SA surfaced with a modified cap sheet membrane 4.14mm Parafor

30 TG (BW) with published SRI 90 granular cap supplied by Siplast. Colour to be selected by Owner and Consultant from manufacturer's full range of colours.

- 2.13. Waterproofing Underlayment – Paradiene 20 SA 98mls (2.55mm) thickness 3.28ft (1.00m) 33.5ft (10.21m) length self-adhesive modified bitumen membrane consisting of light weight random fibrous glass mat impregnated and coated with high quality styrene butadiene-styrene (SBS) modified bitumen with TA 325 self adhesive primer . Supplied by Siplast.
- 2.14. Cant strips - 3" x 3" (75mm x 75mm) torch safe cant strips supplied by Siplast.
- 2.15. Stack Jacks (pipe flashing) - SJ-41A 12" in height pre-insulated aluminum "stack jacks" supplied by Thaler Metal Industries Inc.
- 2.16. Miscellaneous Flashings (for protrusions through roof) – Provide ChemLink . Para Pro 123 Flashing System as supplied by Siplast
- 2.17. Gasline and other pipe supports as specified by **Division 15 – Mechanical**.
- 2.18. Sheet Metal for Flashing - 26 ga. pre-painted galvanized steel series 8000 supplied by Stelco - colour to be selected by Owner and Consultant prior to prefabrication from manufacturer's full range of colours.
- 2.19. Miscellaneous Metal for Flashing - for "hook-on" strips, fastening strips, metal bellows, etc., same metal as specified for sheet metal flashing but thickness shall be 1 ga. thicker.
- 2.20. Back paint for metal - asphalt primer (two coats) conforming to C.G.S.B. specification #37-GP-9.
- 2.21. Nails, bolts, screws and other fastenings - compatible with metal specified. Size of fasteners and type shall suit applicable conditions and must be approved by Owner or his authorized representative prior to use.
- 2.22. Roof drains – specified by **Division 15 – Mechanical**.
- 2.23. Plastic cement – PA-1021 plastic conforming to ASTM D 4586 Type II forasbestos free, asphalt base roof cement supplied by Siplast.
- 2.24. Caulking Sealant – PS 209 elastomeric sealant colour gray meeting CAN-19-13M82. Supplied by Siplast.

3. EXECUTION

3.1. PREPARATION

- 3.1.1. Remove all dust, dirt and debris from substrate and ensure same is smooth and free of all foreign matter. Perform only as much roof that can be completed each day or before showers commence. Take whatever

action is necessary to prevent moisture from entering during roofing installations. Vacuum roof deck surfaces if necessary.

3.1.2. Inspect roof deck to determine if additional work is required before proceeding.

3.1.3. Any sharp projections, that in the opinion of the Consultant may penetrate the vapour retarder, shall be grounded smooth and flush.

3.2. ASPHALT PRIMING

3.2.1. Apply primer at the rate of 1 gal. (4.5L) per 100 sq. ft. (9m²) by brush or spray method. Work primer into surface by brooming and allow sufficient time for primer to penetrate and ensure same does not run into the building or stain aesthetic surfaces. Limit quantity of primer at deck openings and at points of termination to prevent damage to the building's interior.

3.2.2. Apply primer to vertical surfaces commencing at the top of cant strips and terminate primer 1" (25mm) below reglets and/or highest possible point.

3.2.3. Apply asphalt primer over all cementitious decks.

3.3. STEEL DECK OVERLAYMENT

3.3.1. Apply adhesive to the steel deck in ribbon form by mechanical means at the recommend rate parallel to flutes and centred on high sections of deck. On 8" (200mm) modular decks apply 2 ribbons of adhesive. Immediately place dens-deck with the long sides at right angles to the run of the deck. All joints must be staggered and no pieces less than 1/3 of the full size sheet will be accepted. Apply vapour retarder over the surface of the dens-deck. Conform to "rated system" requirements.

3.4. VAPOUR RETARDER

3.4.1. Apply vapour retarder in straight lines, smooth, free from air pockets, wrinkles, fishmouths, open laps or tears, etc. Reinforce and extend vapour retarder minimum 12" (300mm) at perimeter, vertical walls, pipes and other abutments. Continuously secure and laminate reinforcement to vapour retarder. Envelope insulation with vapour retarder and reinforcement by minimum 6" (150mm), all continuously secured to insulation.

3.4.2. Applicable to steel deck overlayment and cementitious deck – install Paradiene 20 TG membrane torch installed over dens-deck. Overlaps shall be minimum 4" (100mm) on side laps and all end laps shall be minimum 3" (75mm).

3.5. ROOF BOARD INSULATION

3.5.1. Place Paratherm polyisocyanurate roof insulation with all joints staggered

over the vapour retarder membrane with the longest side parallel to the perimeter where work is commencing. Where cutting and fitting is required, minimum width of insulation must be 12" (300mm). Do not force insulation into place. Cut neatly at protrusions and points of termination. Replace all broken, damaged or misfit boards as work progresses. Protect insulation from moisture during all phases of the application progresses. Paratherm is to be set in Parafast by Siplast a highly elastomeric, two components, one step, all purpose, foamable adhesive that contains no solvents and sets in minutes. Apply adhesive to vapour retarder with specified adhesive applied in 2 cm. wide bands every 33 cm using the manufacturer's recommended applicator. Protect insulation from moisture during all phase of application process. Remove any temporary waterproof cut off prior to continuing with further work.

- 3.5.2. Subsequent layers of Paratherm polyisocyanurate insulation shall be applied with specified adhesives at the same application rate and bead spacing as the previous layer. Ensure all layers of Paratherm polyisocyanurate roof insulation are offset at joints of each layer by minimum 12" (300mm). Tapered polyisocyanurate insulation is to be positioned on top of the flat stock polyisocyanurate and below the cover board.
- 3.5.3. Tapered insulation shall be installed on top of the polyisocyanurate insulation prior to installing the insulation cover board. Tapered insulation to be set Parafast adhesive and at the same bead spacing and application rate as previous layer.
- 3.5.4. Reduce insulation thickness by 1/2" (12.5mm) at all drainage locations for a distance of 36" (900mm) from the centre of the drain opening and an additional 1/2" (12.5mm) for a distance of 12" (300mm) from the centre of the roof drain opening. Totally fill flutes of steel decks with insulation at drain openings to provide continuous support for drain.

3.6. INSULATION COVER BOARD

- 3.6.1. Cover board shall be installed with specified adhesives at the same application rate and bead spacing as the previous layer(s) of insulation. Ensure cover board is offset at joints by minimum 12" (300mm). Walk cover-board in to place to ensure good contact.

3.7. INSTALLATION OF TORCH SAFE CANT STRIPS

- 3.7.1. Apply a single continuous and uniform bead OF Parafast adhesive in 2 cm. wide bands every 33 cm using the manufacturer's recommended applicator to the surface of the cover board and embed the cant strips in place.

3.8. ROOF MEMBRANE BASE SHEET

- 3.8.1. Initially apply base sheet over cover board terminating 2" (50mm) above

top of cant strips. Membrane shall be torched into place. Side laps shall be minimum 3" (75mm) and end laps minimum 6" (150mm) all continuously torched into place.

- 3.8.2. Starting at low points of each roof area apply modified bituminous membrane base sheet torched into place.
- 3.8.3. Rolls must first be unrolled to align each course then rerolled before torching commences.
- 3.8.4. Base sheet membrane not to be left exposed longer than ten days before cap sheet is applied. It is recommended the cap sheet application be completed immediately after base sheet has been installed.
- 3.8.5. At the end of each working day all insulation and cover board must be covered with a minimum of base sheet membrane.

3.9. ROOF MEMBRANE BASE SHEET FLASHING

- 3.9.1. Extend base sheet from a point 4" (100mm) on the flat roof surface terminating at the highest possible points and at eaves, parapets, copings the flashing membrane shall extend across the top and down the fascia to a point 1/2" (12.5mm) above the lowest terminating point of metal flashing at fascia.
- 3.9.2. Width of base sheet 1m wide, with lengths to fit, are to be cut from across the width of the rolls and torched or self adhere into place with no voids and with all laps sealed and mitres neatly cut and well sealed.
- 3.9.3. At sloping roofs base sheet membrane is to terminate 3ft up the sloping roof.

3.10. ROOF MEMBRANE CAP SHEET

- 3.10.1. Over the surface of the base sheet place the 4mm cap sheet into place and simultaneously heat the surface of the base sheet and underside of cap sheet to a point where the bitumen flows at a sufficient temperature to form homogeneous mass consisting of the base and cap sheet. Slowly roll membrane into the continuous bead of hot melted bitumen overlaps of the cap sheet shall not coincide with the base membrane but be offset by minimum 12" (300mm). Side laps shall be 3" (75mm) (follow selvage edge lines and end laps shall be 6" (150mm). The cap sheet shall terminate at the base of all cant strips.
- 3.10.2. The rolls must first be unrolled to align each course and then rerolled prior to torching the membrane into place.
- 3.10.3. All end laps of adjacent sheets are to be degranulated before the cap

sheet membrane sheets are bonded together.

- 3.10.4. Liquid modified bitumen must flow in front of the cap sheet as it is being rolled onto the base sheet to ensure proper and complete adhesion. A bead of bitumen must flow out at the side lap onto the adjacent surface to seal the side laps.
- 3.10.5. Bleed outs of bitumen onto adjacent surfaces must be covered with additional loose granules the same colour as the cap sheet.
- 3.10.6. All end laps are to be neatly cut, the underlying selvage edge corners mitred and the cap sheet is to be neatly cut and fitted around all openings, sleeves, drains and curbing.
- 3.10.7. Care is to be taken not to walk on the freshly applied cap sheet and any marring or damaging of the cap sheet surface must be repaired either with additional granules broadcast into melted bitumen or with an additional ply of cap sheet. Contractors shall have a wet sponge on site at all time when applying the cap sheet membrane.
- 3.10.8. If a piece of cap sheet for repair is needed then this piece is to be at least 18" long and is to extend from the side lap of the repaired sheet over to butt against the side lap of the adjacent cap sheet course (The selvage strip is to be removed from the piece of repair material).

3.11. ROOF CAP SHEET FLASHING MEMBRANE

- 3.11.1. Apply one ply 4mm granular cap sheet as previously specified extending from a point 6" (150mm) on the flat roof surface terminating at highest possible point and at eaves, parapets and copings the flashing membrane shall extend across the top and down the fascia to a point 1/2" (12.5mm) above the lowest terminating point of metal flashing at fascia.
- 3.11.2. Width of the cap sheet 1m wide with lengths to fit, are to be cut from across the width of the rolls and torched into place with no voids and with all laps sealed and mitres neatly cut and well sealed.
- 3.11.3. All laps at mitres at adjacent sheets and the underlying cap sheet membrane surfaces are to be degranulated before the cap sheet membrane is torched into place
- 3.11.4. At parapets with a metal upstand to terminate membrane flashings a bead of sealant is to be applied and covered with granular
- 3.11.5. Mechanical fastening at curbs shall consist of nailing at the top at 6" (150mm) oc. Wherever reglets occur and at vertical surfaces apply a bead of Parafast(PS-304 Sealant) where membrane terminates and secure 1" (25mm) below with a continuous metal fastening strip at 12" (300mm) oc.

- 3.11.6. "Strip-in" flanges of "stack jacks" and other flashing flanges with the flashing membrane basically as previously specified. Ensure flanges are primed and set into (PA-828 Flashing Cement) a bed of hot asphalt set in over the base sheet. The prime membrane shall be torched to the flange all as specified and directed. Around the base of the stack jack provide Parafast adhesive (PS-304 Sealant) and granular to match the colour of the membrane.

3.12. EXPANSION JOINTS

- 3.12.1. Supply and install metal bellows and insert expansion joint filler of sufficient height to extend 3/4" (18.75mm) above the top of cant strips. Terminate roof membrane at the base of expansion joint filler and immediately install fibre cant strips.
- 3.12.2. Commencing with the base sheet membrane extending 4" (100mm) on top of the previously applied system and extending up and over the expansion joint extending 4" (100mm) onto the previously applied system on the opposite side of the expansion joint. Once the base sheet membrane has been completed the cap sheet shall be torched into place extending 6" (150mm) onto the previously applied system and extending up and over the expansion joint extending 6" (150mm) on the opposite side of the expansion joint. Prior to installing the membrane degranulate the previously installed membrane as required. Flashing system at the junction of eaves must extend up and over eave and be secured at lowest point. Referring to walls and parapets, membrane shall extend 8" (200mm) up vertical surface and be mechanically secured.

3.13. WALL EXPANSION JOINTS

- 3.13.1. Supply and install metal bellows and insert expansion joint filler of sufficient height to extend 1 1/2" (37.5mm) above the top of cant strip. Terminate roof membrane at base of expansion joint filler and install fibre cant strip.
- 3.13.2. Provide the base sheet membrane commencing 4" (100mm) onto previously applied system extending up and over the cant strip, insulation and extending 17" up the vertical wall. Commencing 6" onto the previously applied system torch the modified membrane cap sheet into place over top of the entire base sheet membrane and extending 18" up the vertical wall. Apply mastic sealant where membrane terminates and provide continuous metal fastening strip 1" (25mm) below termination of the membrane flashing.

3.14. ROOF DRAINS

- 3.14.1. Temporarily block drain pipe during installation and ensure insulation thickness has been reduced.
- 3.14.2. Copper drains shall be set into a bed of Mastic. Ensure flashing flange is primed and strip-in flange with base sheet and cap sheet membrane.

- 3.14.3. Referring to scupper drains, ensure that same are prefabricated, complete with gravel stop, and flanges are primed. Extend base membrane through the scupper opening and turn the membrane down the face. Set scupper into a bed of Mastic, secure and strip-in flanges with cap sheet membrane.

3.15. CAULKING

- 3.15.1. Apply caulking sealant into all reglets and at points deemed necessary by the Owner or his authorized representative following installation of metal flashing. Caulking sealant shall be applied in strict accordance with the manufacturer's literature. Ensure caulking is tooled to provide and even finish. Colour of caulking shall match sheet metal counter-flashings or other adjacent material confirmed by the Consultant.
- 3.15.2. Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- 3.15.3. Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair work.
- 3.15.4. Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- 3.15.5. Ensure joint surfaces are dry.
- 3.15.6. Prepare surfaces in accordance with manufacturer's directions.
- 3.15.7. Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- 3.15.8. Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.
- 3.15.9. Apply bond breaker tape where required to manufacturer's instructions.
- 3.15.10. Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.
- 3.15.11. Apply sealant in accordance with manufacturer's written instructions.
- 3.15.12. Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
- 3.15.13. Apply sealant in continuous beads.
- 3.15.14. Apply sealant using gun with proper size nozzle.

- 3.15.15. Use sufficient pressure to fill voids and joints solid.
- 3.15.16. Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
- 3.15.17. Tool exposed surfaces before skinning begins to give slightly concave shape.
- 3.15.18. Remove excess compound promptly as work progresses and upon completion.
- 3.15.19. Cure sealants in accordance with sealant manufacturer's instructions.
- 3.15.20. Do not cover up sealants until proper curing has taken place.
- 3.16. CLEANUP
 - 3.16.1. Clean adjacent surfaces immediately and leave work neat and clean.
 - 3.16.2. Remove excess and droppings, using recommended cleaners as work progresses.
 - 3.16.3. Remove masking tape after initial set of sealant.
- 3.17. VENT AND OTHER PIPES PROTRUDING THROUGH DECK
 - 3.17.1. Install stack jacks, etc., including all accessories, specified and supplied by Division 15 and / or Division 16. Ensure flanges are primed and set in a continuous bed of asphalt. "Strip-in" flanges with 3-ply flashing membrane. Extend first ply 6" (150mm), second ply 9" (225mm) and the third ply 12" (300mm) beyond the flange.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One, General Requirements is part of this Section and shall apply as if repeated here.

1.2 SHOP DRAWINGS

1. Submit shop drawings in accordance with Section 01300 – Submittals. Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings, finishes and fire ratings.
2. Fire Ratings indicated on Door Finish Schedule are minimums. If door design cannot be satisfied at specified rating (i.e. 20 min), supply door or frame with acceptable higher rating (i.e. 45 min.).

1.3 QUALIFICATIONS OF MANUFACTURER

1. Products used in the work of this Section shall be produced by manufacturers regularly engaged in manufacture of similar items and with a history of successful production acceptable to the Architect.
2. Only steel hollow metal doors and frames manufactured by members of the Canadian Steel Door and Frame Manufacturer's Association (CSDFMA) are eligible for use on this project.
3. Qualified Manufacturers:
 1. S. W. Fleming
 2. Baron
 3. Daybar
 4. Artek
 5. Trillium
 6. Ambico
4. All other manufacturers to submit for approval a minimum seven (7) days prior to tender closing.

1.4 PROTECTION

1. Use all means necessary to protect materials of this Section before, during and after installation and to protect installed work & materials of all other trades.

1.5 REPLACEMENTS

1. In the event of damage, immediately make all repairs & replacements necessary to the approval of the Architect and at no additional cost to the Owner.

1.6 WORK INCLUDED

1. Supply all hollow metal doors, frames and screens as shown on drawings and on door schedule.
2. Provide removable mullions where indicated. Refer to door and frame schedule.
3. Supply and install all hollow metal fire doors, frames and screens shown on the drawings and on door schedule.
4. Door cutouts, complete with reinforcing, stops, and closures required for glazing.
5. Cut outs and reinforcing for finishing hardware including preparations for mortice type hardware.
6. Cutouts for security system. Coordinate with Div.16.
7. Supply all necessary fastening and anchoring devices for above items.
8. Supply and install door grilles where indicated on drawings or sizes as indicated on the drawings and specified in Mechanical Sections.

1.7 STANDARDS

1. Materials and workmanship to be in accordance with Canadian Steel Door and Frame Manufacturer's Association Specifications Standards for steel doors and frames.

1.8 REGULATORY REQUIREMENTS

1. Supply fire labelled steel doors and frames in accordance with NFPA-80, current edition, except where specified otherwise.

PART 2 PRODUCTS

2.1 MATERIALS

1. Steel: cold rolled steel, double annealed patent levelled, fully pickled and free from scale and internal defect. Surfaces shall be free from perceptible waves, buckles and other imperfections.
2. Zinc Coating: wipe coated galvanizing in conformance with ASTM 527, Coating Class A01.
3. Primer for Touch-Up: conforming to CGSB 1GP-181M.
4. Labels: Provide ULC or Warnock-Hersey Labels for doors and frames as per Door Schedule.
5. Thermal Break: Polyvinyl Chloride (PVC) thermal break.

6. Reinforcing Channel: to CAN/CSA - G40.21-M7, grade 300W, 3.25 mm.

2.2 FABRICATION

1. Generally:

1. Fit and assemble work in shop where possible. Execute according to details and approved shop drawings. Where shop fabrication is not possible, make trial assembly in shop.
2. Weld all components of doors and frames. File or grind exposed welds smooth and flush. Exposed welds shall be continuous. Knock-down frame not to be used on this project.
3. Workmanship shall be best grade modern shop and field practice known to recognized manufacturers specializing in this work. Joints and intersecting members accurately fitted made in true planes with adequate fastening.
4. Insulate where necessary to prevent electrolysis between metal to metal or metal to masonry or concrete.
5. Fabricate and erect work square, plumb, straight, true and accurately fitted. Provide adequate reinforcing and anchorage.
6. Clean, scrape and remove rust, mill scale, grease or extraneous material from frames and doors following fabrication. Flood coat with air-drying paste filler and again sand to eliminate all unevenness or irregularities. Apply in shop a full smooth coat of zinc chromate primer to all surfaces. Deliver work to site with primer undamaged and otherwise satisfactory for following work specified in Section 09900 – Painting and Finishing.

2. Doors:

1. Provide hollow metal doors of type and size indicated on Door Schedule, and as detailed on Drawings.
2. Construct flush type continuously welded exterior doors conforming to ASTM A527 16 gauge (1.6 mm) hollow metal construction, steel stiffened with vertical steel ribs, all voids filled with semi-rigid fibrous insulation minimum density 24 kg/m³ polystyrene polyurethane and complete with top and bottom caps. Finish shall be "wipe coat" galvanized steel.
3. Construct interior slab and stile and rail type doors and panels of 18 gauge (.683 mm) cold rolled, roller levelled sheet "wipecoat" galvanized steel with

honeycomb structural core consisting of pre-expanded, resin impregnated Kraft paper having 3/4" (20 mm) cell size to thickness indicated.

4. Provide 16 gauge (1.6 mm) continuously welded interior doors, reinforced with interior stiffeners at all corridor, washrooms, changerooms and Gymnasium and elsewhere where indicated on drawings and Door Schedule. Interior Stiffeners: for steel doors and panels, spot weld interior stiffeners at 150 mm (6") o.c. maximum to face sheets. Laterally stiffen steel doors at top and bottom by continuous channels securely welded to both face sheets.
 5. Doors shall be mortised, reinforced, drilled and tapped to receive templated hardware including mortise type hardware. Reinforce for surface mounted hardware.
 6. Prepare doors to receive glass or grilles as required. Provide removable stops secured with countersunk tamperproof head screws at 6" (150 mm) o.c. Prepare exterior doors to receive 1" (25 mm) thick insulated sealed glass units.
 7. Weld door and panel components together to provide integrated units, square, true and free from distortion or waves. All 18 gauge doors to have welded seams minimum 30% overall and 2" (50 mm) length welds. Weld above and below all hinge locations. All 16 gauge doors to be continuously welded. Grind and fill smooth welded seam.
 8. Door head and bottom shall have channel shaped member, closing off top and bottom of door flush with face skins. NOTE: close off top and bottom of exterior doors even with outer edge of door.
3. Fire Rated Doors:
1. Provide doors, frames and hardware with Underwriters Laboratories of Canada labels where noted "Label" on Door Schedule.
4. Door and Screen Frames:
1. Provide steel hollow metal door and window frames for openings indicated on Door Schedule and as detailed elsewhere on drawings.
 2. Form interior hollow frames to profile indicated of 16 U.S. gauge (1.6 mm) hot rolled "wipe coat" zinc coated steel. Construct exterior frames of 16 U.S. gauge (1.6 mm) hot rolled, zinc coated steel.
 3. Cut mitres and weld corners continuously along inside frame profile. Fill corners of steel frames with metallic paste filler and sand smooth and uniform. Do not weld corner of removable stop.

4. Provide 10 gauge channel stiffeners in mullions each side of door openings occurring in screens, or as required to provide a rigid installation.
 5. Prepare removable stops secured with counter-sunk tamperproof screws at 6" (150 mm) o.c.
 6. Provide three (3) neoprene single stud bumpers for each interior door frame and (2) bumpers at head for pairs of doors.
 7. Prepare frames for mortise type hardware at all doors except panic hardware locations at exterior doors, stair doors, corridor cross doors, gym doors and library doors. Blank, reinforce for butts with 1/4" (6.35 mm) steel plate, drill and tap as required. Reinforce both sides of every door closer, provide for concealed door closers where required.
 8. Cover reinforcement plates or attachments and cut-outs with 22 gauge (0.8 mm) steel sheet boxes to protect against mortar. Provide channel or angle spreaders readily removable.
 9. Provide adjustable "Tee" or wire masonry anchors with head of No. 6 gauge (4.94 mm) steel and body of 10 gauge (3.45 mm) corrugated steel where frames are built into masonry, except at thermal broken frames. Provide manufacturer recommended anchor at all other locations.
 10. Supply three anchors for jambs between 4'0" (1219 mm) and 7'0" (2134 mm) and four anchors for jambs exceeding 7'0" (2134 mm) high. Adjustable type shall be as recommended by manufacturer. Provide adjustable jamb anchors for fixing at floor.
 11. Provide head reinforcement in frames wider than 4'-0" (1200 mm) and where indicated or recommended by manufacturer.
 12. Prepare frames for electric hardware and security systems. Reinforce and drill and tap frames as required. Coordinate with Div.16.
 13. Prepare frames for continuous door length type hinges where indicated on door schedule.
 14. Provide 12 gauge reinforcing in frames for continuous door length type hinges where indicated on door schedule.
 15. Provide removable mullions where indicated on door frame schedule.
 16. Provide insulated doors at all exterior locations and at interior locations in the music rooms and anywhere acoustic doors are called for on the drawings
5. Thermal Door Frames and Screens:

1. Equal to "Therma-Frame" door frames and screens as manufactured by S. W. Fleming Ltd. at all exterior hollow metal door frame and screen locations as indicated on drawings and in the door schedules.
 2. Frames must meet or exceed CGSB 82-GP-5M.
All jambs, heads, sills, centre rails and mullions will be fabricated from 16 gauge (1.63 mm) wipe coated galvanized steel meeting the requirements of ASTM Designation A527, Coating Class A01.
 3. Interior and exterior frame sections shall be separated by a Polyvinyl Chloride (PVC) thermal break and the sections must not be fixed by screws, grommets or other fastening devices.
 4. Wall and floor anchors to be supplied to suit wall conditions and shall be designed so as not to permit thermal transfers from exterior to interior surfaces of the frames sections.
 5. Where doors are required frames shall be mortised, reinforced, drilled and tapped to receive hardware as specified in the hardware list.
 6. Where welded frames are employed, welds must not cause thermal transfers between exterior and interior surfaces of the frame sections.
 7. Provide reinforcement in frames wider than 4'-0" (1200 mm) and where indicated or recommended by manufacturer.
 8. Prepare frame for hardware, electronic hardware and security systems. Drill, tap and reinforce frames where required.
 9. Prepare for 1" (25 mm) thick insulated glass units at all glass locations in doors and screens.
6. Metal Panels and Closures:
1. Provide 16 U.S. gauge (1.6 mm) hot rolled zinc coated steel closures (at corners and/or between frames) and panels as indicated and detailed on drawings.

PART 3 EXECUTION

3.1 INSTALLATION

1. Frame Installation:
 1. Allowable limit of distortion shall be 1/16" (1.5 mm) out of plumb each jamb, measured on face of frame, resulting in maximum twist of frame of 1/8" (3 mm) measured diagonally from upper to lower corner.

2. At masonry walls: install frames using the corrugated or wire masonry anchors. At preformed openings and exterior thermally broken doors use machine screws and expansion anchors as provided for this application. After installation, fill countersunk screw heads flush with frame and sand smooth ready for painting. Fill exterior frames with spray-on insulation by Section 07215 – Spray-on Insulation. Co-operated with masonry trade who will fill interior frames with mortar.
 3. Brace frames solidly in position while being built in. Install temporary spreader of wood at mid-height of frame until adjacent wall work is completed. Provide vertical support at centre of head for openings of 4'-0" (1200 mm) wide or wider.
 4. Remove temporary jamb spreader bars and vertical supports only after frames are securely anchored in place.
2. Door Installation:
1. Install hollow metal doors plumb, true and level and at correct elevation.
 2. Co-ordinate installation of hardware.
 3. Adjust operable parts to ensure proper operation.
 4. Install hollow metal panels and closures with concealed fastenings.
 5. Install acoustical assembled doors and frames as per manufacturer's recommendation.
 6. Install fire rated doors and frames in accordance with National Fire Codes, Volume 4, produced by National Fire Protection Association (NFPA 80).
 7. Attach fire rating labels to doors and frames required to be fire rated. Ratings shown on door schedule are minimum. Attach temperature rise rated labels to doors required to be 90 MFR or greater.
 8. Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
 9. Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08700 - Finishing Hardware.
 10. Adjust operable parts for correct function.
 11. Install glazed lites, stops and louvres.
 12. Install door grilles provided by Mechanical Contractor.

3.2 TOUCH-UP

1. Remove rust, clean and touch-up any damaged galvanizing with "Zincrich" or "Galvicon" paint.
2. Remove rust, clean and touch-up any damaged paint with approved primer.

END OF SECTION

1. GENERAL

1. GENERAL REQUIREMENTS

1. Division One, General Requirements, is part of this section and shall apply as if repeated here.

2. QUALIFICATIONS

1. Manufacturers approved for the work of this Section are:

1. Kawneer Company, Canada Limited.
2. Muraflex
3. Fulton Windows (Commadoor Aluminum doors)
4. Alumicor
5. Aerloc
6. SaftiFirst

2. No other manufacturer or supplier, except those noted above, shall be used unless approved in writing by the Architect seven (7) days prior to tender closing.

3. **It is the responsibility of the approved manufacturers to *meet or exceed* and submit OBC SB-10 Energy Efficiency Compatibility Results.**

Note: The above-mentioned submittal is to incorporate the specified sealed glazing unit and each opening component as a whole before the shop drawings are accepted or before any shop drawings are reviewed.

3. SHOP DRAWINGS

1. Submit shop drawings in accordance with Section 01300 – Submittals.
2. Submit shop drawings for the fabrication and installation of associated components of the work. Indicate anchors, joint system, expansion provisions, hardware, and other components not included in manufacturer's standard data. Include glazing details (where required).
3. Before shop drawings and fabrication are started, take critical measurements at the site to facilitate installation and fitting of work.
4. **Shop drawings that are submitted are to be in the units of the tendered drawings with critical on center mullion dimensions (dimension string from datum level to top of opening noting center of mullions) noted along with all other regular shop drawing dimensions, no exceptions. Both units (metric and imperial) are allowed. Openings are to be identified with the corresponding tags on the tendered drawings. (Coordinate with typical A8 drawing notes)**

4. SUBMITTALS

1. Submit samples of sections and finishes for Architect's approval before fabrication.
2. Furnish templates, diagrams, and other data to fabricators and installers of related work, as needed for coordination installation.
3. Coordinate with Section 08700 Finish Hardware and security subcontractor for any electrical provisions required.

5. DESIGN

1. Design for wind and snow loads as set out by the Ontario Building Code, 2012 as currently amended for the building location. Copies of any and all structural calculations made in connection with the supplementary design and/or detailing of the work of this section shall be promptly furnished to the Architect if requested.
2. Submit with shop drawings certification that window and entrance design and construction will meet the specified requirements. Certification shall be in the form of test reports on similar units performed by an independent testing laboratory, and shall meet approval of Architect before fabrication commences.

6. WARRANTY

1. The Work and materials of this Section shall be under warranty in accordance with CCDC Document 2 - 2020 but for a period of five years and ten (10) years for hermetically sealed units from the date of Architect's Certificate of Substantial Completion.

2. PRODUCTS

1. MATERIALS

1. Aluminum: Extruded Members: 6063-T54 alloy and temper.
2. Fasteners, Screws & Bolts: 300 Stainless Steel or 400 series stainless steel cadmium plated and of sufficient size and quantity to perform their intended function.
3. Glazing Tape: Tremco 440 tape with built-in shim and as recommended by window manufacturer.
4. Weathering and Glazing Gaskets: Extruded black closed cell or dense elastomer of durometer appropriate to the functions.

5. Spacer Shims: oil resistant rubber or plastic acceptable to glass manufacturer, channel shaped and approximately 4" long (100 mm).
6. Silicone Sealant: Dow Corning #795 or as per manufacturers recommendations exceeding CAN2-19.13-M82 Class 40 requirements.
7. Isolating Coating: Black alkali resistant bitumastic enamel.
8. Spray-On Insulation: Supply and install by this section as per Section 07215.
9. Miscellaneous: Supply all covers, copings, special flashings, filler pieces, termination pieces, caps closures and expansion joint covers as required and as indicated on drawings.
10. Glass for Aluminum Doors: as per 08800 Glass and Glazing Section.
11. Glass for Exterior Aluminum Entrance Framing: as per 08800 Glass and Glazing Section.
12. Glass for Interior Aluminum Screens: as per 08800 Glass and Glazing Section.

2. FABRICATION

1. General

1. Construct aluminum assemblies of extruded sections to size and profile shown on drawings.
2. Build units square, true, accurate to size, free from distortions, waves, twists, buckles or other defects detrimental to performance or appearance.
3. Units too large for handling or shipping shall be prefabricated in shop, disassembled and marked for shipping and field assembly.
4. Use concealed fastenings. No exposed screws shall show in the finished work unless approved by the Architect. Such screws shall be countersunk and finish match surfaces in which they occur.
5. Joints shall be accurately cut and fitted to result in a tightly closed joint.

3. DOORS, ENTRANCE SCREENS, INTERIOR SCREENS

1. Frames

1. "Kawneer Trifab 451UT, Center, Interior Glazed" thermally broken framing at exterior entrance screens where the door system is stand alone.

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2. "Kawneer Trifab 451, Center, Interior Glazed" framing at interior entrance screens where the door system is stand alone.
 3. For products listed above, coordinate with manufacturer and drawings for side light base heights (dimension to match doors) with associated aluminum sill flashing, metal liner, insulation and aluminum panels where indicated on drawings.
-
2. Conform to CAN3-A440-M90 performance standards Air Leakage to meet the Fixed rating, and Type A3, Water Leakage Type B5 and Wind Resistance Type C7.
 3. Doors
 1. Exterior entrance / vestibule doors to be insulated **"Kawneer 560 InsulClad"** with insulated double glazing.
(Coordinate with door schedules on drawings)
 2. Interior entrance/library doors to be **"Kawneer 190 narrow Stile"** with single glazing, clear anodized finish/
(Coordinate with door schedules on drawings). Interior screen doors to be coordinated with screen schedules and associated door type schedules.
 3. The entrance from the Library to the New Staff Work Room to be "Fino sliding door" by Muraflex. Coordinate with the door schedule on drawings. With ADA manual handle, black anodized aluminum frame, tempered glass. Final selection after reviewing the shop drawings.
 4. Coordinate with door schedules for heads and stiles sizing and base height. Adjacent screens / curtain wall bases to match door base height typical.
 5. Provide mid-rail at all doors that require panic devices, coordinate with door schedules for sizing.
 6. The core shall be foamed-in-place urethane foam at density of 5.0 lb./cu.ft. (64 kg.m³). Provide insulated aluminum panel where indicated on drawings.
 7. Stiles shall have a wall thickness of .125". (3.2 mm). Glazing mouldings shall be .050" thick (12.7 mm).
 8. Use snap-in type square glazing stops with neoprene bulb type glazing. Do not use exposed screws to secure stops. Use lock-in, tamperproof type stops.

9. Equip door leaf with an adjustable mechanism in top rail near the lock stile, to provide for minor clearance adjustments after installation.

4. Door Hardware

1. Equip all aluminum doors with continuous weather stripping with adjustable weather stripping at the base; and aluminum thresholds, 6mm (1/4") maximum vertical height, over 6mm up to 1/2" (12.7mm) height to be sloped / bevel in a 1 in 2, 50%. Closer cover to match door finish colour.
2. Equip all aluminum doors with full height (continuous) heavy-duty stainless steel hinge.
3. All other hardware including concealed closers, exposed closers, locksets, exit device, push/pulls, overhead stops, handicap automatic door openers to be supplied under Section 08700 – Finishing Hardware and installed under Section 06200 – Finish Carpentry.

5. Finish

1. Prepare and fabricate components as required before finishing.
2. Finish to be clear anodized.
3. Metals other than aluminum shall match colour finishes.

6. Closures, Flashings and Miscellaneous Covers

1. Provide .125" (3 mm) thick aluminum closures and caps where required.

7. Operating Vents:

1. Hinged awning style limited opening to max. 4" (100mm). Provide 1 pair of heavy duty Anderburg or Senator friction arms at all openings & 2 pair where opening is 500mm & wider. Polished US - #4 cam handle (for operation locate handle so that screen does not need to be removed to operate the vent). Finish to be clear anodized typical.

8. Insect Screens:

1. Sized to match operator. Glass fibre mesh in aluminum frame with extruded polymer removable spline

3. EXECUTION

1. INSTALLATION

1. Secure work adequately and accurately to the structure in required position and in manner not restricting thermal movement. Work shall be plumb, square and level, free of twist, warp or other superimposed loads. Provide shims as required.
2. All metal to metal joints shall be sealed to provide a weathertight assembly in accordance with manufacturer's instructions.
3. Use concealed fixings where possible, where not possible use flat head screws in countersunk holes. Exposed bolt or nut heads not permitted. Match exposed fastenings with surfaces on which they occur.
4. Isolate all aluminum coming in contact with unlike materials with heavy shop coating of black alkali resistant bitumastic enamel to prevent electrolytic or chemical reaction.
5. Fill voids between aluminum extrusions and wall surfaces at exterior doors and entrance framing with foam spray applied insulation where required to prevent movement or infiltration of air. Supply and install spray-on insulation as per Section 07215 – Spray-On Insulation.
6. Supply and install all caps and closures where required to create a complete installation and as indicated on the drawings.

2. CAULKING

1. Caulking between aluminum and aluminum; aluminum and glass to conform to this section. Caulking to perimeter drywall masonry and concrete all by this section as per Section 07900 - Sealants.
2. Caulking by this Section shall be installed as per Section 07900.

3. GLAZING

1. Glaze windows in accordance with CAN3-A440-M90.
2. Set glazing tape against permanent stops, allow 1/8" for cap bead, set horizontal strips first using full width pieces of tape, then set vertical pieces. Butt tape at corners, do not lap tape or run continuous at corners.
3. Set glass on setting blocks, number as recommended by glass manufacturer. Set glass with draw lines horizontal.
4. Apply heel bead on interior, using sealant. Place spacer shims, set glazing tape against glass and install stops.
5. Apply cap bead to fill void on exterior. Tool sealant with a slight bevel, sloped away from the glass to create a water shed.

**ALUMINUM ENTRANCE
DOORS, FRAMES &
SCREENS**

6. Mark each light with a large white cross to indicate the presence of glass.
7. Replace under this section defective, damaged or broken glass due to faulty setting, handling or storage.
8. Neoprene bulb type glazing in accordance with manufacturer's instructions.

4. ADJUST AND CLEAN

1. Adjust all hinges, closers and weather stripping for optimum condition. Lubricate operating equipment.
2. Clean surfaces promptly after installation, exercising care to avoid damage of the protective coating (if any).
3. Advise the contractor of protective treatment and other precautions required through the remainder of the construction period, to ensure that doors will be without damage or deterioration (other than normal weathering) at the time of acceptance.
4. Aluminum shall be isolated from concrete, mortar, plaster and dissimilar metal with bituminous paint. Windows shall be protected from other building materials during and after insulation until acceptance by the General Contractor. Thereafter, it shall be the responsibility of the General Contractor to maintain protection and provide final cleaning.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One, General Requirements, is a part of this Section and shall apply as if repeated here.

1.2 WARRANTY

1. The work under this Section shall be warrantied in accordance with CCDC Document 2 - 2020 but for a period of 10 years on insulated units and 5 years on all other work from the date of Architect's Certificate of Substantial Completion.

1.3 PROTECTION

1. Mark each light with a large cross to indicate presence of glass (colour that stands out to the visible eye). Use material that will leave no residue after removal.
2. Replace under the work of this section, defective, damaged or broken glass due to faulty setting, handling or storage.

1.3 SUBMITTALS

1. Submit shop drawings in accordance with Section 01300 - Submittals for items 2.15 and 2.16 below designed and stamped by a Certified Structural Engineer from Ontario for the design thickness of the glass as a Guard per latest OBC, as currently amended.

1.4 STANDARDS

1. Design in conformance with CAN/CGSB-12.20-M, structural design of glass for buildings.

PART 2 PRODUCTS

2.1 MATERIALS

1. All exposed glass edges shall be polished and chamfered typical.
2. Float Glass: 1/4" (6 mm) minimum clear float glass conforming to CAN/CGSB - 12.3 M91.
3. Tempered Glass: 1/4" (6 mm) minimum clear glass tempered conforming to CAN/CGSB - 12.1 M90 equal to Ford Glass.
4. Laminated Safety Glass: 1/4" (6 mm) minimum clear core laminated – 2 layers of 1/8" min (3mm) with laminate between layers conforming to CAN/CGSB - 12.1-M90.

5. Fire Rated Glass: 3/16" (5 mm) minimum thick Firelite NT Standard Grade glass ground and polished both sides manufactured by Nippon Electric Glass Company Ltd. conforming to CAN/CGSB - 12.11-M90, ASTM E2010, CAN 4 S-104 and CAN 4 S-106 and thickness required by manufacturer for fire rating required in the assembly in which the glazing is installed, to be submitted in shop drawings before any manufacturing. Glazing tape to be PVC, to be confirmed with the manufacturer's written recommendations.
 - I. Pyran Platinum F to be considered an acceptable alternative to Firelite NT Standard.

6. Spandrel Glass Panels

1. At Exterior Locations:

1. Outer Light Glass Type: 6 mm (1/4") tempered clear, Solarban R60(2) on inner face of outer light,
2. Gas Cavity: 1/2" (12.7 mm) 90% argon and 10% air space, hermetically sealed, insulating units conforming to CAN/CGSB - 12.8 - M90 and with thermally broken stainless steel glazing spacer.
3. Inner Light Glass Type: 6 mm (1/4") clear tempered glass with opaci-coat high-performance glass coating. Colour is to be selected by the Architect from the manufacturer's full range of colours before manufacturing.

Note: there is an Alternate price called for on the Supplementary Tender Form to use single glazing at spandrel glass locations.

7. Glazing Tape: Tremco 440 tape and as indicated in other glass sections.
8. Sealant: CWS by Dow Corning.
9. Heal Bead Sealant: One part polysulphide or acrylic sealant conforming to CGSB 19-GP-5 and as indicated in other glass sections.
10. Spacer Shims: neoprene, Shore "A" durometer hardness 80, 3" (75 mm) long x 0.08" (2.4 mm) thick and 3/8" (9 mm) high.
11. Setting Blocks: neoprene, Shore "A" durometer hardness, 4" (100 mm) long x 1/4" (6 mm) high x width to suit glass thickness.
12. Primer: Sealers and cleaners to glass manufacturer's standard.
13. Vision Glass: Sealed insulated glass units, ten (10) year guarantee, 1/2" (12.7 mm) 90% argon and 10% air space, hermetically sealed, insulating units conforming to CAN/CGSB - 12.8 - M90 and with thermally broken stainless steel glazing spacer. Warm edge spacer is only allowed in curved glazing units.

NOTE: Colour selection of glass to be confirmed by Architect prior to manufacturing.

1. Outer Light Glass Types:

1. 6mm (1/4") Tempered Solargray with Solarban 70XL (Surface 2) by P.P.G. Canada or approved equal typical at all vision glass locations.

2. Fire rated glass: at all fire rated wall assemblies or exposure situations.

3. Inner Light Glass Type:

1. 6mm (1/4") Clear Tempered by P.P.G. Canada or equal.

2. Provide Fire rated glass at all fire rated wall assemblies or exposure situations. Refer to life safety drawings for locations required.

14. Vision Glass for Exterior Entrance Doors, Sidelights and Transoms: Sealed insulated glass units, ten (10) year guarantee, 1/2" (12.7 mm) air space filled with 90% Argon and 10% air, hermetically sealed with stainless steel thermally broken glazing spacer insulating units conforming to CAN/CGSB - 12.8 - M90.

1. Outer Light Glass Types:

1. 4mm Heat Strengthened Clear / .090 PVB interlayer / 4mm Heat Strengthened clear by TRULITE or equal (9.525mm (3/8") air space)

2. Inner Light Glass Type:

1. 6mm Solarban 70XL (3) Clear Tempered by TRULITE or equal.

15. Glass for Interior Doors:

1. Typical 6mm Clear Tempered by P.P.G. / TRULITE or equal.

NOTE: All vision glazing lower than 1070mm a/f/f (upper floor levels, stair landings, etc.) to be designed to withstand the loading on guards as per OBC SB-13; where the difference in elev. between the adjacent ground or floor level is more than 600mm typical.

16. Glass for Framed Interior Screens:

1. 10 mm (3/8") minimum Clear Tempered by P.P.G Canada or Equal. Contractor shall verify the minimum required glass thickness based on the manufacturers engineered directions for the size, location and mounting details prior to pricing

17. Glass for Interior Screens (set in CRL stainless steel shoe):

1. 16mm (5/8") minimum Clear Tempered by P.P.G Canada or Equal with caulked butt joints complete with clear CWS silicone by DOW Corning .
2. Shop drawings to be provided stamped by professional engineer with actual glazing thickness indicated in all required guard locations.

NOTE: All vision glazing lower than 1070mm a/f/f (upper floor levels, stair landings, etc.) to be designed to withstand the loading on guards as per OBC SB-13; where the difference in elev. between the adjacent ground or floor level is more than 600mm typical.

18. Glass for Display Cases:

1. Suspended Glass shelves to be clear 10mm tempered with chamfered edges all sides, refer to Section 06400.
2. Glass for Display Case Doors to be 10mm tempered with chamfered edges all sides.

19. Safety Vision Strips

1. 50mm Vinyl adhesive by 3M or Solar Graphics, pattern to be frosted.

20. Glass for large Miirrors

1. All glass for large mirrors indicated on the drawings to be minimum 6mm tempered.

PART 3 EXECUTION

3.1 WORKMANSHIP

1. Installation of glass shall be by workmen skilled in this trade and done in strict accordance with material manufacturer's directions to produce a first class installation.
2. Accurately cut glass to fit opening and provide for glass expansion.
3. Carefully remove glazing stops and replace after glazing. Exercise care to prevent damage to stops.
4. Collect all glass cuttings in boxes and remove when cleaning up debris.
5. Cut glass and mirrors from dimensions taken in field.

6. Remove protective coatings and clean contact surfaces with solvents and wipe dry.
7. Apply primer-sealer to contact surfaces.

3.2 DOORS, SIDELIGHTS AND SCREENS

1. Interior Lights:

1. Glaze with glass as indicated, using mastic glazing compound.
2. Set glass with equal bearing full width of pane. Use setting blocks as per manufacturer's instructions.
3. Apply thin layer of mastic compound to rebate, set glass, then press until even bed is secured, sprig and run face compound, replace removable stops.
4. Insert spacer shims to centre glass in space. Place shims at 2'-0" (600 mm) o.c. and keep 1/4" (6mm) below the sight line.
5. Installation shall be rattle free.

2. Exterior Lights:

1. Set glazing tape against permanent stops, allow 1/8" (3.2 mm) for cap bead, set horizontal strips first using full width pieces of tape, then set vertical pieces. Butt tapes at corners, do not lap tape or run continuously.
2. Set glass on setting blocks, quantity as recommended by glass manufacturer. Set glass with draw lines horizontal.
3. Apply heel bead on interior using sealant. Place spacer shims, at 2'-0" (600mm) o.c. and keep 1/4" (6mm) below the sight line. Set glazing tape against glass and install stops.
4. Apply cap bead to fill void on exterior. Tool sealant with a slight bevel, sloped away from glass to form a water shed.

3.3 ALUMINUM WINDOWS, ENTRANCE FRAMING AND DOORS

1. Specified under this Section.

3.4 HOLLOW METAL DOORS AND SCREENS AND WOOD DOORS

1. Specified under this Section.

3.5 GLASS FOR MILLWORK

1. Supply and install tempered glass and glazing for millwork where glass is indicated on drawings and under Section 06400 – Architectural Woodwork.

3.6 GLASS FOR CURTAIN WALL

1. Specified under this Section.

3.7 MIRROR INSTALLATION

1. Install mirrors where indicated using full adhesive bed and clips.
2. Provide unframed mirrors with polished smooth edges as shown on Drawings. Mirrors shall be equally divided into units, or as shown on Drawings.

3.8 GLASS FOR INTERIOR SCREENS

1. Specified under this Section.

3.9 FINISHING

1. Immediately remove sealant and compound droppings from finished surfaces. Remove labels after work is completed and inspected by Architect.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS:

1. Division One, General Requirements, is a part of this Section and shall apply as if repeated here.

1.2 DESCRIPTION

1. This section specifies subsurface preparation requirements for areas to receive the installation of applied and resinous flooring. This section includes removal of existing floor coverings, testing concrete for moisture and pH, remedial floor coating for concrete floor slabs having unsatisfactory moisture or pH conditions, floor leveling, and repair as required.
2. **Note:** where new vinyl tile floor finishes are being applied to existing floor substrates other than slab on grade conditions, refer to Section 09650 for leveling material.

1.3 SUBMITTALS

1. Submit in accordance with Section 01300 – Submittals.
2. Written approval confirming product compatibility with subfloor material manufacturer and the flooring manufacturer.
3. Product Data:
 1. Moisture remediation system
 2. Underlayment Primer
 3. Cementitious Self-Leveling Underlayment
 4. Cementitious Trowel-Applied Underlayment (Not suitable for resinous floor finishes)
4. Test Data:
 1. Moisture test and pH results performed by a qualified independent testing agency or warranty holding manufacturer's technical representative.

2.4 DELIVERY AND STORAGE

1. Deliver materials in containers with labels legible and intact and grade-seals unbroken.
2. Store material to prevent damage or contamination.

1.5 APPLICABLE PUBLICATIONS

1. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in text by basic designation only.
2. American Society for Testing and Materials (ASTM):

D638-10 (2010)	Test Method for Tensile Properties of Plastics
D4259-88 (2012)	Standard Practice for Abrading Concrete to alter the surface profile of the concrete and to remove foreign materials and weak surface laitance.
C109/C109M-12 (2012)	Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens) Modified Air Cure Only
D7234-12 (2012)	Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.
E96/E96M -12 (2012)	Standard Test Methods for Water Vapor Transmission of Materials
F710-11 (2011)	Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
F1869-11 (2011)	Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
F2170-11 (2011)	Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
C348-08 (2008)	Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars
C191-13 (2013)	Standard Test Method for Time of Setting of Hydraulic Cement by Vicat Needle

PART 2 - PRODUCTS

2.1 MOISTURE REMEDIATION COATING (SLAB ON GRADE LOCATIONS ONLY):

1. System Descriptions:
 1. High-solids, epoxy system designed to suppress excess moisture in concrete prior to an overlayment. For use under resinous products, VCT, tile and carpet where issues caused by moisture vapor are a concern.
2. Products: Subject to compliance with applicable fire, health, environmental, and safety requirements for storage, handling, installation, and clean up.

3. System Components: Verify specific requirements as systems vary by manufacturer. Verify build up layers and installation method. Verify compatibility with substrate. Use manufacturer's standard components, compatible with each other and as follows:
 1. Liquid applied coating:
 1. Resin: epoxy.
 2. Formulation Description: Multiple component high solids.
 3. Application: Per manufacturer's written installation requirements.
 4. Thickness: minimum 10 mils
 4. Material Vapor Permeance: Application shall achieve a permeance rating of less than 0.1 perm in accordance with ASTM E96/E96M.
 5. Maximum RH requirement: 100% testing in accordance with ASTM F2170.

Property	Test	Value
Tensile Strength	ASTM D638	4,400 psi
Volatile Organic Compound Limits (V.O.C.)	SCAMD Rule 1113	25 grams per liter
Permeance	ASTM E96	0.1 perms
Tensile Modulus	ASTM D638	1.9X10 ⁵ psi
Percent Elongation	ASTM D638	12%
Cure Rate	Per manufacture's Data	4 hours Tack free with 24hr recoat window
Bond Strength	ASTM D7234	100% bond to concrete failure

2.2 CEMENTITIOUS SELF-LEVELING UNDERLAYMENT (AT LOCATIONS WHERE EXISTING FLOOR SURFACE VARIES MORE THAN 3MM OVER 3000MM):

1. System Descriptions:
 1. High performance self-leveling underlayment resurfacer. Single component, self-leveling, cementitious material designed for easy application as an underlayment for all types of flooring materials. It is used for substrate repair and leveling.
 2. Products: Subject to compliance with applicable fire, health, environmental, and safety requirements for storage, handling, installation, and clean up. Gypsum-based products are unacceptable.
2. System Characteristics:

1. Wearing Surface: smooth
2. Thickness: Confirm existing conditions, ranging from feathered edge to 1", per application. Applications greater than 1" require additional 3/8" aggregate to mix or as recommended by manufacturer.
3. Underlayment shall be calcium aluminate cement-based, containing Portland cement. Gypsum-based products are unacceptable.
4. Compressive Strength: Minimum 4100 psi in 28 days in accordance with ASTM C109/C109M.
5. Flexural Strength: Minimum 1000 psi in 28 days in accordance with ASTM C348.
6. Dry Time: Underlayment shall receive the application of moisture insensitive tile in 6 hours, floor coverings in 16 hours, and resinous flooring in 3-7 days.
7. Primer: compatible and as recommended by manufacturer for use over intended substrate.
8. System Components: Manufacturer's standard components that are compatible with each other and as follows:
 1. Primer:
 1. Resin: copolymer
 2. Formulation Description: single component ready to use.
 3. Application Method: Squeegee and medium nap roller.
All puddles shall be removed, and material shall be allowed to dry, 1-2 hours at 70F/21C.
 4. Number of Coats: (1) one.
 2. Grout Resurfacing Base:
 1. Formulation Description: Single component, cementitious self-leveling high-early and high-ultimate strength grout.
 2. Application Method: colloidal mix pump, cam rake, spike roll.
 - 1) Thickness of Coats: Per architectural scope, 1" lifts.
 - 2) Number of Coats: More than one if needed.
 3. Aggregates: for applications greater than 1inch, require additional 3/8" aggregate to mix.

Property	Test	Value
Compressive Strength	ASTM C109/C109M	2,200 psi @ 24 hrs 3,000 psi @ 7 days
Initial set time Final Set time	ASTM C191	30-45 min. 1 to 1.5 hours

Property	Test	Value
Bond Strength	ASTM D7234	100% bond to concrete failure

2.3 CEMENTITIOUS TROWEL-APPLIED UNDERLAYMENT(NOT SUITABLE FOR RESINOUS FLOOR FINISHES)

1. Underlayment shall be calcium aluminate cement-based, containing Portland cement. Gypsum-based products are unacceptable.
2. Compressive Strength: Minimum 4000 psi in 28 days
3. Trowel-applied underlayment shall not contain silica quartz (sand).
4. Dry Time: Underlayment shall receive the application of floor covering in 15-20 minutes.

PART 3 - EXECUTION

3.1 ENVIRONMENTAL REQUIREMENTS

1. Maintain ambient temperature of work areas at not less than 16 degree C (60 degrees F), without interruption, for not less than 24 hours before testing and not less than three days after testing.
2. Maintain higher temperatures for a longer period of time where required by manufacturer's recommendation.
3. Do not install materials when the temperatures of the substrate or materials are not within 60-85 degrees F/ 16-30 degrees C.

3.2 SURFACE PREPARATION

1. Existing concrete slabs with existing floor coverings:
 1. Conduct visual observation of existing floor covering for adhesion, water damage, alkaline deposits, and other defects.
 2. Remove existing floor covering and adhesives. Comply with local, state and federal regulations and the RFCI Recommended Work Practices for Removal of Resilient Floor Coverings, as applicable to the floor covering being removed.
2. Concrete shall meet the requirements of ASTM F710 and be sound, solid, clean, and free of all oil, grease, dirt, curing compounds, and any substance that might act as a bond-breaker before application. As required prepare slab by mechanical methods. No chemicals or solvents shall be used.
3. General: Prepare and clean substrates according to flooring manufacturer's written instructions for substrate indicated.

4. Prepare concrete substrates per ASTM D4259 as follows:
 1. Dry abrasive blasting.
 2. Wet abrasive blasting.
 3. Vacuum-assisted abrasive blasting.
 4. Centrifugal-shot abrasive blasting.
 5. Comply with manufacturer's written instructions.
5. Repair damaged and deteriorated concrete according to flooring manufacturer's written recommendations.
6. Verify that concrete substrates are dry.
7. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of per flooring manufactures formal and project specific written recommendation.
8. Perform in situ probe test, ASTM F2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity per flooring manufacture's formal and project specific written recommendation.
9. Provide a written report showing test placement and results.
10. Prepare joints in accordance with 07900 – Sealants.
11. Alkalinity: Measure surface pH in accordance with procedures provided in ASTM F710 or as outlined by qualified testing agency or flooring manufacturer's technical representative.
12. Tolerances: Subsurface shall meet the flatness and levelness tolerance specified on drawings or recommended by the floor finish manufacturer. Tolerance shall also not to exceed 1/4" deviation in 10'. As required, install underlayment to achieve required tolerance.
13. Other Subsurface: For all other subsurface conditions, such as wood or metal, contact the floor finish or underlayment manufacturer, as appropriate, for proper preparation practices.

3.3 MOISTURE REMEDIATION COATING:

1. Where results of relative humidity testing (ASTM F2170) exceed the requirements of the specified flooring manufacturer, apply remedial coating as specified to correct excessive moisture condition.
2. Prior to remedial floor coating installation mechanically prepare the concrete surface to provide a concrete surface profile in accordance with ASTM D4259.
3. Mix and apply moisture remediation coating in accordance with manufacturer's instructions.

3.4 CEMENTITIOUS UNDERLAYMENT:

1. Install cementitious self-leveling underlayment as required to correct surface defects, floor flatness or levelness corrections to meet the tolerance requirements as or detailed on drawings, address non-moving cracks or joints, provide a smooth surface for the installation of floor covering, or meet elevation requirements detailed on drawings.
2. Mix and apply in accordance with manufacturer's instructions.

3.5 PROTECTION:

1. Prior to the installation of the finish flooring, the surface of the underlayment should be protected from abuse by other trades by the use of plywood, tempered hardwood, or other suitable protection course.

3.6 FIELD QUALITY CONTROL

1. Where specified, field sampling of products shall be conducted by a qualified, independent testing facility.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One - General Requirements are part of this section and shall apply as if repeated here.

1.2 QUALIFICATIONS

1. Conform to CSA A82.30-M1980 including appendices.

1.3 SHOP DRAWINGS

1. Submit shop drawings in accordance with Section 01300 – Submittals.
2. Shop drawings are to be designed for fabrication to meet all codes and be stamped by a Professional Engineer registered in the Province of Ontario.
3. Clearly indicate construction details, sizes, thickness or gauge of steel studs, connections, joints, method of anchorage, number of anchors, supports, reinforcement and accessories. Confirm all dimensions on site.
4. Indicate control joint and expansion joint locations and framing details.

1.4 ALLOWANCES

1. Allow included in Base Bid amount for **20 sq. meters of additional wall furring and 60 sq. meters of additional framing for bulkheads** for additional work not indicated on drawings. Locations as per later designation by Architect.

PART 2 PRODUCTS

2.1 MATERIALS

1. Non-load-bearing channel stud framing less than 4800 mm long: to ASTM C645-83 size as noted on drawings, roll formed from 25 gauge (0.53 mm) thickness electro galvanized steel sheet; for screw attachment of gypsum board. Knock-out service holes at 1'-6" (460 mm) centres.
2. Extra strength channel stud framing (4800mm long and greater): to CAN 3-S146-M84 for design and ASTM A446 for steel, 3 5/8" (92 mm) or 6" (152 mm) stud size, roll formed from 20 ga. (0.91 mm) thickness hot dipped galvanized steel sheet; for screw attachment of gypsum board. Knock-out service hole a 1'-6" (460mm) centres. Use this type at all exterior framing locations. Note interior extra strength stud partitions with drywall on both sides can be electro galvanized finish.

3. Floor and ceiling tracks: to ASTM C645-83; in widths to suit stud sizes, 1 1/4" (32 mm) flange height. Use hot dipped galvanized units at exterior wall and exterior canopy locations.
4. Metal channel stiffener: size to suit studs, 2 mm thick cold rolled steel, coated with rust inhibitive coating. Use hot dipped galvanized units at exterior wall and exterior canopy locations.
5. Bridging channels and diagonal tension straps (load bearing stud systems): material and gauge to match studs, let into or surface fastened to studs for diagonal/lateral bracing and reinforcement.
6. Screws: CGC Branch Screws (or approved equal) of type recommended in the selector guide on Page 5 of Canadian Gypsum Brochure 09250 - 1E. Use hot dipped galvanized or epoxy coated fasteners at exterior walls and canopies.
7. Furring Channels: 7/8" (22 mm) x 2 3/4" (70 mm), 25 Ga. (18 mils), cold rolled galvanized after fabrication, types manufactured by Bailey Metal Products Limited, D-1001, Donn Products, Universal Sections or Canadian Gypsum Co. to meet CSA A82.30-M1980. Use hot dipped galvanized units at exterior walls and canopies.
8. Resilient Channels: 1/2" (13mm) x 2 1/4" (57mm), Bailey RC Plus, manufactured by Bailey Metal Products Limited, Model No. D-1007, to meet ASTM A653/A653-11. Use G40 galvanizing to ASTM C754-11.
9. Carrying Channels: 1 1/2" (38 mm) x 6 lbs./10 ft. (892 g/m) cold rolled steel after fabrication to meet CSA A82.30-M1980. Use hot dipped galvanized units at exterior walls and canopies.
10. Hangers: 1/4" (6.3 mm) dia. galvanized pencil rods at 4'-0" (1220 mm) o.c. maximum on main tees to meet CSA A82.30-M1980.
11. Tie Wire: No. 16 (1.5 mm) Imperial Wire gauge galvanized soft annealed to meet CSA A82.30 - M1980.
12. Anchors: to meet CSA A82.30-M1980 standard.
13. Heavy Duty Studs: 4" (100 mm) and 6" (150 mm) 16 gauge (1.5 mm) as supplied by Bailey Metal Products Ltd., Toronto, Ontario.
14. Batt Insulation (exterior stud walls): Coordinate with Specification Section 07213, Mineral Fibre Insulation, thickness to suit stud cavity.
15. Acoustical Sealant: Acoustical sealant to CGSB 19-GP-21M by Tremco or approved equal.

16. Insulating Strip: Rubberized, moisture resistant 1/8" (3mm) thick foamstrip, 1/2" (12mm) wide with self-sticking adhesive on one face, lengths as required.

PART 3 EXECUTION

3.1 GENERAL

1. Installation shall be by mechanics skilled in this trade and done in accordance with best standard practice and material manufacturer's printed directions.
2. Do not cover piping, conduit, duct and the like until inspected and approved by the Architect.
3. Furring indicated shall not be regarded as exact or complete.
4. Method of framing and furring left to Contractor's option but shall result in a rigid, secure, plumb framing and forming, erected to maintain overall sizes as indicated and of adequate strength to support without distortion of the facing indicated. Wall furring and suspended and furred ceilings must be installed to meet CSA A82.31-M1980 except where specified otherwise.
5. Do not make fastenings to ducts, pipes, conduit, door frames, backers or inserts of other trades not specifically intended for fastening metal furring.
6. The completed installation of framing and furring must allow drywall to be installed free of waves, depressions, other defects that would mar the finished appearance.

3.2 PARTITION AND WALL FURRING ON WALLS

1. Install partition tracks at top and bottom of studs, align accurately, and make allowance for deflection under beams and structural slabs to avoid transmission of structural loads to studs. Use 2" (50 mm) leg ceiling track.
2. Secure tracks to concrete and steel with power actuated fasteners at a min. 24" (600 mm) o.c.
3. Install dampproof course (vapour barrier) under stud shoe tracks of partitions on slabs-on-grade.
4. Place studs vertically at 16" (400 mm) centres and not more than 2" (50 mm) from abutting walls, openings and each side of corners. Secure studs to tracks at floor and ceiling using screws or crimp method. Place interior heavy duty studs vertically at 12" (300 mm) centres where indicated on drawings.

5. When necessary, splice studs with 8" (200 mm) nested lap and one positive attachment per stud flange. Place studs in direct contact with door frame jambs, abutting partitions, partition corners and existing construction elements. Where studs are installed directly against uninsulated surfaces install insulating strips between studs and wall surfaces.
6. Anchor studs for shelf-walls and those adjacent to door and window frames, partition intersections and corners to ceiling and floor runner flanges with an approved crimping tool. Securely anchor studs to jamb and head anchor clips of door or borrowed-light frames, place horizontally a cut-to-length section of runner, with a web-flange bent at each end, and secure with one positive attachment per flange. Position a cut-to-length stud (extending to ceiling runner) at vertical panel joints over door frame header.
7. Install heavy gauge single jamb studs at all openings.
8. Erect metal studding to tolerance of 1:1200.
9. Stiffen partitions exceeding 8' (2400 mm) in height and/or 10' (3000 mm) in length with 3/4" (19 mm) channel bracing extending horizontally across the length of the partition. Provide one horizontal stiffener for partitions under 12' (3600 mm) high; at least two horizontal stiffeners for partitions 12 or more feet high (3600 or more mm), at maximum 6' (1800 mm) centres. Install metal strapping securing stud to masonry or concrete walls at every other stud where horizontal stiffeners occur. Provide other partition reinforcing necessary to support wall hung components, cupboards, closets and the like. Use 2 studs at jambs of openings and corners.
10. Where horizontal runs of service lines are to be installed within the partition, erect studs with web openings aligned.
11. Provide reinforcing and necessary stiffeners to support hollow metal screens. Reinforcing to be capable of supporting screens rigidly and solid without deflection.
12. Work includes the installation of hollow metal frames.
13. All fire rated partitions must be installed from floor to underside of floor slab at ceiling above.
14. Provide horizontal 25 ga. metal anchor strips with wood blocking behind it for blocking behind wood base millwork tackboard and chalkboard, etc. All wood blocking for trim, base, millwork, miscellaneous specialties, to be installed by Section 06100 after erection of metal studs and ceiling suspension system.

3.3 RESILIENT CHANNELLING ON PARTITIONS AND WALLS

1. Work includes as below
2. Installation on Substrate: new and existing (on wood stud framing, metal stud framing, concrete block masonry, brick masonry, poured in place concrete, bulkheads, and all other substrates not noted, that is exposed and seen by line of sight)
 1. **Walls are to be flat and an even / level & plumb plane, install resilient channelling, blocking, shims as required to achieve this. A wavy wall will not be accepted – wall types do not have to state this in order for it to be installed.**
 2. Install resilient channelling (13mm – ½" min.) at 400mm o/c maximum horizontally on substrate framing as to manufacturer's installation instructions (it is important which direction the fastened side is orientated). Ensure substrate framing is adequate to support loading of wall finish and resilient channelling loadings as per manufacturer's installation instructions / recommendations.
 3. Resilient channelling should not be required on new framed wall systems (unless noted otherwise on wall types) as these should be an even / level and plumb plane when installed – if not the framing is to be rectified.
 4. Also consult manufacturer's installation instructions for other requirements that are to be met.
 5. Erect resilient channelling to tolerance of 1:1200.

3.4 BULKHEADS

1. Work includes fire separations in ceiling space, drywall surfaces above windows and bulkheads to suspended ceilings.
2. Install steel studs and furring of sizes shown at 16" (400 mm) o.c. or as shown.
3. Furring indicated shall not be regarded as exact or complete. Provide adequate bracing at bulkheads to structure to ensure a rigid installation and to meet CSA A82.31-M1980.
4. Locate bulkhead furring no more than 2" (50 mm) from corners abutting partitions or other construction.

3.5 CEILINGS

1. Supply and install suspension and furring system and resilient channelling for exposed gypsum board ceiling.
2. Do not regard suspension system indicated on drawings as exact or complete. The specification for metal framing contained in Canadian Gypsum Co. Ltd. Brochure 09260 - 1E and CSA-A82.31-M80 shall govern installation conditions not covered by this specification. The more stringent being the acceptable.
3. Install hangers for suspended bulkhead or ceiling to support the grillage independent of the walls, columns, pipes, ducts and the like. Erect plumb and securely anchor to the structure. submit details of the proposed method to the consultant for approval. If so requested by the Architect, test hangers to provide that anchorage is adequate to support the proposed loading.
4. Supply hangers to support the grid in time to be installed in slabs.
5. Space hangers at maximum 3'-0" (910 mm) centres in the direction of the carrying channels and at 4'-0" (1200 mm) centres at right angles to the carrying channels, within 6" (150 mm) of ends and where normally required in good standard practice.
6. Space furring channels at maximum 16" (400 mm) o.c.
7. Erect the grillage for suspended ceilings and beams of required elevation to provide rigid, secure, framing independent of walls.
8. Frame all openings on all sides with suitable channels. Check clearances with respective trades. Co-operate with others to accommodate diffusers, grilles, light fixtures and access panels in drywall ceilings. Provide additional hangers and supports for fixtures as required.
9. Level drywall screw channels to a maximum tolerance of 1/8" (3.2 mm) over 12'-0" (3650 mm).
10. Erect ceiling furring system in strict accordance with system manufacturer's printed directions to allow drywall board installation to be free of waves or loose boards.
11. Frame exterior soffits and walls using hot dipped galvanized framing materials and rustproof fasteners.

3.6 RESILIENT CHANNELLING ON CEILINGS

1. Work includes as below:
2. Installation on Substrate: new and existing (on wood stud framing, metal stud framing, concrete block masonry, brick masonry, poured in place concrete, bulkheads, roof rafters, floor joists, stair systems and all other substrates not noted, that is exposed and seen by line of sight)
 1. **Ceiling is to be flat and an even / level plane, install resilient channelling, blocking, shims as required to achieve this. A wavy ceiling will not be accepted – ceiling types do not have to state this in order for it to be installed.**
 2. Install resilient channelling (13mm – ½" min.) at 400mm o/c maximum at right angles substrate framing. Ensure substrate framing is adequate to support loading of ceiling finish and resilient channelling loadings as per manufacturer's installation instructions / recommendations.
 3. Resilient channelling should not be required on new metal framed ceiling suspension systems as these should be an even / level plane when installed .
 4. Also consult manufacturer's installation instructions for other requirements that are to be met.
 5. Erect resilient channelling to tolerance of 1:1200.

3.7 CONTROL JOINTS

1. Provide metal studs or furring next to end condition of each side of control joint. Control joints to be provided in accordance with the best standard practice to meet the approval of the Architect and as noted on the drawings.
2. Provide control joints every 25'-0" (7600 mm) o.c. and/or where shown on drawings.
3. Install additional control joints as directed on site by Architect.

3.8 HEAVY DUTY STUDS

1. Use heavy duty studs where shown on drawings and as required in other locations to give firmness to bulkheads.
2. Secure studs at ends with solid bearing at bulkheads.

3.9 CONSTRUCTION OF SOUND ATTENUATED PARTITIONS AND AROUND STEEL JOIST AT
TOP OF MASONRY CLASSROOM & FIRE RATED WALLS

1. Install insulating strips under studs and tracks around perimeter of sound control partitions. Install acoustical sealant at joints at each side of studs and tracks, against insulating strips between studs and tracks and floor, wall or underside of floor or roof deck above.

END OF SECTION

1. GENERAL

1. GENERAL REQUIREMENTS

1. Division One, General Requirements, is a part of this Section and shall apply as if repeated here.

2. DESCRIPTION

1. Work of this Section includes:
 1. Gypsum wallboard to partitions, ceilings, bulkheads furring and wall facings at all areas.
 2. Products finished by, but not supplied under this section is 06260 Solid Mineral Profile Panelling.

3. QUALIFICATIONS

1. Contractor for this work to have a minimum of five years' experience in installation of wallboard.
2. Install work to CSA A82.31-M1980, C.G.C., Drywall Construction Handbook and the Manual of Gypsum Wallboard Construction by Gypsum Drywall Contractor's International except where specified otherwise.

4. DELIVERY, STORAGE

1. Store materials in a dry weather proof enclosure. Store wallboard flat, in piles without overhanging boards.
2. Do not install damaged or deteriorated material but remove from site.
3. Materials as delivered shall bear the manufacturer's name branch name of material and where applicable, CAN/CSA classification.

5. JOB CONDITIONS

1. Air and surface temperature: Minimum 54 F (12 C) and maximum 77 F (25 C) for 24 hours before, during and until entire installation is complete.
2. Ensure proper ventilation, during and following joint treatment, to eliminate excessive moisture.
3. Examine surfaces in which wallboard is to be attached and check environmental conditions and do not commence work until surfaces and conditions are satisfactory.
4. Commencement of work will denote acceptance of conditions.

6. PROTECTION

1. Protect work of other sections against damage resulting from work of this section. Repair and make good to approval, damage to other sections caused by this work.

7. SUBMITTALS

1. Submit shop drawings showing control joints for Architect's approval.
2. Submit sample of each type of casing bead, corner bead, control joints, reveal moulding, etc.

8. ADDITIONAL DRYWALL AND FURRING

1. Include in base bid quote by this Section 09250 and 09110 for an additional **60 sq. metres** of gypsum wallboard complete with metal furring and finished taping for addition furred in pipes at walls or ceilings. Locations as per required by Architect.

2. PRODUCTS

1. MATERIALS

1. Gypsum Wallboard:

1. Manufacturer: Specification is generally based on Canadian Gypsum Co. Ltd. material but equivalent materials by other manufacturers are acceptable.
2. Backing Board and Gypsum Coreboard: CSA A82.27-M1977.
3. Gypsum Wallboard: CSA A82.27-M1977. Use Type 'X' (special fire retardant) board such as CGC Firecode 'C' when fire rating is required,. Use Abuse resistant board such as ToughRock or approved equal 16mm (5/8") thick from floor to minimum 2440mm, above finished floor level in all areas and wherever noted on the drawings. Use board with round or tapered edges.
4. Exterior Sheathing: 5/8" (16mm) thick Dens-Glass Gold Fiberglass - Faced Sheathing by Georgia Pacific Corporation.
5. Tile Backer Board: at showers (walls and ceilings), washrooms (walls and ceilings), drinking fountains (walls), wet or moist areas receiving a tile finish: 16mm (5/8") thick, Dens-Shield tile backer board by Georgia-Pacific Corporation. Use board with round or tapered edges.
(If existing wall systems do not have this wall substrate, it is to be installed, including removal of existing finish substrate and installation of specified substrate above – if existing wainscoting

exists, contact architect for further clarification)
(Tile Backer Board is not required on masonry wall substrates unless otherwise noted on drawings)

2. Accessories:

1. Casing beads, corner beads, fill type: 24 ga. (0.5 mm) base thickness commercial grade sheet steel with G90 zinc finish to ASTM A525-80A; perforated flanges; one piece length per location.

NOTE: Use Beadex U Trim (thickness as required) where "J" mould is indicated on drawings as manufactured by BeadeX Manufacturing Company Inc.

2. Screws: C.G.S. Brand Screws Type S. 1" (25 mm) and 1 ½" (38 mm) as required to C.S.A. A82.31-M1980. For exterior Sheathing and tile backer board use 1 1/4" Bugle head fine thread rust resistant drillpoint drywall screw (type S-12).
3. Joint Treatment Material: CGC MC "All-Purpose" and CGC MC "Joint Topping" compounds - to ASTM 0474 and 0475. Use materials recommended by board manufacturer for the proposed use. Material shall be pre-mixed, ready to use, in sealed cans.
4. Tile Backer Board Joint Treatment Materials: thin set mortar mixed with acrylic latex. Tape shall be 2" (50 mm) wide alkali resistant fibreglass tape. Screws to be self-taping rust resistant screws.
5. Reinforcing Tape: Perf-a-Tape by CGC or equal.
6. Adhesive: CGC "Durabond" 90 pre-mixed, ready to use in sealed cans.
7. Acoustic Materials:
 1. Acoustical Caulking: Acoustical sealant by Tremco or approved equal to CGSB 19-GP-21M.
 2. Sound Attenuation Batts: Section 07213 Mineral Fibre Insulation
8. Control Joint: equal to C.G.C. control joint No. 093.
9. Thermal Break: Permanent adhesive faced rubberized cork, 1/8" (3 mm) thick by width required.
10. Stud adhesive: to C.G.S.B. 71 GP-25M.

3. EXECUTION

1. EXAMINATION

1. Examine surfaces and other conditions on which work of this Section depends and do not proceed until conditions are suitable.
2. Commencement of work will denote acceptance of conditions.

2. GYPSUM BOARD INSTALLATION

1. General:

1. Do not install gypsum board until work of other Trades which will be covered by the board has been installed and approved.
2. Use board of maximum practical length to reduce number of end joints. Install control joints in long runs of board.
3. Fit ends and edges closely, but do not force together.
4. Attach board to framing using screws, not nails.

2. Installation on Stud Framing:

1. Install board vertically or horizontally whichever results in fewer end joints, use longest possible lengths. Cut and fit boards around openings, beams, joists, ducts, light fixtures and similar items. Install board up to underside of slab or metal deck above to provide sound insulated walls and fire separations.
2. Minimize gypsum board joints over openings. Use one piece application to span over opening width where board lengths allow. There is to be no board joint directly over / above edge condition of opening.
3. Position edges over supports for vertical or horizontal application.
4. For single layer vertical application space screws 12" (300 mm) o.c. for field of panel and 6" (150 mm) o.c. staggered, along vertical abutting edges. For horizontal application space screws 12" (300 mm) o.c. in field and 8" (200 mm) and along abutting end joints. For double layer application, stagger joints in second layer of boards, a minimum of one-stud spacing in both directions and fasten with screws as before.

3. Installation on Ceiling:

1. Install board with long dimension at right angles to furring channels.

2. Position end joints over channel flange and stagger in adjacent rows.
3. Fasten board to channels with 1" (25 mm) type S screws spaced 12" (300 mm) o.c. in field of panels and 8" (200 mm) along abutting edges.
4. Install board continuously above ceiling at exterior walls to support vapour barrier where it occurs.

3. FIRE RATING

1. Conform with following for fire rated partitions, ceilings and bulkheads:
 1. Fire resistant ratings called for on drawings and schedules.
 2. Appropriate codes and regulations.
 3. Use "Firecode C" or approved equivalent gypsum board.

4. FINISHING

1. Mix joint compound (powder) in accordance with manufacturer's printed instructions.
2. Prefill "V" grooves of rounded edges with Durabond 90 compound. Finish flush with tapered surface ready for reinforcing tape application. Allow pre-fill material to dry thoroughly before application of embedding compound and tape.
3. Apply "All-Purpose" compound in thin uniform layer; embed reinforcing tape accurately centred on joint, securely pressed in, leaving sufficient compound under tape to provide proper bond. Immediately apply skim coat over tape application. Allow to dry thoroughly before application of filler coat.
4. Apply filler coat of "Topping" compound such that taper depression is flush with board surfaces. Allow to dry thoroughly before application of finish coat.
5. Apply finish coat of "Topping" compound extending slightly beyond the filler coat and feathered out onto the board surface.
6. Sand between coats and following the finish coat, where necessary, and leave surface smooth and ready for painting.
7. Finish screw depressions with filler material and finish coat as specified in 4. and 5. above.

8. Joint and depression finish shall in no case protrude beyond the plane of the board surface.
 9. Finish corner beads and metal trim flush with board surface using filler and finishing coats feathered out approximately 2" (50 mm) and 4" (100 mm) respectively onto the board surface to ensure that metal visible only at arris.
 10. Fill and tape joints and internal corners and fill screw depressions in board face and smooth out along corner beads and metal trim with joint compound.
 11. Provide specified metal trim and control joints at exposed edges, at junctions of drywall with dissimilar material, at control joints and at junction with columns. Fasten with screws at 12" (300 mm) o.c. along entire length.
 12. Cut out a 'V' at all butt joints and install Durabond 90 then complete with filler and topping coats.
 13. Avoid sanding adjacent paper surface of boards.
5. CLEANING
1. Clean thoroughly and remove all excess materials from other surfaces.
 2. Remove all excess materials as job proceeds and at completion.
6. 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. Secure at 6" (160 mm) o.c. for full length.
 2. Install "J" molds around perimeter of suspended ceilings.
 3. Install "J" molds where gypsum board butts against surfaces having no trim concealing junction and where indicated.
 4. Install aluminum reveals at all locations as indicated on drawings. Install tape and joint material tight to edges of tape type "reveals". Aluminum reveal to be extruded Alloy 6063-T5 with chemical conversion coating. Primed painted – factory sprayed and baked-on coating to serve as base for field painting. Final paint as per specification Section 09900 and to be selected by Architect prior to manufacturing.
- .1 19mm Millwork Reveal – (3/4") Product # MWR7550 by Fry Reglet or approved equal (all vertical and horizontal applications); provide all intersection reveal components to provide a complete system.

- .2 MWCLEAT 25 to be provided at all millwork panel locations to provide a straight, secure, horizontal attachment to substrate where shown on drawings; to be extruded alloy 6063 T5, with powder coat finish.
- .3 6mm channel screed Model PCS-75-25/25 by Fry Reglet or approved equal, between wall wood panels (all horizontal and vertical applications) and where indicated on drawings.

7. CONTROL JOINTS

- 1. Construct control joints using C.G.C. control joint No. 093 set in gypsum board facing and supported independently on both sides of joint.
- 2. Provide shrinkage control joints in accordance to the best standard practice to meet the approval of the Architect and as noted on drawings.
- 3. Locate control joints at approximately 25 feet (7600 mm) in ceilings and walls and where shown on drawings.
- 4. Locate control joints at changes in substrate construction.
- 5. Install control joints straight and true.
- 6. Install additional control joints as directed on site by the Architect and as the substrate recommends to eliminate future drywall problems.

8. ACCESS PANELS

- 1. Ceiling access panels to be 18" x 18" (460 mm x 460 mm) drywall to match adjacent ceiling finishes except at fire rated ceilings, and as noted on drawings.
- 2. Provide "J" molds at exposed drywall edges of panel and at ceiling opening.
- 3. Reinforce panel with 3/4" (19 mm) fire retardant plywood backer as required.
- 4. Install access panels at wall locations provided by Mechanical and Electrical Sections.
- 5. Rigidly secure frames to furring or framing systems.

9. THERMAL BREAK

- 1. Provide a continuous moisture resistant insulating material at edges of wallboard in contact with aluminum windows and exterior door frames to provide a thermal break.

10. CERTIFICATION

1. Provide at completion of work a written certification that all drywall work where applicable conforms to the required ULC fire rated assemblies.

11. ACOUSTICAL MATERIALS

1. Install a continuous double row of caulking beads around perimeter of partitions which are indicated as containing sound attenuation batts.
2. Install sound attenuation batts in partitions where shown, with air space consistently on one side. Continue batts behind electrical boxes and conduits and all other services and items installed in partitions.
3. Provide caulking around all ducts, pipes, conduits and other items passing through partitions
4. Caulk all openings in wall and through base and ceiling plates for plumbing.
5. Electrical Outlets: cut holes neatly to reduce leaks. Caulk it tight around outlets before plate is installed. Do same for wall mounted fixture outlets before fixtures installed.
6. Bring early to General Contractor's attention that no electrical outlets are to be back to back in sound control walls. Consult Electrical Engineer.
7. Caulk edge of drywall to studs at perimeter of wall with 2 beads of caulking.
8. Installation of acoustical walls shall be from floor to bottom of floor above (not ceiling height) and sealed at all perimeters (including voids in metal deck).

12. INSTALLATION OF TILE BACKER BOARD TO WALLS

1. Use maximum length panels. Stagger intermediate end joints of adjacent lengths. Butt ends and edges. Secure tile backer board to studs with grabber type, 1 1/4" (32 mm) galvanized self tapping screws at 6" (150 mm) on centre complete with a fosco fastener. Edge screws shall be 1" (25 mm) away from other board.
2. Gap between board panels to be filled with thin set mortar mixed with acrylic latex. Embed 2" (50 mm) wide, alkali resistant fibreglass tape into thin set mortar.

3. Locate control joints and expansion joints at same locations as substrate, and at a maximum 20'-0" (6000 mm) centres.
4. Waterproof membrane over tile backer board by Section 09300.

13. INSTALLATION OF EXTERIOR SHEATHING

9. Examine subframing; verify that surface of framing and furring members to receive sheathing does not vary more than 1/4" from the plane of faces of adjacent members.
10. Install sheathing in accordance with manufacturer's instructions and applicable instructions in GA-253.
11. Install Dens-Glass Gold with gold side out.
12. Use maximum lengths possible to minimize number and joints. Locate edge joints parallel to and located on framing. Stagger intermediate end joints of adjacent lengths of sheathing.
13. Attach sheathing to metal framing with screws spaced 8" (200mm) o.c. at perimeter and 8" (200mm) o.c. in field.
14. Drive fasteners to bear tight against and flush with surface of sheathing. Do not countersink.
15. Locate fasteners minimum 3/8" from edges and ends of sheathing panels.

14. FIRE STOPPING

16. Provide gypsum wallboard and furring as required to box in around steel joists at top of masonry and gypsum wallboard partitions including cross walls parallel to steel joists as per drawings.
17. All firestop sealants and backup mineral wool by Section 07270 - Firestopping and Smoke Seals.

END OF SECTION

1. GENERAL

1. GENERAL REQUIREMENTS:

1. Division One is part of this Section and shall apply as if repeated here.

2. REFERENCE STANDARDS:

1. Do tile work to Installation Manual 212-2014 "Quarry Tile and Ceramic Tile", produced by Terrazzo Tile and Marble Association of Canada (TTMAC), except where specified otherwise.
2. Contractor shall have been and still be a current member of the TTMAC.

3. MAINTENANCE DATA:

1. Provide maintenance data for tile work.

4. MAINTENANCE MATERIALS:

1. Provide minimum 2% of each type and colour of ceramic and porcelain tile required for project maintenance use. Store where directed.
2. Maintenance material to be of same production run as installed material.

5. ENVIRONMENTAL REQUIREMENTS:

1. Air temperature and structural base temperature at porcelain tile and ceramic installation area must be above 54°F (12°C) for 48 hours before, during and 48 hours after installation.

6. SAMPLES:

1. Submit 1'-0" x 1'-0" (300 mm x 300 mm) samples of each type, colour, texture, size and pattern of tile to be used for the approval of the Architect before installation.

1. SHOP DRAWINGS:

1. **Porcelain and Ceramic Tile: submit shop drawings showing expansion joint, control joint locations and pattern layouts for Architect's approval.**

2. ASSEMBLY:

1. All installation assemblies will compose of materials from the same manufacturer and be completely compatible. The completed assembly will pass the service requirements "Extra Heavy Duty" (Passing ASTM C627 - Cycles 1 through 14) as described in the TTMAC Specification Guide and TCA Handbook (Page 10).

2. **PRODUCTS**

1. Tiles:

1. Tile: Conforming to CGSB 75-GP-1A.
2. Colours: Indicated for ceramic, porcelain and glass tiles are for tendering purposes. Final colour selection to be confirmed by Architect prior to installation.
3. NOTE: Provide round edge, round edge both sides, cove base, nosing's and tiles to do all work as per drawings and as required.
4. Porcelain Tiles: (coordinate with room finish schedule and drawings

1. **PT1 – Floor tile:** As manufactured by Daltile, provide Imagica, Midnight IG98 tile. Size to be 12" x 24" x 5/16". Acceptable alternate from Olympia, Stonetile or Centura, to be approved by architect. Refer to floor finish plans and schedule for locations. Color selection to be confirmed by Architect prior to installation.
2. **CT1 – Washroom wall tile:** As manufactured by Daltile, provide Color Wheel Classic, Matte Dessert Grey X714, straight joint tile. Size to be 6" x 6". Acceptable alternate from Olympia, Stonetile or Centura, to be approved by architect. Refer to wall finish plans and schedule for locations. Color selection to be confirmed by Architect prior to installation.

5. Grout:

1. At PT1– Mapei – Sahar Beige 5011. Color to be confirmed by Architect prior to installation.
2. At CT1 - Mapei – Timberwolf 5104. Color to be confirmed by Architect prior to installation.

1. Metal Transition Strips: 14 gauge zinc divider strip. Add the following transition strips types by Schluter for the following locations (height of transition strips to suit tile thickness):

1. At PT1 in washrooms provide Schluter Systems DILEX-AHK Cove Shaped Profile, Petwer (TSG).
2. **T1 - Transition #1:** Schluter Reno-T, satin anodized aluminum finish, for same height hard surface transitions – Porcelain to Porcelain. To be confirmed by Architect prior to installation.
3. **T2 - Transition #2:** Schluter Reno-U, satin anodized aluminum finish, profile for abutting tile to lower transitions. To be confirmed by Architect prior to installation.
4. A Schluter Commercial Manager shall be contacted to review the site with the awarded Tile Contractor prior to the start of installation

to ensure installation methods and guidelines are followed to ensure all warranties will be in effect. On site Demo can be arranged if required.

2. Mortar Beds:

1. For Walls: 1 part Portland Cement: 1/5 to 1/2 parts hydrated lime; 4 parts sand; gauged with Custom - Flex latex by Custom Building Products as per manufacturer's directions. All Custom Building Products are distributed by Brolain Distributors Ltd. 519-740-9311. Approved equal manufacturer is TEC

2. For Floors: 1 part Portland Cement: 4 parts sand; gauged with Custom - Flex latex by Custom Building Products as per manufacturer's directions. Approved equal manufacturer is TEC.

3. Thin Set Mortar: Master Blend Thin-Set Mortar gauged with Custom - Flex latex by Custom Building Products as per manufacturer's directions. Approved equal manufacturer is TEC

4. Porcelain Tile Grout and Joint Filler: Classic-Blend Grout by Custom Building Products floor grout and joint filler mixed with Custom's Acrylic Mortar Admix grout as per manufacturer's directions in colours as selected by Architect. Approved equal manufacturer is TEC. One colour to be selected by Architect for each porcelain tile specified.

5. Caulking:

1. Flexible caulking conforming to CGSB 19-GP.22M: Dow Corning 786 and CGE 1702 Sanitary Sealant. Colours as selected by Architect.

6. Control Joints:

1. Porcelain Tile:

1. Floor to Floor: Schluter Dilex KSN (height to suit tile thickness).
Colour as selected by Architect, stainless steel / aluminum.

2. Floor to Wall: Schluter Dilex KSA (height to suit tile thickness).
Colour as selected by Architect, stainless steel / aluminum.

9. Crack Isolation Uncoupling Membranes: premanufactured reinforced membrane self-adhering meeting requirements of ANSI A118; thickness as recommended by manufacturer to accommodate in plane substrate movement of 3mm in thin set applications meeting or exceeding requirements of ANSI A108.1.

10. Tile Trim:

1. For porcelain tile base: Schluter, Jolly, ATGB, colour to be stain anodized aluminum.
11. STAIR NOSING:
Schluter, Model #Trep – G-B nosing, 55mm depth, slip resistant stair nosing and all end caps where applicable. Contractor to ensure the nosing does not project past the face of the riser.
12. Sub-floor Filler and Leveller: Adrex SD-F Feather Finish TL 1000, TL Patch portland cement based filler by Ardex Engineered Cements and distributed by Brolain Distributors Ltd. (519-740-9311). Levelrock brand Super Smooth Patching Compound by C.G.C or Novoplan, Ultraplan 1 Plus, Ultraplan Easy are approved alternative products.

3. EXECUTION:

1. EXAMINATION:
 1. Examine substrates before commencing work to ensure they are satisfactory. Defective work resulting from installation on unsatisfactory surfaces will be considered the responsibility of those performing the work of this section.
2. WORKMANSHIP:
 1. Regard recommendations, installation methods specified and illustrated in Terrazzo, Tile and Marble Association Manual No. 2000, and applicable manufacturer's instructions as minimum acceptable standard accept as varied by this Specification.
 2. Fit tile units around corners, fitments, fixtures, drains and other built-in objects to maintain uniform joint appearance. Make cut edges smooth, even and free from chipping. Edges resulting from splitting not acceptable.
 3. Maximum surface tolerance: Ensure floor surfaces are smooth and flat to plus or minus 1/8" (3.2 mm) over 10 ft. (3050 mm).
 4. Make joints between tiles uniform. Tile joints shall be approximately 1/8" (3 mm) wide for ceramic tiles and 1/4" (6 mm) wide for porcelain tile, plumb, straight, true, even and with adjacent units flush. Align grout lines from floor to wall.
 5. Drill holes for fixing accessories of other trades.
 6. Finish surfaces flat and level (ensure leveler is used to accomplish this) or sloped and graded to drain where floor drains occur.
 7. Sound tiles after setting and replace hollow sounding units to obtain full bond.

8. Make internal angles square, external angles bull nosed.
 9. Install transition strips at junction of tile flooring and dissimilar material. Where transition occurs in a doorway, transition strip to be below door.
 10. Clean installed tile surfaces progressively as work proceeds. Do not allow mortar to stain absorbent tile. Do not use acids for cleaning. Seal in accordance with manufacturer's approved products and in accordance with TTMAC certified products only.
 11. Layout borders, defined lines, accent patterns and bands wherever they occur prior to setting tile. Keep inner edges of borders against fields or wall panels straight.
 12. Install base trim, control joints, and beveled reducing strips as per manufacturer's instructions.
3. EXPANSION AND CONTROL JOINTS:
1. Control joints to be located directly on block control joints and concrete floor control joints and expansion joints.
 2. Control joints are also to be placed where tile abuts other hard materials.
 3. Install control joints in tile floors in accordance with TTMAC Detail 301MJ at 10'-0" (3050 mm) max. o.c. and at 20'-0" (6100 mm) max o.c. at wall locations. Align joints at concrete floor and masonry control joint locations as well.
 4. Allow for control joints at the perimeter junction to all walls, around all columns.
 5. Submit shop drawings to indicate layout of control joints. Porcelain tile control joints shall occur directly above a concrete floor control joint therefore minimizing the cutting of porcelain tile.
 6. The approved control joint shop drawing layout shall be marked onto the concrete floor slabs by the porcelain tile contractor and the actual cutting of the control joints in the concrete floor slab shall be done by the concrete floor finisher.
 7. It is the responsibility of the porcelain tile contractor and the concrete floor finisher to co-ordinate through the project manager the exact location of floor control joints.
 8. At expansion joint locations install back to back metal transition strips at each side of joint then caulk between
4. PORCELAIN TILE:

1. Refer to TTMAC Specifications and Detail No. 311F-2016 Detail A, thin set method of porcelain tile floor to concrete slab, and Detail No. 303W-2000 thin set method of porcelain tile base to wall.
 2. Install tile using thin set mortar, in accordance with manufacturer's instructions.
 3. Provide levelling coat where required to achieve a level sub-floor prior to installation. Existing wood sub-floors may require additional plywood flooring coverage and shimming to achieve this, install as required.
 4. Provide leveling coat at all wall tile locations.
 5. Wall to wall, floor to wall, wall to ceiling tiles should not touch to stop transfer of noise and vibrations from one plane to the other, all joints are to be caulked (wall tile should start above floor tile with caulking space typical).
 6. Porcelain tile base to be installed on first course of block without rounded corners (i.e. square). Block to be ground above base to match radius of block courses above first course.
 7. Install porcelain tile base using Schluter, Jolly stainless steel cap (thickness to suit tile) complete with 90 degree corner return caps installed as per manufacturer's instructions.
 8. Install porcelain tile base using Schluter, Jolly stainless steel at all vertical outside corners (thickness to suit tile) installed as per manufacturer's instructions.
5. GROUTING OF PORCELAIN TILE:
1. Pack joints solid with grout at porcelain tile using a plastic or non-staining trowel.
 2. Allow joints to stiffen before finishing.
 3. Remove excess grout with clean cloths.
 4. Grout shall be mixed according to manufacturer's instructions. Colours as selected by Architect.
 5. Clean all surfaces with clean solution specified as per manufacturer's instructions.
6. CAULKING:
1. Install continuous caulking neatly and tool concave around base of all door frames and at all inside corners at 'wall to wall' and 'wall to ceiling'

and 'wall to floor' (install at 'floor to wall' locations even where there is a base noted to cover this joint up) transition locations to stop transfer of noise and vibrations. Tiles at plane transitions should not touch, wall tile should start above floor tile with caulking space, etc. typical.

7. CLEANING AND REMEDIAL WORK:

1. Clean tile surfaces upon completion of grouting as per tile manufacturer printed instructions using cleaning agents and procedures recommended by the manufacturers of tile and grout.
2. Remove all grout haze, observing tile manufacturer's recommendations as to use of acid and chemical cleaners. (Do not use muriatic acid on tile work or pavers.)
3. Rinse tile work thoroughly with clean water before and after using chemical cleaners.
4. After setting, all tile surfaces shall be sounded and visually inspected and wherever any hollow backed or damaged tiles are found they shall be removed and replaced with matching tiles.

8. PROTECTION FROM CONSTRUCTION DIRT:

1. Seal cementitious grout joints and unglazed tile with "Aqua Mix Penetrating Sealer" by Aqua Mix Inc. or as recommended by manufacturer.
2. Cover all tile floors with heavy duty non-staining cotton reinforced paper or 6 mil vapour barrier taped into place.
3. Prior to final acceptance of tile work, remove paper and clean with "Aqua-Mix Miracle Cleaner" by Aqua Mix Inc. or as recommended by manufacturer.

9. PROTECTION FROM TRAFFIC:

1. Prohibit all foot and wheel traffic from using newly tiled floors for at least three days, preferably seven days after grouting is completed.
2. Place large, flat boards in walkways and wheel ways for seven days, where use of newly tiled floor is unavoidable.
3. Leave finished installation clean and free of cracked, chipped, brock, unbonded or otherwise defective tile work. Replace damaged or defective work.
4. Provide cardboard walkway using recycled boxes to protect finished work during construction.

END OF SECTION

PART 1 - GENERAL

1. GENERAL REQUIREMENTS

1. Division One, General Requirements, is a part of this Section and shall apply as if repeated here.

2. QUALIFICATIONS

1. The Company performing the work of this Section shall be a member of the Terrazzo, Tile and Marble Association of Canada.

3. SAMPLES

1. Submit 4" x 6" (100 mm x 150 mm) samples of each colour and type of terrazzo intended for use on this project. Colours to match the following standard terrazzo plate numbers: Terrazzo 1 Plate No. 751G, Terrazzo 2 Plate No. 752G, Terrazzo 3 Plate No. 743G, and Terrazzo 4 Plate No. 746G.
2. Final colours of terrazzo to be selected by Architect.
3. See drawings for quantity of four colours to be used to create floor patterns as indicated on drawings.

4. MAINTENANCE MANUAL

1. Provide the Owner three brochures containing Maintenance and Stain Removal instructions approved by the Terrazzo, Tile and Marble Association of Canada.

5. SPECIAL PROTECTION

1. Prohibit traffic on terrazzo floors during installation and for a minimum of 24 hours after installation.
2. Protect newly ground floors from damage and staining.
3. Protect finished corners exposed to construction operations and traffic.
4. Before final acceptance of the work all damaged or defective work of this Section shall be made good and the entire work cleaned down and waxed in an approved manner so that it shall be turned over in perfect condition in all respects.

6. SHOP DRAWINGS

1. Submit shop drawings in reproducible vellum form showing expansion joints, control joints, and divider strip locations for Architect's approval.
2. Locate joints above sawcut joints in concrete slab below. Refer to

structural slab shop drawings for locations of control joints and expansion joints.

3. This shop drawing shall be co-ordinated with the concrete slab contractor and the Structural Engineer to finalize exact locations of control joints prior to concrete slab being installed and control joints cut.

PART 2 – PRODUCTS

1. MATERIALS

1. Cement: Portland Cement to CAN/CSA-A5.
2. Sand: Sharp, screened sand to CAN/CSA-A23.1.
3. Water: Clean, potable water free from oil, acids, alkali or organic matter.
4. Marble and Granite Chips: Clean and sound No. 1 and No. 2 crushed from sound marble with dust screened out. Size as per T.T.M.A.C. recommended standardization of chip sizes.
5. Colour Pigments: Non-fading mineral pigments to British Standard 1014.
6. Divider Strips: 1/8" (3 mm) x 1 1/4" (32 mm) deep except where specified otherwise, brass divider strips provided with anchorage devices.
7. Curing Compound: Type 11 non-staining to CGSB specification, 90-GP-1. Moisture retention shall not exceed 0.015 grams.
8. Cleaners, Sealers, and Floor Finish: Terrazzo, Tile and Marble Association of Canada Types 1001, 1002, 1003, 1004, 2001, 2002, and 3001 as applicable.
9. Slip Sheet: 6 mil (25 um) polyethylene film to CGSB Specification 70-GP-1, Type 1.
10. Reinforcing Mesh: 50 mm x 50 mm No. 16 x No. 16, steel mesh, electrical welded, galvanized after fabrication, conforming to CSA Standard G30.5.

2. MIXES/PROPORTIONS

1. Underbed: one part of cement to four parts sand by volume. Wet and

mix thoroughly. Generally use no more than 4 gal. (18 litres) of water per bag of cement for underbed mix.

2. Standard Terrazzo Topping: 90 lb. (40 kg) bag of cement and 200 lb. (90 kg) of chips, mixed dry. Chip sizes 70% No. 2 and 30% No. 1 as directed to obtain colour and finish as approved by Architect. Mix with no more than 4 gal. (18 litres) of water per bag of cement.

3. TERRAZZO COLOURS

1. Allow for four terrazzo colours to be from the standard colour range as per 1.4 a.
2. The Architect shall finalize colour selection prior to sample submittals.
3. Cement pigment colour for each of the 4 chosen colours shall be selected by Architect.

PART 3 - EXECUTION

1. EXAMINATION OF SURFACES

1. Examine surfaces upon which the work of this section is to be installed and report any defects to the architect.

2. PREPARATION

1. Concrete slab below underbed to have a light broom finish to allow for proper bonding. Provide additional roughness to slab where required to allow for good bonding.
2. Floating Terrazzo: broom clean base slab, fill all voids with loose sand. Apply 1 ply polyethylene film over sand. Lap joints 4" (100 mm). NOTE: Make total thickness of floating terrazzo not less than 2 ½" (64 mm) thick. See Detail No. 2 in TTMAC Portland Cement Terrazzo Manual.

3. INSTALLATION

1. Underbed: Apply over prepared substrate and screed level making allowances for applicable terrazzo topping. Permit underbed to cure minimum 24 hours prior to receiving terrazzo topping.
2. Divider Strips
 - .1 Set divider strips while underbed is semi-plastic. Set strips accurately, straight and to exact finished floor level at approximately 30" (750 mm) o.c. both ways except where indicated otherwise and to patterns indicated on drawings. Set

shelf type dividing strips at junctions of resilient flooring and terrazzo surfaces. Install applicable strips under centre line of doors, to separate terrazzo from adjacent different floor finishes.

- .2 Provide 500 feet (150,000 mm) of straight double divider strip at control joint locations directly above concrete slab control joints. See Structural drawings for suggested locations of control joints.
- .3 Provide curved divider strips where required to form patterns indicated on drawings.

3. Standard Terrazzo Topping to TTMAC Detail No. 2

- .1 When underbed has sufficiently set, apply terrazzo topping, consisting of chips and cement proportioned to produce a surface showing at least 85% marble aggregate. Add integral colouring as required. Thoroughly compact topping with a 200 lb. (90 kg.) roller where possible, tamp inaccessible areas where rolling is not possible. Add dry aggregate as required to obtain a compact mass and the proportion of exposed aggregate specified. Install terrazzo topping to provide colours and patterns indicated on drawings.
- .2 Steel trowel to true even surface exposing dividing strips. Cure for at least 6 days.
- .3 After curing machine grind surface using No. 60 to No. 80 carborundum grit until at least 85% of aggregate exposed.
- .4 Immediately after grinding, fill voids and pores with cement grout coloured same as original mix. Maintain moist for minimum of 24 hours.
- .5 Final polishing shall not proceed within 72 hours after placing grout.
- .6 Remove grout and rub to a polished surface using No. 120 carborundum grit. Clean surface using a soap emulsion and warm water. Scrub to Architect's approval. Rinse terrazzo with clean water and then dry thoroughly. Dry clean terrazzo with industrial vacuum cleaning machine, removing all traces of dust. Apply first coat of sealer as soon after cleaning as possible. Apply sealer in accordance with manufacturer's written directions, and wipe off excess sealer before it dries. Apply second coat of sealer in same manner as first, but not until all other work is complete and terrazzo has been cleaned again as previously specified above. Then apply two coats of surface finish as approved by Owner's maintenance staff TTMAC.

4. PATCHING

-
- .1 Remove and replace all defective or damaged work promptly and when directed by Architect.

END OF SECTION

1. GENERAL

1. GENERAL REQUIREMENTS

1. Division One is a part of this Section and shall apply as if repeated here.

2. DESCRIPTION OF SYSTEMS

1. Lay-in Tile System: Exposed suspended tee-bar system accommodating 2'-0" x 4'-0" (610 mm x 1220 mm), 2'-0" x 2'-0" (610mm x 610mm) and other sizings of acoustical panels in areas as indicated drawings and reflected ceiling plans as acoustical tile ceiling.
2. All tile and suspension systems shall comply to U.L.C. Design as indicated on drawings.

3. SAMPLES

1. Submit for approval, two samples of each type of tile to be used in the project.

4. WORK INCLUDED

1. This contractor shall supply and install all acoustic tile and required accessories as indicated on the working drawings, room finish schedule, including the following:
 1. All non-combustible ceiling board.
 2. All exposed "T" grid suspension systems.

5. MAINTENANCE MATERIALS

1. Deliver acoustical units in packages for maintenance use amounting to 3% of gross ceiling area for each lay-in panel type. Store where directed. Clearly identify packages.
2. Maintenance materials shall be of same production run as installed materials.

6. ENVIRONMENTAL CONDITIONS

1. Commence installation only after building has been enclosed and dust generating activities have been completed.
2. Permit wet work to dry completely before commencement of installation.
3. Ensure that a uniform minimum temperature of 15 deg. C. and humidity of 20-40% before, during, and after installation is maintained.

7. LETTER OF CERTIFICATION

1. The Contractor, together with manufacturer, shall submit a written confirmation, signed by manufacturer's registered professional engineer, stating that the suspended ceiling system will provide adequate support for electrical fixtures, as required by current bulletin of the ESA of Ontario Hydro. NOTE: all electrical fixtures to have independent supports in fire rated ceilings.

8. WARRANTY

1. Provide 10 year warranty on ceiling tiles for humidity and sag resistance.

2. PRODUCTS

1. Lay-in Tile System:

1. Hangers: Min. No. 12 (2.5 mm) SWG galvanized mild steel hanger wire - 24" (600 mm) o.c. or galvanized steel wire of size capable of safely supporting anticipated ceiling system and loading.
2. Tees: Donn Suspension Systems by C.G.C. (Typical Lay In)
3. Tees: Armstrong Superfine 9/16" suspension Systems for with square-cut lay-in tile system
 1. Main Tees: .021" (.53 mm) thick cold rolled steel, double web, with rectangular bulb section at least 1 1/2" (38 mm) high. Fabricate with punched cross tee holes at not greater than 16" (400 mm) o.c. and hanger wire holes at 2" (50 mm) o.c. Exposed flange shall be 15/16" (23.8 mm) wide and not less than .009" (.23 mm) thick cold rolled steel.
 2. Cross Tees: Double web design with rectangular bulb; web extending to form a positive inter lock with main tees in same exposed flange width.
 3. See lay-in panel types for width of Tees to be used with each tile type.
4. Accessories:
 1. Miscellaneous approved clips, splicers, screws, nails and other standard types to suit applicable conditions. Provide special accessories as required. Accessories shall be galvanized after forming.
 2. Standard edge moulding as manufactured by system

- manufacturer to suit applicable details. Moulding shall be formed of zinc coated steel.
3. Provide Armstrong Impact Clip System Item No. 414 system at areas where clipped down ceilings are indicated on drawings and at all vestibule entrances. Provide accessible type clips where access is required.
 5. Finish:
 1. Tees, edge mouldings, and exposed accessories shall be finished with baked, non-yellowing, low sheen colour to match colour of lay-in panels.
 6. Lay-in Panels:
 1. Install tile types where acoustic tile is indicated on room finish schedule. Mineral tile types are as listed below:
 1. **ACT1:** (Throughout) "Ultima #1713" ceiling tile, 24" x 24" x 3/4" (610 mm x 1220 mm x 19 mm), with square-cut lay-in edge detail as manufactured by Armstrong or equal by C.G.C. Stone Hurst.
 2. **ACT2:** "Ultima #1714" ceiling tile, 24" x 48" x 3/4" (610 mm x 1220 mm x 19 mm), with square-cut lay-in edge detail as manufactured by Armstrong or equal by C.G.C. Stone Hurst.
 7. Tie Wire: 1.2 mm galvanized annealed steel wire.
 8. Inserts and attachments to Structure for Hanger Connections: to suit conditions and loadings, galvanized after fabrication.

3. EXECUTION

1. WORKMANSHIP
 1. Installation shall be by skilled mechanics and in strict accordance with system manufacturer's printed directions to produce a first class, flush finished surface in true plane and free from drooping, warped, uneven joints, damaged tile or panels. Butt joints tightly.
 2. Consult with mechanical and electrical trades to co-ordinate and arrange work to accommodate recessed fixtures, diffusers, grilles, and other similar items, where indicated on mechanical and electrical drawings. Recessed items shall replace, or be centred in acoustical units.
 3. Frame around recessed fixtures, diffusers, grilles and openings and where normally required in good standard practice.

4. Provide all furring required and construct drywall bulkhead, incorporated as part of best standard practice to Architect's approval.
5. Provide and install protection panels and/or five sided box enclosures at recessed lighting fixtures, speaker boxes, diffusers, duct openings, firestop flaps, etc. as specified in the applicable ULC assembly specification. Approval of enclosures and protection will be by Architect and/or Municipal Authorities.

2. ERECTION

1. Lay-in Tile System

1. Install ceiling suspension system to ASTM C636-76 and manufacturer's instructions, except where specified otherwise.
2. Supply hangers and inserts to support the grid in time to be installed in structural system if required.
3. Hangers for acoustic systems shall be spaced to comply to U.L.C. Design, approximately 4 ft. (1200 mm) centres both ways and where normally required in good standard practice.
4. Secure hangers firmly.
5. Erect carrying channels for suspended systems of required elevation and level to tolerance of 1/8" (3.2 mm) over 12 ft. (3650 mm). Frame around recessed fixtures, diffusers, grilles and openings and where normally required in good standard practice. Furr around ducts, beams, bulkheads or the like, as shown or required by U.L.C. Standard.
6. Ensure that the suspension system supports the completed assembly, including all superimposed loads, such as lighting fixtures, diffusers and grilles, with a maximum deflection of 1/360 of the span. Provide supplemental hangers within 6" (150 mm) of each corner and at maximum 2'-0" (610 mm) around perimeter of light fixtures.
7. Attach exposed tees at centres required in good standard practice.
8. Install expansion joints in all main beams as required by U.L.C.
9. Provide angle wall mouldings at junctions of ceilings and vertical surfaces.
10. Provide spring clips to ensure tight installation, in rooms having an

area less than 20 sq. ft. (1800 mm²).

11. Provide lay-in tile and grid to meet fire rating at all fire rated ceilings.
12. Erect ceiling system at required elevation and level to tolerance of 1/8" (3 mm) in 12'-0" (3660 mm).
13. Cut reveal edges to match factory detail at all reveal edge lay-in ceiling that needs cutting to fit grid size.

3. FIXTURE SUSPENSION

1. Make provisions for carrying flush mounted and recessed fixtures on suspended ceilings, using 4 hangers per fixture. Consult and coordinate with Electrical and Mechanical Trades.
2. The suspended ceiling system must comply with the current bulletin from the Electrical Inspection Department of Ontario Hydro regarding "Lighting Fixtures in Suspended Ceilings".
3. It is the responsibility of this contractor to supply the Architect with a letter stating that the suspension system is capable of holding the electrical fixtures as shown on the electrical drawings and as required by the above bulletin of the Electrical Inspection Department of Ontario Hydro.

4. MITRED JOINTS

1. "T" bar ceiling grid to be mitred at the outside corners.

5. ACOUSTICAL UNITS

1. Install acoustical units parallel to building lines to produce uniform borders and with edge units not less than 50% of unit width.
2. Accurately scribe and cut acoustical units to fit recessed items and adjacent work. Butt joints tight; terminate edges with moulding.

6. SPECIAL CLEANING

1. Keep acoustical panel installation and all components clean.
2. Remove and replace damaged or improperly installed units.

7. MECHANICAL EQUIPMENT ACCESS

1. Install "T" bar system to allow it to be removed easily at areas where

mechanical units occur to allow units to be easily removed. NOTE: Stop main "T" on each side of equipment access.

8. IMPACT CLIPS

1. Install Impact Clip System at all acoustic tile ceiling areas indicated on drawings including rooms less than 20 sq. ft., (1800 sq. mm.) and all vestibules.

9. CERTIFICATION

1. Provide at completion of work a written certification that all ceiling conform to the requirements of the ULC design criteria for fire rated assemblies and that the suspended ceiling will provide adequate support electrical fixtures as per current bulletin of the ESA of Ontario Hydro.

END OF SECTION

PART 1 - GENERAL

1. GENERAL REQUIREMENTS:

1. Division One is a part of this Section and shall apply as if repeated here.

2. SAMPLES:

1. Submit full size tiles in duplicate, in each colour or design to be used, for approval of the Architect.
2. Label each sample with appropriate Code as per drawings.
3. Include in each submittal MSDS & product information.
4. Provide with each submittal list of items that require selection/ review & approval.

3. MAINTENANCE INSTRUCTIONS:

1. Submit 3 copies maintenance manual at completion of work in accordance with Section 01015.

4. DELIVERY, STORAGE AND HANDLING:

1. Deliver materials in original containers with manufacturer's seals and labels intact. Maintain temperature of storage area at 70°F (21°C) for 48 hours prior to installation.

5. ENVIRONMENTAL REQUIREMENTS:

1. Maintain minimum 70°F (21°C) air temperature at flooring installation area during installation and for 72 hours prior to and until floor area is occupied by Owner.

6. MAINTENANCE MATERIALS:

1. Leave 2% of each colour, type and size of tile installed, with Owner for replacement purposes. Clearly mark containers. Material shall be from same production run as the material installed.

7. PROTECTION:

1. General Contractor's Responsibility: In each location immediately following installation, protect new floors, if work is to be done after flooring installed with heavy cotton reinforced paper or polyethylene taped at joints and maintain in place until Architect gives instructions for the removal of temporary protection. Work shall be handed over to the Owner free of blemishes and in perfect condition.

PART 2 - PRODUCTS

1. MATERIALS:

1. VCT Primers and Adhesives: Environmentally friendly materials as recommended in writing by Flooring tile and base manufacturer, and approved by the Architect before application, to suit type of sub floor and wall finish for this project. Adhesive shall produce good and waterproof bond between applicable substrate and tile. Use only Premier #71 by Flextile below all VCT or approved equal.
2. Sub-floor Filler and Leveller: White premix latex requiring water only to produce cementitious paste 2-part latex-type filler requiring no water as recommended by flooring manufacturer for use with their product.
3. LVT -1: - Luxury Vinyl Tile: Manufacturer Polyflor, Expona Commercial pur' series, Blond Lined Oak Product, Color 4081. Size 203.2 X 203.2 mm (2.5mm Thick). Architect to approve final color selection prior to ordering and installation.
4. Rubber - Rubber Base: 1/8" (3.2 mm) thick, 4" (100 mm) as indicated, rubber cove base at resilient locations by Tarkett. Black Magic Color as selected by Architect. Use continuous coil rubber base not 4'-0" (1220 mm) lengths. Approved alternate manufacturers are Amtico and Roppe. Architect to approve final colour selection prior to ordering and installation.
5. Floor Transition Strips:
 1. **T1:** Schluter Reno-U, Brushed stainless steel finish. From VCT/LVT to Porcelain tile
 2. **T2:** Tarkett Metal Edge Transition, Black colour. From porcelain tile to carpet. Contractor to select appropriate profile options based on site requirements.
6. Cleaner: Neutral chemical compound as approved by tile manufacturers that will not damage tile or affect its colour.
7. Sealers and Waxes: Type recommended by flooring manufacturers for material type and location and shall be compatible with Owner's sealer and wax. Obtain Owner's approval of sealer and wax product prior to installing VCT.
8. Reducing Strip: strips in thickness as required. Colour as selected by Architect.
9. Metal Edge Trim: Aluminum or brass alloy with lip of edge extending under and with shoulder finishing flush with top of resilient flooring.
10. Concrete Floor Sealer: to C.G.S.B. 25-GP-20m Type 1.

11. Reducers / Transitions: One piece homogeneous polyvinyl chloride, installed using materials and methods per Manufacturer's written installation instructions. Colour: from Manufacturer's complete line. Style: SSR-XX-B by Johnsonite Inc..

PART 3 - EXECUTION

1. INSPECTION:

1. Maximum surface tolerance: Ensure floor surfaces are smooth and flat to plus or minus 1/8" (3.2 mm) over 10 ft. (3050 mm).
2. Ensure concrete floors are dry by using test methods recommended by manufacturer, and exhibit negative alkalinity, carbonization or dusting. Ascertain nature of curing and/or sealing compound used on concrete and its compatibility with flooring adhesive. Take all required remedial measures. Remove compounds if necessary to ensure that adhesive bonds to concrete.
3. Installation of any part shall constitute acceptance of these surfaces as satisfactory.

2. PREPARATION:

1. Remove sub floor ridges and bumps by light buff grind. Fill low spots, cracks, joints, holes and other defects with sub floor filler.
2. Clean floor and apply trowel and float filler to leave smooth, flat hard surface. Prohibit traffic until filler cured.
3. Split, bumpy or otherwise deformed tile resulting from improperly prepared base, will not be accepted.
4. Prime/seal concrete slab to resilient floor tile manufacturer's printed instructions.
5. Fill all low spots in flooring with high grade latex cement base flashing compound and gently blend in floor level at a rate of 1/8" per 1'-0" (10.5 mm per 100000 mm) to flush resilient flooring with ceramic tile, quarry tile, etc.
6. Power sand concrete floor smooth then dry vacuum clean entire floor area.

3. INSTALLATION - RESILIENT FLOOR TILES:

1. Apply adhesive uniformly to tile manufacturer's directions. Do not spread more adhesive than can be covered by tile before initial set takes place.

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2. Lay flooring with joints and seams parallel to building lines to produce a

symmetrical tile pattern unless noted otherwise. **Tile pattern shall be checkerboard type with all seams lined up in each direction and tile turned in opposite run directions to form checkerboard pattern.**

3. Install flooring with minimum tile width half full sizes.
4. Distribute tiles having varying tones or texture evenly over entire floor area to avoid patches or streaks, and to produce homogeneous blend. Reject tiles having undue variations in colour, shade and texture.
5. Make tile joints flush, uniform, in straight lines and as inconspicuous as possible.
6. Install tile and colours to form patterns indicated on 9 series drawings.
7. Set flooring in place, press with 100 lb. (45 kg.) minimum roller to ensure full adhesion.
8. Cut tile and fit neatly around fixed or excessively heavy objects.
9. Terminate flooring at centre line of door in door openings where adjacent floor finish is dissimilar.
10. Install metal edge strips at unprotected edges of flooring.
11. Use reducing strips at centre line below doors where resilient flooring meets concrete floor or quarry tile.
12. Allow for random pattern and border in each classroom

4. INSTALLATION – BASE:

1. Layout base to keep number of joints to a minimum.
2. Install straight and level to variation of plus or minus 1/8" (3.2 mm) over 10'0" (3050 mm) straight edge.
3. Fill cracks and level irregularities of surfaces to which base is to be applied with filler approved by adhesive manufacturer so as to provide solid backing over entire area behind base. Cement cove base to vertical surfaces so that gaps do not occur behind base, so that front lip of base cove bears firmly and uniformly on floor surface, and so that good and permanent bond is produced between base and surface to which it is applied. Set base tightly in adhesive by using a 7 lb. (3 kg.) roller against wall and floor surfaces. Make end joints flush with gap.
4. Scribe and fit to door frames and other obstructions.

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5. Cope internal corners.

6. Use full length pieces where possible. Accumulated short lengths at base not permitted.
7. Supply straight base for carpeted areas and cove base for resilient flooring areas.
8. Supply rubber base for all millwork bases.
9. Gaps below bottom edge of base will not be accepted.
5. SPECIAL CLEANING AND WAXING OF VINYL COMPOSITION FLOOR TILE:
 1. Clean off excess adhesive as work progresses from floor, base and wall surfaces without damage. Upon completion, remove all markings and heel scuffs.
 2. Upon completion of laying V.C.T., clean floors in accordance with manufacturer's printed instructions. Install two coats of sealer after installation and then three coats of wax.
6. PROTECTION OF FINISHED WORK:
 1. Prohibit traffic on floor for 48 hours after installation.
 2. Protect floors as per item 1.7.1 in this Section.
 3. Clean floors and wax during final cleaning just prior to Owner occupying building.

END OF SECTION

1. GENERAL

1. GENERAL REQUIREMENTS

1. Division One, General Requirements, is a part of this Section and shall apply as if repeated here.

2. SUBMITTALS

1. Samples

1. Prepare samples of various finishes for Architect's approval either on site or by submitting samples as directed, at least thirty days before materials are required. Submit samples in triplicate on 8" x 12" (200 mm x 300 mm) material. Identify each sample as to job, finish, formula, colour name, number, sheen name and gloss units, date and name of Subcontractor.

3. PRODUCT HANDLING

1. Delivery and Storage

1. Deliver materials to site in their original containers with label intact and store in spaces directed by Architect. Keep stored materials covered at all times and take all necessary precaution against fire.
2. Provide CO2 fire extinguisher of minimum 20 lbs. (9 kg.) capacity in storage area.

4. ENVIRONMENTAL CONDITIONS

1. Do not paint or finish in unclean or improperly ventilated areas. Do not paint in temperatures lower than 50 degrees F. (10 degrees C.) or varnish in temperatures lower than 65 degrees F. (18 degrees C.) for 24 hours before, during and 48 hours after application.
2. Do not undertake exterior painting at temperatures under 50 degrees F. (10 degrees C.) for 24 hours before, during and 48 hours after application or immediately following rain, frost or dew. Safe levels shall be determined by use of an electronic meter.
3. Test for moisture content in each location immediately before commencing application of paint. Do not apply paint on surfaces where moisture content exceeds 14%. Promptly notify Consultant if such conditions are encountered.
4. Provide approved equipment for testing moisture content of surfaces to receive paint finishes and have available on Site at all times during Work of this Section.

5. Do not apply paint finish in areas where dust is being generated

5. PROTECTION

1. Provide metal pans or adequate tarpaulin to protect floors in areas assigned for the storage and mixing of paints.
2. Use sufficient drop cloths and protective coverings for the full protection of floors, furnishings and work not being painted.
3. Leave above areas clean and free from evidence of occupancy upon completion of painting.
4. Protect paint materials from fire and freezing.
5. Keep waste rags in metal drums containing water and remove from building at end of each working shift.

6. RELATED WORK SPECIFIED ELSEWHERE

1. Read carefully all other Sections of the specifications to determine the extent of prime and finish coats applied by others.
2. Asphalt Paving Markings - Section 02610
3. Concrete Floor Sealer - Section 03300
4. Wood preservative for Rough Carpentry - Section 06100.
5. Wood Athletic Flooring – Section 09551
6. See Mechanical and Electrical Sections for extent of baked enamel finish on equipment.

7. FINISH CARPENTRY & ARCHITECTURAL MILLWORK

1. All cabinet millwork must be finished in the shop by Section 06400. All other finish carpentry materials (including miscellaneous brackets for benches) to be finished by Section 09900.

8. SCOPE OF WORK

1. With exceptions noted in 1.6 and 1.7 above or specifically called for in other Sections of the Specification, all paintwork is included in the scope of this Section
2. NOTE: In locations where Drawings do not call for paint or similar finish on walls and/or ceilings, the intent of this Specification is that all exposed unpainted metal surfaces shall be painted.
3. Paint exposed drywall and the like in locations where finish is not otherwise specified or noted. Do not paint such surfaces in mechanical shafts, unless specifically noted.

4. In locations where Drawings do not call for paint or similar finish on walls and/or ceilings, the intent of this Specification is that items such as new work, including miscellaneous metalwork, shall be painted.
5. Paint pipes, conduit, ducts and related thermal insulation and all prime painted mechanical and electrical equipment and supports located in mechanical and electrical storage and maintenance rooms in allocations where Drawings call for paint or similar finish on walls and/or ceilings.
6. Do not paint pipe, conduit, ducts, insulation and the like where concealed above ceilings (except louvred type ceilings) or in service shafts.
7. Make good paint finish on shop coated work where damaged.
8. Paint visible portions of steel shelf angles, lintels and structural steel.
9. Paint all edges and all faces of doors where primed for paint supplied.
10. Stain all top, bottom and side edges of all plastic laminate doors.
11. Interior of ducts and diffusers visible from exterior on room side.
12. Paint all roof top equipment, stairs, pipes, conduit, vents, ducts, pipe insulation, etc. exposed on roofs (including primed and prefinished items).
13. Allow for fifteen (15) different paint colours to be used in the building - including field, accent walls and bulkheads and four (4) exterior paint colours.

9. QUALITY ASSURANCE AND REFERENCES

1. Paint work shall meet or exceed standards set out in C.G.S.B. Specification No.'s 85-GP-1M to 85-GP-33A and C.P.C.A. Canadian Painting Contractors Association - Painting Manual.
2. Employ fully trained workers who are regularly employed in this field.
3. Manufacturer's sales representative shall perform inspections on the Owner's behalf in order to ensure compliance with product specifications.

10. RETOUCHING

1. Do all retouching, etc. to ensure that the building may be handed over to the Owner in perfect condition, free of spatter, finger prints, rust, watermarks, scratches, blemishes or other disfiguration.

11. TEST AREA

1. A room or area in the building will be designated by the Architect as a test

- area to establish standard of workmanship, texture, gloss and coverage.
2. Prior to any painting being started, request a meeting on Site between Architect, Contractor, Subcontractor and Material Manufacturer's Representative to review conditions, surfaces, anticipated problems and to clarify quality of workmanship acceptable to Architect.
3. Apply finishes to each type of surface within room with correct material, coats, colour, texture and degree of gloss in sample area and have same approved prior to providing Work of this Section.
4. Retain test area until after completion of Work. Test area to be minimum standard for the Work.
5. Failure to comply with the above will be cause for Architect to request all Work previously painted to be repainted.

2. PRODUCTS

1. MATERIALS

1. "Top Line" products only are acceptable. Use only products of manufacturers whose best quality lines meet or exceed CGSB Specifications for the particular type of material required. Approved manufacture and product unless specifically indicated otherwise in specification:
 1. Paints, stains and varnish:
 - a) General Paint
 - b) Benjamin Moore
 - c) Sherwin Williams
 - d) Zinsser
 - e) Glidden/Devoe Coatings
 2. Latex Water Based Epoxy
 - Sherwin Williams B70W00211 - Waterbased catalyzed epoxy extra white/
Tint base A/B60V00025 - Waterbased Catalyzed epoxy Semi Gloss Hardner Part B
 - Glidden - 4420 - True Glaze Waterborn epoxy / 4426 True Glaze semi gloss converter
 3. Latex Supper Adherent Primer,
 - General Paint 51-050 Premium Latex Plastic Primer
 - Benjamin Moore #23-00 Freshstart Acrylic Primer Sealer
 - Zinsser 1-2-3 Acrylic Primer Sealer
 - Sherwin-Williams - B51WQ8850 - Adhesion Prm White
 - Glidden Latex super undercoat 94280
 4. Interior Latex Block Filler, C.G.S.B. Standard #-GP-188M

- General Paint 70-224 Premium Latex Block Filler
 - Benjamin Moore #595-01 Latex Block Filler
 - Glidden #362650 Concrete Block Filler
 - Sherwin-Williams B42W00046 Heavy Duty Block Filler
5. Stain Suppressant Sealer/Primer Hi-Hide, C.G.S.B. #1-GP-119M (where required)
- General Paint 60-200 X-Terminator 2 Latex Sealer
 - Zinsser BIN Primer, hi-hide (spot prime only)
 - Zinsser Bullseye Odourless
 - Sherwin-Williams - B49WQ8820 Multipur LTX Pr Wh
 - Glidden/Jammer 200
6. Clear Wood Trim and Panel Finish
- General Paint 25-011 Urethane Semi-Gloss
 - Benjamin Moore & Co. Ltd. #435 Low Lustre Alkyd Urethane.
 - Glidden #90333 Urethane Varnish.

Note: Colors will be selected from Benjamin Moore and Sherwin-Williams color system. Sherwin-Williams color formulas must be matched if one of the other approved manufacturers are being used. Allow for 15 paint colors to be selected. Refer to Interior Finish Schedule for color information.

7. Fire Retardant Clear Coat at all exposed wood panels: Quantum Safe Coat Clear Fire Retardant Coating or equal by Ocean Products.
8. Typical Furniture Finish of all Wood Millwork, wood trim, panels, etc. (by Sections 06200 and 06400): shall be polymerizing two component catalytic varnish system equal to "Duravar Plus" manufactured by M. L. Campbell. The individual components of the system used must be chemically compatible to assure perfect adhesion and a top quality, durable final finish.
9. Thinners, cleaners: Type and brand recommended by the paint manufacturer.
10. Materials to be new and first line of manufacturer.
11. Deliver materials to site in original unbroken containers bearing brand and manufacturer's name.

3. EXECUTION

1. CONDITION OF SURFACES

1. Check all surfaces with electric moisture metre and do not proceed if reading is higher than 12-15 without written permission from Architect.

2. Proceed with work only when surfaces and conditions are satisfactory for production of a first class job.
3. Clean and remove dust, grease, rust and extraneous matter from all surfaces (except that rust occurring on items specified to be primed under other sections shall be removed and worked reprimed under these sections).
4. The commencing of work in a specific area shall be construed as acceptance of the surfaces, and thereafter the contractor shall be fully responsible for satisfactory work as required herein.
5. All surfaces shall be prepared in accordance with Chapter 2 for Interior Work of the Master Painters and Decorators Association Painting Manual latest edition.
6. Prepare surfaces in accordance with paint covering manufacturer's instructions.

2. PREPARATION

1. Concrete and Masonry

1. Test surfaces for alkalinity with pink litmus paper or other recognized method.
2. Where extreme alkalinity occurs, wash surface with 4% solution tetrapotassium pyrophosphate (5 oz. per gallon (31 ml./l.) of water) where latex base paint is to be used and with zinc sulphate solution (3 lbs. per gallon (300 g./l.) of water where other paint bases are to be used.)
3. Etch normal concrete surfaces to receive alkyd paint with muriatic acid solution (1 part commercial) 31.45% to 3 parts water. Neutralize and allow to dry before painting.
4. Prepare masonry concrete surfaces to CGSB 85-GP-31M.

2. Metal

1. All metal surfaces to receive coatings shall be cleaned to SSPC-SP1 (solvent washing) prior to painting as specified herein.
2. Touch-up shop primed metal after first removing loose primer, rust, oil, grease and other contaminants.
3. All metal surfaces exposed and/or exhibiting rust shall be cleaned to SSPC-SP2 or SSPC-SP3 standards and primed with an approved rust inhibitive primer prior to recoating as specified.

4. Feather edges to make touch-up inconspicuous when applying new primer.
 5. Conform to CGSB 1-GP40d.M to CGSB 85-GP-14M.
3. Galvanized Surfaces
 1. For Primer Application Type C Corrosive ensure that all surfaces to be painted are clean, dry, and free of all contaminants.
 2. Cleaning of existing surfaces to be conducted according to SSPC-SP-4 Flame Cleaning procedure. Pass high temperature, high velocity, oxyacetylene flames over entire surface and then wire brushing. Primer is to be applied before surface is cool.
 3. Phosphatize galvanized metal surfaces using CGSB 31-GP-105M pretreatment or prime with galvanized metal primer.
4. Woodwork
 1. Inspect millwork, trim and panels to assure surfaces are smooth, free from machine marks and that nailheads have been countersunk. Seal all knots and sapwood in surfaces to receive paint, with a vinyl sealer compatible with finish specified conforming to CGSB 1-GP-125b.
 2. Sand smooth all woodwork which is to be finished and clean surfaces free of dust before applying first coat. Fill nail holes, splits and scratches with non-shrinking filler conforming to CGSB 1-GP-103b after first coat is dry. When these occur on a transparent surface, filler shall be stained to match the finish as approved by Architect. Between coats, sand lightly with No. 00 sandpaper and remove dust.
 3. Prime all wood noted for paint finish immediately on delivery to site.
 4. Back paint all wood noted for stain, varnish or Intumescent fire retardant clear coating or natural finish.
 5. Prepare all wood surfaces to CGSB-85-GP-1M.
5. Hardware
 1. Remove finishing hardware, electric cover plates and accessories, mask any that are not removable. Replace these when paint is dry and clean them. Do not clean hardware with solvent that will remove permanent lacquer finish.

6. Gypsum Wallboard

1. For small holes, scratches or other surface marks fill with patching compound and sand smooth.
2. For larger holes or damaged areas do not proceed until trade for original work has filled or repaired surfaces to acceptable levels.
3. Prepare wallboard surfaces to CGSB-85-GP-33M.

7. Copper

1. Prepare copper piping and accessories to CGSB 85-GP-20M.

8. General

1. Mask specification plates occurring on equipment, switch boxes, and similar items requiring painting.
2. Protect, remove and replace hardware, accessories, lighting fixtures and similar items as required.
3. Conform with Architect's colour schedules and exactly match approved samples.

3. APPLICATION

1. Finishes and number of coats specified in the schedule are intended to cover surfaces perfectly. If they do not, apply further coats until perfect coverage and colour are achieved as required.
2. Any areas exhibiting incomplete or unsatisfactory coverage shall have the entire plane painted. Patching will not be acceptable.
3. Walls needing repainting, entire wall (plane) shall be painted to the satisfaction of the Architect. See drawings for extent of work.
4. Spray painting will not be permitted (except at metal deck and joist areas) unless specifically approved in writing by the Architect in each instance. Architect may withdraw approval at any time and prohibit spray painting for reasons such as carelessness, poor masking or protection measures drifting paint fog, disturbance to other Trades or failure to obtain a dense, even, opaque finish. Spray painting shall be full double coat, i.e. at least two passes for each coat. Do not use spray or roller on wood or metal surfaces, brush only unless approved in writing by Architect. Spray painting and backroll may be permitted on concrete blocks.
5. Arrange to have traffic barred from completed areas wherever possible.
6. Apply materials in strict accordance with manufacturer's directions and

specifications and be familiar with these directions and specifications.

7. Prime woodwork as soon as possible after woodwork is delivered to site. Prime all surfaces, whether exposed or not, before installation. In case of woodwork which is to be stained, apply one coat of penetrating sealer to all finish surfaces of wood having uneven absorption, such as birch. Woods of uniform density such as oak shall be left unsealed. Back prime stained and varnished woodwork with one coat of gloss varnish reduced 25%. Fill open grain woods with filler tinted to match wood when transparent finish is required, and work well into grain. Before filler sets, wipe excess from surface.
8. Apply primer-sealer coats by brush or roller method. All primers and undercoats to be tinted to no more than 25% of intensity of the finish colour.
9. Permit paint to dry before applying succeeding coats, touch up suction spots and sand between coats with No. 00 sandpaper.
10. Where two coats of the same paint are to be applied, the first coat shall be the same colour as the finish coat and be inspected by the Architect before application of final coat, to allow the Architect to make reasonable modification of colour if necessary. Furnish Architect with a schedule showing expected completion of the respective coats of paint for the various areas and surfaces. Keep this schedule current as the job progresses.
11. Exterior paints and deep/intense interior and exterior colours shall be from the nearest factory premixed colour selection and shall be alterable to match required colours.
12. Flat and semi-gloss finishes on gypsum wall board, block and other surfaces of large areas shall be applied by roller and to all other surfaces applied by brush.
13. Paint shall be uniform in sheen, colour and texture, free from brush or roller marks, sags, runs or other defects.
14. Finish edges of doors (top, bottom, sides and cutouts) with paint or stain treatment as required to match face of door. Stain top and bottom edges a different colour and seal with one coat of shellac and one coat gloss varnish or two coats paint. Refinish tops and edges of wood doors after fitting.
15. Even up stained woodwork in colour as required by nature of wood and as directed by Architect. Apply same finish on trim, fitments, cupboards and other protecting ledges as on surrounding work, disregard sight lines.
16. Carefully hand smooth and sandpaper wood between coats (including priming). Apply one coat sealer before applying first coat paint filler to

knots or sap blemishes on wood surfaces to receive paint or stain finish.

17. Remove rust, oil, grease and loose shop paint from metal work by brushing or with wire brushes and make good shop coat before proceeding with final finish. Feather out edges to make touch up patches inconspicuous.
18. After first coat, fill nail holes, splits, and scratches, using putty coloured to match finish.
19. Clean castings with wire brush before application of first paint coat.
20. Do not etch galvanized metal. Prepare prime and paint elsewhere in this section. This includes metal door frames and the like with wiped zinc coating.
21. Remove form oil or parting compounds from concrete surfaces. Use Xylol or approved compound.
22. Paint interior of pipe spaces, ducts, etc. visible through grilles or through metal ceilings in black matt finish.
23. Conform with Architect's colour schedule and exactly match approved samples.
24. Mechanical and Electrical Materials
 1. Refer to Mechanical and Electrical Sections of the Specifications and note the instructions regarding painting and finishing of materials and equipment supplied and installed by those trades. In general paint mechanical and electrical items prime painted as installed.
 2. Remove grilles, covers, access panels for mechanical and electrical systems from location and paint separately, if these items are not factory finished.
 3. Paint work to match adjacent walls and ceilings unless directed otherwise. Note: This includes trim on fixtures exposed, speaker covers, emergency lights, grilles, diffusers, louvres, vents, fire extinguisher cabinets, electrical panels, etc.
 4. Paint interior surfaces that are visible through grilles and louvres with one coat of flat black metal paint to limit of sight line.
 5. Where walls and ceilings are not scheduled to be painted, the work described above shall be painted a colour selected by Architect.
 6. Unless factory painted, all exposed piping, conduits, ductwork hangers, insulation and mechanical equipment shall be painted.

25. Rooms without finished ceilings will have decks, joists, beams, ducts, etc., painted.
26. Paint graphics as shown on drawings. All graphics to be semi-gloss minimum two coat application.

4. ADJUST AND CLEAN

1. Cracks occurring in walls or ceilings requiring patching during "warranty period" shall be repainted in such a way that the patch is not visible at a distance of 5'-0" (1500 mm).
2. If patch painting not acceptable repaint entire wall or ceiling surface.
3. At completion clean entire area of surplus materials and equipment.

5. FIELD QUALITY CONTROL

1. Locate testing area in building to establish standard of workmanship, texture, gloss and coverage where designated.
2. Apply samples of all finishes on each type of surface to be coated with correct material, number of coats, colour, texture and degree of gloss required.
3. Retain test area until completion of work. Use approved work in test areas as standard for corresponding work throughout building. Correct and refinish work which does not compare with approved finishes.

6. FINISH SCHEDULE

1. General

1. Finish the listed exposed surfaces, wherever they occur unless such surfaces are specifically noted to be left unfinished.
2. Exposed means visible in the completed work and includes the interior of closets, cabinets and drawers.
3. The Architect shall have the option of having wood painted or with transparent finish and of which finish shall be used.
4. In instances where materials specified are not suitable for a particular job application, or are contrary to manufacturer's recommendations for use on a particular surface, such condition shall immediately be brought to the attention of the Architect for clarification and instructions.

5. Finishes shall match approved samples but Architect reserves the right to make reasonable changes to finish specifications to obtain desired results without additional cost or obligation of Owner.
6. Please refer to drawings I-#02 Wall Finish Plans and legends for wall finishes specifications and their associated locations. The final selection of colours and surface textures of all finishes throughout and whether finishes are transparent (natural) or opaque (paint) shall rest solely with the Architect.
7. Where surfaces have been disturbed the entire plane shall be painted.

2. Exterior Schedule

1. Metal (Ferrous): One coat rust inhibitive primer (metal surfaces already primed need not receive a field prime coat except for touch up). Two coats exterior Aura paint by Benjamin Moore.

Note: All roof top equipment, pipes, conduit, vents, ducts, grilles, pipe insulation, etc. to be painted.

2. Galvanized Steel: One coat galvanized primer. Use a Polyamide converted epoxy primer by Devoe Coatings, "4170-1000 with 4170-999 - catalyst". Two coats of galvanized Finish Coat. Use a single package tough, durable alkyd modified urethane coating with water, chemical and solvent resistance by Devoe Coatings "Devoe" Glid Shield Urethane Gloss Enamel No. 4328-0100 Series (installation within 72 hours of installing primer).

Note: All exterior areas are to be painted including stairs, masonry lintels, etc.

3. Painted Wood Surfaces: One coat wood primer. Two coats exterior Aura paint by Benjamin Moore.
4. Stained Pressure Treated Wood or Cedar: Two coats solid hide Aborite stain and one Clear Top Coat both by Benjamin Moore.

3. Interior Schedule

1. Metal (Ferrous): One coat latex super adherent primer (metal surfaces already primed need not receive a field prime coat except for touch up). Apply two coats latex water based epoxy 2 coats.
2. Hot Ferrous Metal - (Valve bodies, strainers, etc., on high temperature lines.) - One coat primer, latex super adherent heat resistant - Two coats latex water based epoxy.

3. Galvanized Steel: One coat galvanized primer. Use a Polyamide converted epoxy by Devoe Coatings "4170-1000 with 4170-9999-catalyst". Two coats of galvanized Finish Coat. Use a single package tough, durable alkyd modified urethane coating with water, chemical and solvent resistance by Devoe Coatings "Devoe Glid Shield Urethane Gloss Enamel No. 4328-0100 Series (install within 72 hours of installing primer).
4. Hollow Metal Doors, Metal Ducts, etc.: One coat super adherent primer. Two coats latex water based epoxy.
5. Metal Roof Decks and Joists: One of the approved primer finish combinations as follows:
 - .1.1 General Paint 10900 Alkyd Dryfall Primer. Apply one coat: spread rate, 250 square feet per 3.78 litre container on smooth surfaces and 75 square feet on corrugated steel. Each coat wet thickness: 4.6 mils. Each coat dry thickness: 2.0 mils.
 - .1.2 General Paint 6000-Line or 33-Line. Apply two coats: spread rate 400 square feet per 3.78 litre container. Each coat wet thickness: 4.0 mils. Each coat dry thickness: 2.0 mils.
 - OR
 - .2.1 Benjamin Moore and Co. Ltd. #597-01 Sweep-Up Spray Latex Flat primer. Apply one coat: spread rate, 255 square feet per 3.79 litre container. Each coat wet thickness: 6.3 mils. Each coat dry thickness: 2.5 mils.
 - .2.2 Benjamin Moore & Co. Ltd. T-7688 Impervo or T-7721 Satin Impervo. Apply two coats: spread rate, 500 square feet per 3.79 litre container. Each coat wet thickness: 3.0 mils. Each coat dry thickness: 1.3 mils.
 - OR
 - .3.1 Glidden #10120 Spraymaster Latex Eggshell primer. Apply one coat: spread rate, 264 square feet per 3.78 litre container. Each coat wet thickness: 6.0 mils. Each coat dry thickness: 2.0 mils.
 - .3.2 Glidden #4308 Devguard. Apply two coats: spread rate, 320 square feet per 3.78 litre container. Each coat wet thickness: 5.0 mils. Each coat dry thickness: 2.25 mils.
6. Woodwork Painted: One coat super adherent primer. Two coats latex Ultra "94800" by Glidden.

7. Natural or Stained Close Grain Wood: One coat non-bleeding alkyd stain. One coat sanding sealer.
Approved Finish Clear Coats are as follows:
 - .1 General Paint 25-011 Urethane Semi-Gloss. Apply two coats: spread rate, 350 square feet per 3.78 litre container. Each coat wet film thickness: 4.0 mils. Each coat dry thickness: 1.5 mils.

OR
 - .2 Benjamin Moore & Co. Ltd. #435 Low Lustre Alkyd Urethane. Apply two coats: spread rate, 575 square feet per 3.79 litre container. Each coat wet thickness: 2.8 mils. Each coat dry thickness: 1.1 mils.

OR
 - .3 Glidden #90333 Urethane Varnish. Apply two coats: spread rate, 638 square feet per 3.78 litre container. Each coat wet thickness: 2.5 mils. Each coat dry thickness: 1.0 mils.
8. Natural Cedar Slat Ceilings: natural finish.
9. Natural or Stained Open Grain Wood: One coat stain filler. One coat sanding sealer.
Approved Finish Clear Coats are as follows:
 - .1 General Paint 25-011 Urethane Semi-Gloss. Apply two coats: spread rate, 350 square feet per 3.78 litre container. Each coat wet film thickness: 4.0 mils. Each coat dry thickness: 1.5 mils.

OR
 - .2 Benjamin Moore & Co. Ltd. #435 Low Lustre Alkyd Urethane. Apply two coats: spread rate, 575 square feet per 3.79 litre container. Each coat wet thickness: 2.8 mils. Each coat dry thickness: 1.1 mils.

OR
 - .3 Glidden #90333 Urethane Varnish. Apply two coats: spread rate, 638 square feet per 3.78 litre container. Each coat wet thickness: 2.5 mils. Each coat dry thickness: 1.0 mils.

- 10.1 Concrete Block: One coat latex block filler, applied at the minimum rate of 80 sq. ft per gallon (1.63 m² per litre), or as required by block texture to completely fill block. **Pinholes will not be accepted.** Apply more block filler if necessary to completely fill the block before applying finish coats. Note that lightweight block requires more block filler to fill than standard weight block does and adjust application rate as required. Two coats interior Latex Semi-Gloss "Ultra 94800" by Glidden.
11. Exposed Insulated Pipes and Ductwork: One coat size. One coat super adherent primer undercoat. Two coats Ultra "94800" by Glidden eggshell.
- 12.1 Gypsum Wallboard (Base Price): One coat of Latex super adherent primer.. Two coats semi gloss Ultra "94800" by Glidden. Velvet or eggshell at walls and Low gloss at ceilings.
13. Surfaces Behind Grilles and Duct Work Where visible Within 12' (300 mm) of Grille:
 1. Two coats vinyl latex matt black.
14. Painted Light Trims, Emergency Lights, Louvres, Diffusers, Vents, Concealed Sprinkler Covers, Fire Extinguisher Cabinets, and Electrical Panels, Etc.
 1. One coat super adherent primer. Two coats Ultra "94800" by Glidden to match surrounding wall and ceiling colours or as specified by Architect.
15. Exposed Sealed Concrete Floors to be Painted
 1. One coat Sikafloor 2001 Primer
 2. One coat Sikafloor polyurethane UV in colour as selected by Architect from complete colour range.
 3. Install floor primer and finish coat as per manufacturer's printed installation instructions.
16. Flame Retardant Coating at Corridor Wood Ceiling and Wall Panels:
 1. One coat stain filler. One coat sanding sealer. Two (4 mil) coats Safe Coat Clear Fire Retardant Coating for a total min. 8 mil thickness.
17. General Notes
 1. See drawings for locations of areas where more than one

colour occurs on one wall and one ceiling plane.

2. Each ceiling bulkhead section or level may be a different colour.
3. Wall planes may be designated a different colour from surrounding walls such as stairwells, entrances to classrooms, corridor intersections, gym (area below band one colour area above another) and Library. Classrooms to have one wall an accent colour.
4. At stairwells and metal railings, allow for flatbars, pickets and stringers at stairs to be each painted a different colour. Maximum three colours to be chosen by Architect. Clarification detail will be issued with colour schedule after tender.
5. Gymnasium walls acoustic sound block to be painted a different colour from surrounding wall. Allow for three colours to be chosen by Architect.
6. Door frames may be one colour and door another colour.

7. WOOD FURNITURE FINISHES (By Section 06400)

1. Natural or Stained Transparent Wood Furniture Finish: One coat non-bleeding alkyd stain. One coat sanding sealer. Two coats polymerizing two component catalytic conversion varnish system. "Duravar Plus" manufactured by M.L. Campbell and distributed by W. E. Saunders & Sons Painters Ltd. (519-582-2621). Flat, stain or gloss finish as directed by Architect.
2. Interior of Wood Drawers: Three coats tinted sealer to inside sides, back and bottom.
3. Unexposed Millwork Surfaces: Two coats of tinted sealer including backs of all base and wall cabinets, enclosures, etc.

8. MAINTENANCE MATERIAL

1. Provided one sealed can of four litre capacity, of each product in each colour used in the Work for Owner's use in maintenance work.
2. Container to be new fully labelled with manufacturer's name, type of paint, and colour.
3. Provide Owner 3 copies of paint formula for each colour and type of paint for Owner's maintenance manual.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One, General Requirements, is part of this Section and shall apply as if repeated here.

1.2 SHOP DRAWINGS

1. Submit shop drawings in reproducible vellum form in accordance with GC 3.10 of CCDC Document 2-2020 and Section 01300 – Submittals.
2. Submit catalogue illustrations as required by Architect.
3. 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 anchors for grab bars.

1.3 SUBMITTALS

1. Submit samples of all accessories for approval by the Architect.
2. Approved manufacturers are ASI.

1.4 DELIVERY, STORAGE AND HANDLING

1. Package accessories and label with description of contents and installation location. Each accessory to be individually wrapped complete with all fixings as required.
2. Deliver accessories where designated at Site by Contractor.

1.5 MAINTENANCE AND OPERATING INSTRUCTIONS

1. Provide for inclusion in data book, three (3) printed copies of maintenance and operating instructions of all accessories.

PART 2 PRODUCTS

2.1 MATERIALS

1. Sheet Steel: Commercial grade, stretcher levelled sheet steel to ASTM A526-71 (1975) with G90 zinc coating to ASTM A525-79.
2. Stainless Steel Sheet: To ASTM A666-72 (1979) type 302 with No. 4 finish, minimum 0.9 mm (0.036"/20 gauge).
3. Stainless Steel Tubing: AISI Type 304, commercial grade, seamless welded, 1.2mm (0.047") wall thickness.
4. Fasteners: Screws and bolts hot dip galvanized. Expansion shields fibre, lead or rubber as recommended by fixture manufacturer for component and its intended use.

5. Fasteners: Screws and bolts stainless steel. Expansion shields, lead or rubber as recommended by fixture manufacturer for component and its intended use.

2.2 FINISHES

1. Chrome and Nickel Plating: to ASTM B456-79 satin finish.
2. Stainless Steel: to AISI No. 4 satin lustre finish.
3. Baked enamel: condition metal by applying one coat of metal conditioner to CGSB 31-GP-107a, apply one coat Type 2 primer to CGSB 1-GP-81M and bake apply two coats Type 2 enamel to CGSB 1-GP-88e and bake to hard, durable finish. Sand between final coats. Colour selected from standard range by Architect.

2.3 KEYING

1. All accessories to be keyed alike. Provide six keys.

2.4 TRADEMARKS AND LABELS

1. Trademarks and labels shall not be visible in the finish exposed surfaces.

2.5 MANUFACTURER

1. Provide accessory items manufactured by companies as noted or approved equal; Bobrick, Frost and ASI are approved manufacturers.

2.6 ACCESSORIES

1. **Toilet Paper Dispensers:** Shall be provided by Waterloo Catholic District School Board and installed by this contractor. Provide one at each water closet.
2. **Paper Towel Dispenser:** Shall be provided by Waterloo Catholic District School Board and installed by this contractor. Provide one by each washroom and classroom sink.
3. **Clothes/ Coat Hooks:** Model No. B233 by Bobrick Washroom Equipment, Inc. Provide one at each washroom.
4. **Fixed Mirrors:** Model No. B165 S.S. Channel Frame Mirror 18" (456 mm) wide x 30" (762mm) by Bobrick Washroom Equipment, Inc. Provide one above each washroom sink, mounted max. 1000mm above finished floor. For Male & Female gang washroom, provide 24" (610 mm) wide x 60" (1520 mm) high mirror.
5. **Soap Dispenser:** Shall be supplied by Waterloo Catholic District School Board for each sink and installed by this Trade Contractor. Install one by each washroom and classroom sink. Soap dispensers to be installed one on each side of the Bradley

6. **Waste Receptacle:** Model No. B-277 Stainless Steel complete with vinyl liner Model No. 3944-12 by Bobrick Washroom Equipment Inc.
8. **SND** - Surface Mounted Sanitary Napkin Disposal: Marino #H260 to be provided and installed by this contractor. Install one in each universal washroom, barrier free washroom, unisex / single washroom and for each stall in female gang washrooms unless otherwise indicated on drawings. Where the recessed B-35303 model is not able to be installed, this surface mounted product is to be used in lieu.
10. **Grab Bars:** Refer to Architectural drawings for locations.
 1. At Barrier Free Accessible Water Closets:
 1. 1 1/2" (38 mm) dia. peened satin finished stainless steel, 24" (610 mm) long straight bar, standard flange position at back of water closet.
 2. L-shaped bar 1 1/2" (38 mm) dia. peened satin finished stainless steel, 30" (760 mm) long horizontal and vertical 30" (760 mm) at side of water closet.
 3. Install item 1 and 2 grab bars noted above at each universal / barrier free water closets.
11. **GB** - Grab bars to be 18 (1.2 mm) gauge stainless steel tubing, with Mandrel bends. Knurled grab bars to be peened grip full length of the tubing to within 4" (100 mm) of ends of bends. Secure concealed fastening grab bars with 2 1/2" (64 mm) No. 14 screws to solid backing, capable of supporting a 500 lb. (225 kg) pull. All accessories must comply with the 2012 January 1, 2015 Ontario Building Code as currently amended.
14. Contractor to install any and all washroom accessory items supplied by owner.

2.7 FABRICATION

1. Weld, ground flush and smooth joints of fabricated components. Use mechanical fasteners only when approved.
2. Form exposed surfaces from one sheet of stock, free of joints.
3. Brake form sheet metal with 2 mm radius bends.
4. Form flat surfaces without distortion. Maintain flat surfaces without scratches or dents.
5. Paint back of components where contact is made with building finishes to prevent electrolysis.
6. Hot dip ferrous metal anchors and fastening devices to conform with CGSB G164.

7. Shop assemble, and package components complete with anchors and fittings.
8. Deliver inserts and rough-in frames to site at appropriate time for building in. Provide templates or rough-in measurements as required.
9. Provide steel anchor plates and components for installation on studding and building framing.
10. All exposed stainless-steel edges to be hemmed.
11. All stainless-steel units to be double panned.

PART 3 EXECUTION

3.1 INSTALLATION

1. Installation of all miscellaneous specialties by this Section. Install all items to secure backing.
2. Securely fasten accessories level and plumb in the locations shown on the drawings and as specified herein. Mounting heights as shown on drawings, or as directed by Architect.
3. Co-ordinate installation with the work of trades providing adjacent construction as required to achieve the reveals or other edge conditions shown where front faces of units are flush with the finished wall surfaces.
4. Perform drilling of steel, masonry and concrete necessary to install the accessories.
5. Insulate accessory surfaces to prevent electrolysis due to contact with masonry, concrete or dissimilar metal surfaces. Use bituminous paint, building paper or other approved means.
6. Clean all accessories in conformance with Division 1.

3.2 LOCATION AND QUANTITY

1. Provide washroom accessories as noted as indicated on drawings and/or called for within this section. Installations shall meet the minimum requirements of the O.B.C., as currently amended.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Division One - General Requirements is a part of this section and shall apply as if repeated here.

1.2 DESCRIPTION

1. Work included: Provide as a separate price option (refer to supplementary tender form), manually operated rolling shade systems in all new offices, Library and wherever else indicated on drawings.

Provide in the base bid amount Privacy screens for doors and sidelights into all classrooms. Provide all components as needed for a complete and proper installation.

1.3 RELATED WORK

1. Documents affecting the work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
2. Masonry - Section 04200
3. Wood Blocking - Section 06100
4. Finish Carpentry - Section 06200
5. Aluminum Entrance Framing, Windows & Doors — Section 08800
6. Aluminum Window Curtain Wall System Section 08900
7. Electrical —Refer to Electrical Sections

1.4 QUALITY ASSURANCE

1. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.5 SUBMITTALS

1. Product Data: Within 60 calendar days after the General Contractor has received the Owner's Notice to Proceed, submit:

1. Materials list of items proposed to be provided under this Section.
 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 3. Shop Drawings in sufficient detail to show fabrication, installation, anchorage and interface of the work of this Section with the work of adjacent trades.
 4. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.
2. Construct one complete light proof window shade with attachments and accessories for approval by the Architect.

1.6 WARRANTY

1. Three-year written warranty against mechanical and fabric failure (including fabric fading) under normal conditions.

1.7 ACCEPTANCE

1. All manual and motorized shades remain the property of the supplier until accepted in place by the Architect.

1.8 SCOPE

1. Supply and installation of Manual Rolling shades with 1% opening weave in all Classrooms, Library and Offices.
2. Provide privacy screens at glazing in all doors and sidelights for new doors. Product equal to Velo PS and Velo PSL by Activar Inc. 1-800-554-6077.

PART 2 PRODUCTS

2.1 MOTORIZED SHADE SYSTEM

1. ElectroShade motorized shading system. Specifications are based on products manufactured by:
 1. Sun Project Canada Inc. — www.altex.com 500
Applewood Crescent
Vaughan, ON, Canada L4K 4B4
1.888.836.6980 | 905.660.3117

2. Provide Moduline Electra Tandem 105 120VAC where required for layout of multiple blinds.
3. Approved equal product/manufacture is Solarfective Products Ltd.

2.2 ELECTROSHADE MOTOR SYSTEM

1. Switches: Internal limit switches are adjusted by two external thumbscrews to allow exact setting of travel in both the raised and lowered positions.
2. Micro switches provide circuit braking at the end of the run. The
3. limit-switch setting cannot be disturbed by the action of the roller tube.
4. Brake: A solenoid activated disc brake mechanism stops and holds in any position. The brake automatically disengages when the motor is operating.
5. Motor: An asynchronous motor with built-in reversible capacitor
6. start-and-run is made to be operated with 95 to 125 V.A.C. at 60 hz., single phase, temperature Class-A (maximum temperature rating of 140 degrees C.), thermally protected, totally enclosed, maintenance free with locking disconnect plug assembly furnished with each operator. Provide Electro tandem 105 120VAC where required for multiple blinds.
7. Gear Box: Three levels of satellite pears are provided for load distribution (planetary pears) and machined to close tolerance of tempered steel.
8. Installation: A single pin locks the drive end of the motor to the tube. A notched section in the tube turns the ring which counts the turns and activates the limit switch. To interchange motors, the pin is pressed out of the tube and the motor slides out.
9. Sizes: The motors are available in torques of 35-435 in lbs. (lifting capacity), 12-30 r.p.m. speed, to meet specified requirements and shall not exceed 60 mm in diameter.
10. Warranty: The manufacturer provides warranty that the motor is free of manufacturing defects for three (3) years from the date of installation. This warranty is void if the products have been improperly installed or subjected to improper care.

2.3 HARDWARE AND ACCESSORIES REQUIRED FOR A TOTAL INTEGRATED SYSTEM

1. Shade Roller: Extruded aluminum tube, 6063-ST6 alloy, 2.55 in. OD with internal keyway to receive tubular motor. The tube is extruded with two fabric-mounting channels designed so that the shade cloth does not disengage from the tube itself.
2. Mounting Spline: Extruded vinyl with asymmetrical locking channels and embossed fabric guide for use with 2.55 in. OD tube. Spline has sufficient capacity to hold shade and additional weight without disengaging from the tube.
3. End Brackets: Consist of 1/8" in. thick sheet steel. Wall, jamb or ceiling mounted as required and permanently installed.
4. Centre Support Brackets: supplied to meet span or weight requirements. Ceiling or wall mounted.
- e. Weights: Mill-finished aluminum, flat bars, single lengths for each shade panel.
5. Recessed Housing: is specifically designed for acoustic or plaster ceilings with a removable closure plate for access to the recessed and concealed roller system.
6. Finishes: All exposed aluminum parts have a clear anodized finish. Steel parts are either cadmium plated, satin finished or have been bonderized prior to painting with a baked enamel finish.
7. Exterior hembars shall be rectangular 6 mm x 37 mm, with internal grooves to accommodate a fabric guide carrier at each end.
8. Side channel shall be a heavy-duty two-piece Snap-On 75 x 22 side channel for inside or frontal mount.
9. Fabric shall be hot laser cut and reinforced at the edges with a high frequency thermoweld seal. Fabric is reinforced with heat sealed spring tempered stainless steel batten stiffeners positioned approximately every 900 mm insuring that fabric cannot escape or be pulled out of the side channel.

2.4 SUNSHADE FABRIC

1. Provide manual rolling shades in all other areas fabric to be 1% open weave flame retardant. The architect to choose colour when the shop drawings are submitted. Seams, if required, shall be equally spaced vertically to form material in equal widths.

2.5 AUTOMATIC OPERATOR

1. 3 position remote control switch with "up", "down", and "stop" control. Mount the operator in shade frame with control switch located where indicated. Include all components for proper unit operation. Control each shade in one room from individual control stations for each shade.

PART 3 EXECUTION

3.2 SURFACE CONDITIONS

1. Examine the areas and conditions under which work of this section will be performed.

Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.3 INSTALLATION

1. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interfaced with the work of this Section.
2. Install the work of this section in strict accordance with the original design, the approved Shop Drawings, pertinent requirements of government agencies having jurisdiction, and the manufacturer's recommended installation procedures as approved by the Architect, anchoring all components firmly into position for long life under hard use.
3. Install the work plumb, level, and in proper operating condition.
4. Upon completion of the installation, put each operating component through at least five complete cycles, adjusting as required to achieve optimum operation and complete blackout at all edges (at blackout locations).
5. Touchup scratches and blemishes to be completely invisible to the unaided eye from a distance of five feet (1500 mm) or replace item.

END OF SECTION

FINISHING HARDWARE SCHEDULE

KILBRIDE P.S. Reno 2025 HDSB
6611 PANTON ST KILBRIDE , ON.

Architect
VG ARCHITECTS

Detailer: **CHRIS HYNES A.H.C.**
Consultant: **ROSS RUPRECHT B.A., A.H.C.**

Submittal Date: **APRIL 4/25 ,NOV 25/25, DEC 2/25**



Commercial Doors & Hardware
2150 Winston Park Drive Unit 16
Oakville, ON, L6H 5V1

KILBRIDE P.S. Reno 2025 HDSB
6611 PANTON ST KILBRIDE , ON.

Submittal Date: **APRIL 4/25 ,NOV 25/25, DEC 2/25**

GENERAL



Commercial Doors & Hardware
2150 Winston Park Drive Unit 16
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Submittal Date: APRIL 4/25 ,NOV 25/25, DEC 2/25

Manufacturers & Finishes

Manufacturers

Baron Metal
Camden
CBH
Gallery
Glynn-Johnson
GYRO-TECH
Ives
K.N. Crowder
LCN
MISC
Schlage
Schlage E.S.
UNK
Von Duprin
Zero

Finishes

626 - Satin chromium plated
over nickel
628 - Satin aluminum, clear
anodized
630 - Satin stainless steel
652 - Satin chromium plated
over nickel
689 - Aluminum painted
US32D - Satin stainless steel



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Openings Schedule

[illegible]

Commercial Doors & Hardware
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6611 PANTON ST KILBRIDE , ON.

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GENERAL:

ALL AUTO OPERATORS GYRO-TECH NO ALTERNATE WILL BE ACCEPTED.

FINISHING HARDWARE SUPPLIER SECTION 08710 TO SUPPLY & INSTALL AUTO OPERATORS.



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Submittal Date: APRIL 4/25 ,NOV 25/25, DEC 2/25

Hardware Schedule

Heading #1 (Group: EXT PR ALUM RM ADO)

Item #1 1 Pair of doors D01A, EXTERIOR FROM VEST 100° LHRA/RHRA

965, 965 x 2121 x 45 - AL DR x AL FR

REM HARDWARE MULLION WITH QUICK ELECTRICAL DISCONNECT.

1		UNK WEATHER STRIPPING BY DOOR AND FRAME SUPPLIER	
6	Standard Hinge	Ives 5BB1HW 5 X 4.5 NRP	630
1	Removable Mullion	Von Duprin KR4854-BLANK -96 --689- 154	689
1	Exit Device	Von Duprin CD-33A-EO-4'-626- 45-- INS-2	626
1	Exit Device	Von Duprin CD-33A-NL-OP-4' -626- 45--388/626- INS-2	626/626
2	Cylinder	Schlage 20-001 114 XQ11-949 36-083	626
1	Cylinder	Schlage 20-021 GMK	626
1	Electric Strike	Von Duprin 6300- CON 24VAC -630	630
2	Door Pull	Gallery GSH 1180-2 C32D 45	US32D
1	Surface Closer	LCN 4021 REGARM	689
1	Mounting Bracket	LCN 4020-18G	689
1	Electronic Closer	GYRO-TECH OPERATOR 8710 X HEADER (NO ALTERNATE)	628
2	Kick Plate	CBH CBH 903 200 X 40MM LDW	US32D
2	Overhead Door Stop	Glynn-Johnson 104S	US32D
1	Accessory	Camden CM-160/22 INSTALL ADO HEADER	
2	Accessory	Camden CM-60/4	
2	Accessory	Camden CM-89S	
1	Accessory	Camden CX-33	
1	Threshold	Zero 625A 96	A
1	Weatherstripping	K.N. Crowder W-25-CA X DOOR HEIGHT	CA
2	Gasketing	Zero SWEEP 8192AA 48	AA
2	Miscellaneous Item	Schlage E.S. 679-05HM BY SECURITY CONTRACTOR	BLK
1	Miscellaneous Hardware	UNK CARD READER BY SECURITY CONTRACTOR	
1	Miscellaneous Hardware	LCN WEATHER RING8310-802	PLA

THIS HARDWARE SUPPLIER SECTION 08710 TO SUPPLY AND INSTALL AUTO OPERATOR.

DIV 16 ELECTRICAL CONTRACTOR TO PROVIDE 120VAC TO FRAME HEADER AND SUPPLY & INSTALL ALL LVW IN CONDUIT TO ALL ACTUATORS AND ELECTRICAL COMPONENTS LISTED IN THE HARDWARE SCHEDULE.

INTEGRATION OF SECURITY INTERCOM WITH ADO BY DIV 26



Commercial Doors & Hardware
2150 Winston Park Drive Unit 16
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Heading #2 (Group: 41 ADO)

Item #2

1 Pair of doors D01B, VEST FROM CORR

100° LHRA/RHRA

965, 965 x 2121 x 45 - AL DR x AL FR

6	Standard Hinge	Ives 5BB1HW 5 X 4.5 NRP 652	652
2	Door Pull	Gallery GSH 4012-2 C32D 45	US32D
2	Push Bar	Von Duprin 350-626--	626
1	Surface Closer	LCN 4040XP EDA ST-3068	689
1	Mounting Bracket	LCN 4040XP-18PA 689	689
1	Electronic Closer	GYRO-TECH OPERATOR 8710 X HEADER (NO ALTERNATE)	628
2	Kick Plate	CBH CBH 903 200 X 40MM LDW C32D	US32D
2	Overhead Door Stop	Glynn-Johnson 104S US32D	US32D
1	Accessory	Camden CM-160/22 INSTALL ADO HEADER	
2	Accessory	Camden CM-60/4	
2	Accessory	Camden CM-89S	
1	Miscellaneous Hardware	MISC WIRING / RISER DIAGRAM	

THIS HARDWARE SUPPLIER SECTION 08710 TO SUPPLY AND INSTALL AUTO OPERATOR.

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Heading #3 (Group: EXTERIOR PR HM)

Item #3 1 Pair of doors D02A, EXTERIOR FROM VEST 100° LHRA/RHRA

967, 967 x 2070 x 45 - HM DR x HM FR

6	Standard Hinge	Ives 5BB1HW 5 X 4.5 NRP	630
2	Exit Device	Von Duprin CD-98EO-626- x	626
2	Cylinder	Schlage 20-001 114 XQ11-949 36-083	626
1	Electric Strike	Von Duprin 6300- CON 24VAC -630	630
2	Door Pull	Gallery GSH 1180-2 C32D 45	US32D
2	Surface Closer	LCN 4040XP EDA 689	689
2	Mounting Bracket	LCN 4040XP-18PA 689	689
2	Kick Plate	CBH CBH 903 200 X 40MM LDW C32D	US32D
2	Overhead Door Stop	Glynn-Johnson 104S US32D	US32D
2	Threshold	Zero 625A 48"	A
4	Weatherstripping	K.N. Crowder W-13-CA X OPENING HEIGHT	CA
2	Weatherstripping	K.N. Crowder W-20S-CA X OPENING WIDTH	CA
2	Gasketing	Zero SWEEP 8192AA 48	AA
2	Miscellaneous Item	Schlage E.S. 679-05HM BY SECURITY CONTRACTOR	BLK
1	Miscellaneous Hardware	UNK CARD READER BY SECURITY CONTRACTOR	

Heading #4 (Group: VEST PR)

Item #4 1 Pair of doors D02B, VEST FROM CORR 100° LHRA/RHRA

967, 967 x 2070 x 45 - HM DR x HM FR

6	Standard Hinge	Ives 5BB1HW 5 X 4.5 NRP	652
2	Door Pull	Gallery GSH 4012-2 C32D 45	US32D
2	Push Bar	Von Duprin 350-626--	626
2	Surface Closer	LCN 4040XP EDA ST-3068	689
2	Mounting Bracket	LCN 4040XP-18PA 689	689
2	Kick Plate	CBH CBH 903 200 X 40MM LDW C32D	US32D
2	Overhead Door Stop	Glynn-Johnson 104S US32D	US32D



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Heading #5 (Group: EXT PR HM RM ADO)

Item #5

1 Pair of doors D03A, EXTERIOR FROM VEST

90° LHRA/RHRA

965, 965 x 2180 x 45 - HM DR x HM FR

REM HARDWARE MULLION WITH QUICK ELECTRICAL DISCONNECT.

6	Standard Hinge	Ives 5BB1HW 5 X 4.5 NRP	630
1	Removable Mullion	Von Duprin KR4854-BLANK -96 --689- 154	689
1	Exit Device	Von Duprin CD-98-NL-OP -4' 626	626
1	Exit Device	Von Duprin CD-98EO-626- x	626
2	Cylinder	Schlage 20-001 114 XQ11-949 36-083	626
1	Cylinder	Schlage 20-021 GMK	626
1	Electric Strike	Von Duprin 6300- CON 24VAC -630	630
2	Door Pull	Gallery GSH 1180-2 C32D 45	US32D
1	Surface Closer	LCN 4021 REGARM 689 45	689
1	Mounting Bracket	LCN 4020-18G	689
1	Electronic Closer	GYRO-TECH OPERATOR 8710 X HEADER (NO ALTERNATE)	628
2	Kick Plate	CBH CBH 903 200 X 40MM LDW C32D	US32D
2	Overhead Door Stop	Glynn-Johnson 104S US32D	US32D
1	Accessory	Camden CM-160/22 INSTALL ADO HEADER	
2	Accessory	Camden CM-60/4	
2	Accessory	Camden CM-89S	
1	Accessory	Camden CX-33	
1	Threshold	Zero 625A 96	A
2	Weatherstripping	K.N. Crowder W-13-CA X OPENING HEIGHT	CA
1	Weatherstripping	K.N. Crowder W-20S-CA X OPENING WIDTH	CA
1	Weatherstripping	K.N. Crowder W-25-CA X DOOR HEIGHT	CA
2	Gasketing	Zero SWEEP 8192AA 48	AA
2	Miscellaneous Item	Schlage E.S. 679-05HM BY SECURITY CONTRACTOR	BLK
1	Miscellaneous Hardware	UNK CARD READER BY SECURITY CONTRACTOR	
1	Miscellaneous Hardware	LCN WEATHER RING8310-802	PLA

THIS HARDWARE SUPPLIER SECTION 08710 TO SUPPLY AND INSTALL AUTO OPERATOR.

DIV 16 ELECTRICAL CONTRACTOR TO PROVIDE 120VAC TO FRAME HEADER AND SUPPLY & INSTALL ALL LVW IN CONDUIT TO ALL ACTUATORS AND ELECTRICAL COMPONENTS LISTED IN THE HARDWARE SCHEDULE.

INTEGRATION OF SECURITY INTERCOM WITH ADO BY DIV 26



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Heading #6 (Group: 41 ADO)

Item #6 1 Pair of doors D03B, VEST FROM CORR 90° LHRA/RHRA

965, 965 x 2180 x 45 - HM DR x HM FR

6	Standard Hinge	Ives 5BB1HW 5 X 4.5 NRP 652	652
2	Door Pull	Gallery GSH 4012-2 C32D 45	US32D
2	Push Bar	Von Duprin 350-626--	626
1	Surface Closer	LCN 4040XP EDA ST-3068	689
1	Mounting Bracket	LCN 4040XP-18PA 689	689
1	Electronic Closer	GYRO-TECH OPERATOR 8710 X HEADER (NO ALTERNATE)	628
2	Kick Plate	CBH CBH 903 200 X 40MM LDW C32D	US32D
2	Overhead Door Stop	Glynn-Johnson 104S US32D	US32D
1	Accessory	Camden CM-160/22 INSTALL ADO HEADER	
2	Accessory	Camden CM-60/4	
2	Accessory	Camden CM-89S	
1	Miscellaneous Hardware	MISC WIRING / RISER DIAGRAM	

THIS HARDWARE SUPPLIER SECTION 08710 TO SUPPLY AND INSTALL AUTO OPERATOR.

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Heading #7 (Group: EXTERIOR SGL EO)

Item #7 1 Single door D04, EXTERIOR FROM CLASS RM 110° LHR

920 x 2190 x 45 - HM DR x HM FR

3	Standard Hinge	Ives 5BB1HW 4.5 X 4.5 NRP 630	630
1	Exit Device	Von Duprin CD-98EO-626-920 x LHR	626
1	Cylinder	Schlage 20-001 114 XQ11-949 36-083	626
1	Door Pull	CBH CBH 353	US32D
1	Surface Closer	LCN 4040XP SCUSH 689 45	689
1	Mounting Bracket	LCN 4040XP-18PA 689	689
1	Kick Plate	CBH CBH 903 200 X 40MM LDW C32D	US32D
2	Weatherstripping	K.N. Crowder W-13-CA X OPENING HEIGHT	CA
1	Weatherstripping	K.N. Crowder W-20S-CA X OPENING WIDTH	CA
1	Weatherstripping	K.N. Crowder W-25-CA X DOOR HEIGHT	CA
1	Gasketing	Zero SWEEP 8192AA 48	AA
1	Miscellaneous Item	Schlage E.S. 679-05HM BY SECURITY CONTRACTOR	BLK



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Heading #8 (Group: EXTERIOR SGL EO)

Item #8 1 Single door D05, EXTERIOR FROM CLASS RM 90° RHR

910 x 2083 x 45 - HM DR x HM FR

3	Standard Hinge	Ives 5BB1HW 4.5 X 4.5 NRP 630	630
1	Exit Device	Von Duprin CD-98EO-626-910 x RHR	626
1	Cylinder	Schlage 20-001 114 XQ11-949 36-083	626
1	Door Pull	CBH CBH 353	US32D
1	Surface Closer	LCN 4040XP SCUSH 689 45	689
1	Mounting Bracket	LCN 4040XP-18PA 689	689
1	Kick Plate	CBH CBH 903 200 X 40MM LDW C32D	US32D
2	Weatherstripping	K.N. Crowder W-13-CA X OPENING HEIGHT	CA
1	Weatherstripping	K.N. Crowder W-20S-CA X OPENING WIDTH	CA
1	Weatherstripping	K.N. Crowder W-25-CA X DOOR HEIGHT	CA
1	Gasketing	Zero SWEEP 8192AA 48	AA
1	Miscellaneous Item	Schlage E.S. 679-05HM BY SECURITY CONTRACTOR	BLK

Heading #9 (Group: EXTERIOR SGL EO)

Item #9 1 Single door D08, EXTERIOR FROM GYM 110° LHR

Item #10 1 Single door D09, EXTERIOR FROM GYM 110° RHR

920 x 2130 x 45 - HM DR x HM FR

6	Standard Hinge	Ives 5BB1HW 4.5 X 4.5 NRP 630	630
1	Exit Device	Von Duprin CD-98EO-626-920 x LHR	626
1	Exit Device	Von Duprin CD-98EO-626-920 x RHR	626
2	Cylinder	Schlage 20-001 114 XQ11-949 36-083	626
2	Door Pull	CBH CBH 353	US32D
2	Surface Closer	LCN 4040XP SCUSH 689 45	689
2	Mounting Bracket	LCN 4040XP-18PA 689	689
2	Kick Plate	CBH CBH 903 200 X 40MM LDW C32D	US32D
4	Weatherstripping	K.N. Crowder W-13-CA X OPENING HEIGHT	CA
2	Weatherstripping	K.N. Crowder W-20S-CA X OPENING WIDTH	CA
2	Weatherstripping	K.N. Crowder W-25-CA X DOOR HEIGHT	CA
2	Gasketing	Zero SWEEP 8192AA 48	AA
2	Miscellaneous Item	Schlage E.S. 679-05HM BY SECURITY CONTRACTOR	BLK



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Heading #10 (Group: EXTERIOR SGL NL)

Item #11 1 Single door D10, EXTERIOR FROM STORAGE 110° RHR

920 x 2130 x 45 - HM DR x HM FR

3	Standard Hinge	Ives 5BB1HW 4.5 X 4.5 NRP	630
1	Exit Device	Von Duprin CD-98-NL-OP -4'	626
1	Cylinder	Schlage 20-001 114 XQ11-949 36-083	626
1	Cylinder	Schlage 20-021 GMK	626
1	Door Pull	CBH CBH 353	US32D
1	Surface Closer	LCN 4040XP SCUSH 689 45	689
1	Mounting Bracket	LCN 4040XP-18PA	689
1	Kick Plate	CBH CBH 903 200 X 40MM LDW C32D	US32D
2	Weatherstripping	K.N. Crowder W-13-CA X OPENING HEIGHT	CA
1	Weatherstripping	K.N. Crowder W-20S-CA X OPENING WIDTH	CA
1	Weatherstripping	K.N. Crowder W-25-CA X DOOR HEIGHT	CA
1	Gasketing	Zero SWEEP 8192AA 48	AA
1	Miscellaneous Item	Schlage E.S. 679-05HM BY SECURITY CONTRACTOR	BLK



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Heading #11 (Group: EXT PR ALUM RM ADO)

Item #12

1 Pair of doors D11A, EXTERIOR FROM VEST

100° LHRA/RHRA

965, 965 x 2170 x 45 - AL DR x AL FR

REM HARDWARE MULLION WITH QUICK ELECTRICAL DISCONNECT.

1		UNK WEATHER STRIPPING BY DOOR AND FRAME SUPPLIER	
6	Standard Hinge	Ives 5BB1HW 5 X 4.5 NRP	630
1	Removable Mullion	Von Duprin KR4854-BLANK -96 --689- 154	689
1	Exit Device	Von Duprin CD-33A-EO-4' -626- 45-- INS-2	626
1	Exit Device	Von Duprin CD-33A-NL-OP-4' -626- 45--388/626- INS-2	626/626
2	Cylinder	Schlage 20-001 114 XQ11-949 36-083	626
1	Cylinder	Schlage 20-021 GMK	626
1	Electric Strike	Von Duprin 6300- CON 24VAC -630	630
2	Door Pull	Gallery GSH 1180-2 C32D 45	US32D
1	Surface Closer	LCN 4021 REGARM 689 45	689
1	Mounting Bracket	LCN 4020-18G	689
1	Electronic Closer	GYRO-TECH OPERATOR 8710 X HEADER (NO ALTERNATE)	628
2	Kick Plate	CBH CBH 903 200 X 40MM LDW C32D	US32D
2	Overhead Door Stop	Glynn-Johnson 104S US32D	US32D
1	Accessory	Camden CM-160/22 INSTALL ADO HEADER	
2	Accessory	Camden CM-60/4	
2	Accessory	Camden CM-89S	
1	Accessory	Camden CX-33	
1	Threshold	Zero 625A 96	A
1	Weatherstripping	K.N. Crowder W-25-CA X DOOR HEIGHT	CA
2	Gasketing	Zero SWEEP 8192AA 48	AA
2	Miscellaneous Item	Schlage E.S. 679-05HM BY SECURITY CONTRACTOR	BLK
1	Miscellaneous Hardware	UNK CARD READER BY SECURITY CONTRACTOR	
1	Miscellaneous Hardware	LCN WEATHER RING8310-802	PLA

THIS HARDWARE SUPPLIER SECTION 08710 TO SUPPLY AND INSTALL AUTO OPERATOR.

DIV 16 ELECTRICAL CONTRACTOR TO PROVIDE 120VAC TO FRAME HEADER AND SUPPLY & INSTALL ALL LVW IN CONDUIT TO ALL ACTUATORS AND ELECTRICAL COMPONENTS LISTED IN THE HARDWARE SCHEDULE.

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Heading #12 (Group: 41 ADO)

Item #13 1 Pair of doors D11B, VEST FROM CORR 100° LHRA/RHRA
965, 965 x 2170 x 45 - AL DR x AL FR

6	Standard Hinge	Ives 5BB1HW 5 X 4.5 NRP 652	652
2	Door Pull	Gallery GSH 4012-2 C32D 45	US32D
2	Push Bar	Von Duprin 350-626--	626
1	Surface Closer	LCN 4040XP EDA ST-3068	689
1	Mounting Bracket	LCN 4040XP-18PA 689	689
1	Electronic Closer	GYRO-TECH OPERATOR 8710 X HEADER (NO ALTERNATE)	628
2	Kick Plate	CBH CBH 903 200 X 40MM LDW C32D	US32D
2	Overhead Door Stop	Glynn-Johnson 104S US32D	US32D
1	Accessory	Camden CM-160/22 INSTALL ADO HEADER	
2	Accessory	Camden CM-60/4	
2	Accessory	Camden CM-89S	
1	Miscellaneous Hardware	MISC WIRING / RISER DIAGRAM	

THIS HARDWARE SUPPLIER SECTION 08710 TO SUPPLY AND INSTALL AUTO OPERATOR.

DIV 16 ELECTRICAL CONTRACTOR TO PROVIDE 120VAC TO FRAME HEADER AND SUPPLY & INSTALL ALL LVW IN CONDUIT TO ALL ACTUATORS AND ELECTRICAL COMPONENTS LISTED IN THE HARDWARE SCHEDULE.

Heading #13 (Group: EXTERIOR SGL EO)

Item #14 1 Single door D12, EXTERIOR FROM LIBRARY 110° LHR
1110 x 2158 x 45 - HM DR x HM FR

3	Standard Hinge	Ives 5BB1HW 4.5 X 4.5 NRP 630	630
1	Exit Device	Von Duprin CD-98EO-626-1110 x LHR	626
1	Cylinder	Schlage 20-001 114 XQ11-949 36-083	626
1	Door Pull	CBH CBH 353	US32D
1	Surface Closer	LCN 4040XP SCUSH 689 45	689
1	Mounting Bracket	LCN 4040XP-18PA 689	689
1	Kick Plate	CBH CBH 903 200 X 40MM LDW C32D	US32D
2	Weatherstripping	K.N. Crowder W-13-CA X OPENING HEIGHT	CA
1	Weatherstripping	K.N. Crowder W-20S-CA X OPENING WIDTH	CA
1	Weatherstripping	K.N. Crowder W-25-CA X DOOR HEIGHT	CA
1	Gasketing	Zero SWEEP 8192AA 48	AA
1	Miscellaneous Item	Schlage E.S. 679-05HM BY SECURITY CONTRACTOR	BLK



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Heading #14 (Group: WR ADO)

Item #15 1 Single door D17, CORR TO UNIV WR 90° LH

965 x 2100 x 45 - HM DR x HM FR

INSTALL WR SET UP AS FAIL SAFE .

3	Standard Hinge	Ives 5BB1HW 5 X 4.5 NRP	630
1	Lockset	Schlage ND80P6D RHO 626 MK	626
1	Electric Strike	Von Duprin 6211- FS Shim 24VDC-630	630
1	Electronic Closer	GYRO-TECH OPERATOR 8710 PULL SIDE X HEADER(NO	628
2	Kick Plate	CBH CBH 903 400 X 40MM LDW C32D	US32D
		MTD BOTH SIDES	
1	Wall Door Stop	Ives WS401/402CVX	626
1	Accessory	Camden CM-160/22 INSTALL ADO HEADER	
1	Accessory	Camden CX-WC13AXSM-PS	
1	Accessory	Camden EMERG WR KIT CX-WEC10K2	
1	Miscellaneous Hardware	Schlage CON-6W	
1	Miscellaneous Hardware	MISC WIRING / RISER DIAGRAM	

THIS HARDWARE SUPPLIER SECTION 08710 TO SUPPLY AND INSTALL AUTO OPERATOR.

DIV 16 ELECTRICAL CONTRACTOR TO PROVIDE 120VAC TO FRAME HEADER AND SUPPLY & INSTALL ALL LVW IN CONDUIT TO ALL ACTUATORS AND ELECTRICAL COMPONENTS LISTED IN THE HARDWARE SCHEDULE. REFER TO WIRING / RISER DIAGRAM SUPPLIED BY HARDWARE SUPPLIER.



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KILBRIDE P.S. Reno 2025 HDSB
6611 PANTON ST KILBRIDE , ON.

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