



**Waterloo Region
District School Board**

REQUEST FOR TENDER

Hespeler Public School Office Renovation

Tender #7201-RW-22

ISSUE DATE: Wednesday, March 16, 2022

ELECTRONIC SUBMISSIONS will be received by the Bidding System, no later than 2:00 p.m. local time, on Wednesday, April 6, 2022

<u>SECTION NUMBER</u>	<u>TITLE</u>	<u>NO. OF PAGES</u>
---------------------------	--------------	-------------------------

DIVISION 00 – BIDDING AND CONTRACT DOCUMENTS

00 00 14	List of Consultants	1
00 01 00	Consultant/Professional Seals NOT APPLICABLE	2
00 01 10	Table of Contents	4
00 21 13	Instructions to Bidders	18
00 21 14	Vendors of Record	XX
00 21 15	Scope of Work	2
00 41 13	Bid Form Sample	2
00 41 13A	Asset and Warranty Card	2
00 41 13B	Vendor Performance Evaluation Form	4
00 41 73	Supplementary Bid Information	4
00 56 13	Definitions Stipulated Price	2
00 72 13	Terms and Conditions	12
00 73 03	Supplementary Conditions	72

DIVISION 01 - GENERAL REQUIREMENTS

01 14 00	Work Restrictions	2
01 19 00	Specifications and Documents	2
01 21 00	Allowances	4
01 31 00	Project Management and Coordination	6
01 32 00	Construction Progress Documents	4
01 33 00	Submittal Procedures	6
01 35 17	Fire Safety Requirements	8
01 35 17A	Appendix 013517A – Hot Work Permit	2
01 35 23	Health and Safety	6
01 35 43	Hazardous Materials	4
01 35 43A	Appendix 013543A – Asbestos Audit	2
01 42 00	References	6
01 45 00	Quality Control	8
01 51 00	Temporary Utilities	6
01 53 00	Temporary Construction Facilities	6
01 61 00	Product Requirements	6
01 70 00	Examination and Preparation	4
01 73 30	Execution and Cutting and Patching	4
01 74 00	Cleaning and Waste Processing	4
01 78 10	Closeout Submittals and Requirements	6
01 78 40	Maintenance Requirements	4
01 79 00	Demonstration and Training	4
01 80 10	Site Safety Protocols for Occupied Buildings	8

<u>SECTION NUMBER</u>	<u>TITLE</u>	<u>NO. OF PAGES</u>
<u>DIVISION 02 – EXISTING CONDITIONS</u>		
02 10 00	Existing Site Photos	5
02 41 15	Selective Demolition and Removals	5
02 81 00	Asbestos Abatement General	1
02 82 00	Designated Substance Report	1
<u>DIVISION 03 – CONCRETE</u>		
No items		
<u>DIVISION 04 – MASONRY</u>		
04 05 00	Mortar and Grout	3
04 22 00	Concrete Unit Masonry	11
<u>DIVISION 05 – METALS</u>		
05 50 00	Metal Fabrications	4
<u>DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES</u>		
06 10 11	Rough Carpentry	6
06 40 00	Architectural Woodwork	9
<u>DIVISION 07 – THERMAL AND MOISTURE PROTECTION</u>		
07 26 00	Self-Adhered Membrane Air and Vapour Retarders	4
07 62 00	Sheet Metal Flashing and Trim	4
07 92 00	Joint Sealers	7
<u>DIVISION 08 – DOORS AND OPENINGS</u>		
08 11 14	Steel Doors and Frames	15
08 11 15	Door Schedule	1+2
08 13 16	Aluminum Doors	2
08 14 10	Wood Doors	4
08 44 13	Glazed Aluminum Wall Systems	8
08 50 50	Windows	8
08 71 00	Finishing Hardware	6
08 80 50	Glazing	7

<u>SECTION NUMBER</u>	<u>TITLE</u>	<u>NO. OF PAGES</u>
<u>DIVISION 09 – FINISHES</u>		
09 21 16	Gypsum Board Assemblies	8
09 22 16	Non-Structural Metal Framing	3
09 30 13	Ceramic Tiling	10
09 51 13	Acoustical Panel Ceilings	4
09 65 16	Resilient Sheet Flooring	4
09 65 19	Resilient Tile Flooring	5
09 68 00	Carpeting	11
09 91 22	Painting	8
09 91 27	Finishes and Colour Notes	4
09 91 30	Room Finish Schedule	3
<u>DIVISION 10 & 11 - Specialties & Equipment</u>		
10 11 25	Manufactured Specialties	3
10 28 10	Washroom Accessories	7
<u>DIVISION 12 – FURNISHINGS</u>		
12 21 16	Window Coverings	4
<u>DIVISION 13 & 14- Conveying Systems</u>		
No items		
<u>DIVISION 20-25 – MECHANICAL</u>		
<u>Division 20 Common Requirements for Mechanical</u>		
20 00 01	Mechanical Specification Index	
Common Contract Requirements for Mechanical		
20 02 51	Mechanical Contract Requirements	
Common Work Results for Mechanical		
20 05 11	Mechanical Work Requirements	
20 05 21	Demolition and Renovation	
20 05 34	Bases, Hangers and Supports	
20 05 53	Identification of Mechanical Services	
Testing, Adjusting, and Balancing		
20 06 11	Testing, Adjusting, and Balancing (TAB) of Mechanical Systems	

<u>SECTION NUMBER</u>	<u>TITLE</u>	<u>NO. OF PAGES</u>
<u>Division 21 Fire Suppression</u>		
Fire-Suppression Sprinkler Systems		
21 13 13	Wet Pipe Fire Suppression	
<u>Division 22 Plumbing</u>		
Plumbing Insulation		
22 07 19	Plumbing Piping Insulation	
Facility Water Distribution		
22 11 16	Domestic Water Piping - Copper	
22 11 31	Potable Water Auxiliary Equipment	
Facility Sanitary Sewerage		
22 13 13	Sanitary Drains	
22 13 16	Sanitary Waste and Vent Piping – Cast Iron and Copper	
22 13 17	Sanitary Waste and Vent Piping – Plastic	
Plumbing Auxiliary Equipment		
22 36 13	Plumbing Auxiliary Equipment	
Fire Extinguishers		
22 37 13	Portable Fire Extinguishers	
Plumbing Fixtures Combined With Drawing Schedule		
22 44 13	Plumbing Fixtures Combined With Drawing Schedule	
<u>Division 23 Heating, Ventilating, and Air Conditioning (HVAC)</u>		
Operation and Maintenance of HVAC Systems		
23 01 31	HVAC System Cleaning	
HVAC Insulation		
23 07 13	Duct Insulation	
HVAC Ducts and Casings		
23 31 13	Metal Ducts	
Air Duct Accessories		
23 33 13	Duct Accessories	

<u>SECTION NUMBER</u>	<u>TITLE</u>	<u>NO. OF PAGES</u>
-----------------------	--------------	---------------------

23 33 13.13	Volume-Control Dampers	
23 33 46	Flexible Ducts	
23 33 53	Duct Liners	

HVAC Fans

23 34 23	Packaged Exhausters	
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Air Outlets and Inlets

23 37 13	Diffusers, Registers, and Grilles	
23 37 23	Louvres and Vents for Intake and Exhaust	

Division 25 Integrated Automation

Control Systems

25 40 11	Building Control System	
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DIVISION 26 – ELECTRICAL

Refer to Electrical Drawings

ARCHITECTURAL DETAILS (8.5" x 11" letter sized drawings)

AD 501	Porcelain Tile Base	
AD 601	Cabinet Type B1	
AD 602	Cabinet Type B2	
AD 603	Cabinet Type B3 – Dish Washer Lower Millwork	
AD 604	Cabinet Type B4 – Under Counter Fridge	
AD 607	Cabinet Type B7	
AD 608	Cabinet Type B8 – Lower cabinet	
AD 610	Cabinet Type B25 – Wall Oven Millwork	
AD 621	Cabinet Type U1	
AD 622	Cabinet Type U3	
AD 623	Cabinet Type U4	
AD 624	Cabinet Type U6	
AD 638	Cabinet Type C8	
AD 652	Cabinet Type C2	
AD 653	Cabinet Type C3	
AD 655	Staff Room Island – B29	
AD 656	Reception Desk – B30	
AD 657	Staff Workroom – B31	

<u>SECTION NUMBER</u>	<u>TITLE</u>	<u>NO. OF PAGES</u>
AD 800	Door Elevations	
AD 801	Hollow Metal Frames	
AD 1000	Washroom Fixture Mounting Heights	

FULL SIZE DRAWINGS

ARCHITECTURAL

A01	KEY PLANS & OBC MATRIX	
A02	DEMOLITION FLOOR PLAN, REFLECTED CEILING PLAN & ELEVATIONS	
A03	PROPOSED FLOOR PLAN, REFLECTED CEILING PLAN & ELEVATIONS	
A04	INTERIOR ELEVATIONS, WINDOWS SCHEDULE, FLOOR PATTERN PLAN & DETAILS	

STRUCTURAL

S101	SCHEDULES, NOTES AND TYPICAL DETAILS	
S201	PART FOUNDATION PLAN & DEMOLITION PLAN, PART ROOF FRAMING PLAN AND DEMOLITION PLAN	
S301	SECTIONS	

MECHANICAL

M1.1	KEY PLAN AND SCHEDULES	
M1.2	SCHEDULES	
M2.1	FIRST FLOOR PART PLAN A - DEMOLITION	
M2.2	FIRST FLOOR PART. PLAN B - DEMOLITION	
M3.1	FIRST FLOOR PART PLAN A - RENOVATION	
M3.2	FIRST FLOOR PART. PLAN B - RENOVATION	
M4.1	GROUND FLOOR PART PLAN - FIRE PROTECTION	

ELECTRICAL

E1.1	LEGEND AND OVERALL KEY PLAN	
E1.2	SCHEDULES AND DETAILS	
E2.1	PARTIAL GROUND FLOOR DEMOLITION AND RENOVATION PLANS	
E3.1	PANEL SCHEDULES AND FIRE ALARM	
E4.1	ELECTRICAL SPECIFICATIONS	
E4.2	ELECTRICAL SPECIFICATIONS	

SECTION 00 01 00 – CONSULTANT/PROFESSIONAL SEALS

- 1.1 The following professional seals and signatures are provided as required by Paragraph 1.21.1 (4) Division C of the Ontario Building Code and apply to the areas of expertise for which each consultant was commissioned.
 - 1.1.1 Architect – REFER TO DRAWINGS
 - 1.1.2 Structural – REFER TO DRAWINGS
 - 1.1.3 Mechanical – REFER TO DRAWINGS
 - 1.1.4 Electrical – REFER TO DRAWINGS

SECTION 00 21 13 – INSTRUCTIONS TO BIDDERS

1.0 INTRODUCTION

1.1. Single Point of Contact

In relation to this procurement process, all communication shall be directed to:

Rebecca Witteman
Senior Procurement Specialist
Waterloo Region District School Board

All request for information, instructions or clarifications shall be directed to the Single Point of Contact only. Requests should be made through the Bidding System by clicking on the “Submit a Question” button found within the bid detail of the specified Tender.

Vendors shall not communicate with other Waterloo Region District School Board (“Board”) employees or agents regarding this tender prior to award. Any attempt by a Vendor to bypass or influence the procurement process may result in disqualification of their Submission.

The Board will not be responsible for any verbal statement, instruction, or representations. In case of difference between any verbal information and written document, the written document shall govern. Information obtained from any source, other than the Single Point of Contact in writing, shall not be relied upon.

1.2. Consultant

The Board has hired the following consultant to assist in the preparation of this Tender: Hossack & Associates Architect Inc

Addenda will be the Board’s only form of communication. The Board will assemble addenda as required.

The consultant and any sub consultants are not to be contacted by any interested parties from the Tender issue date to the bid award notification. The consultant or any sub consultants will not respond to any direct communication.

The Board will be responsible for the contract administration of the project after the purchase order has been issued or the contract has been signed by the Board

1.3. About the Waterloo Region District School Board

The Waterloo Region District School Board is a provincially funded institution reporting to the Ministry of Education of Ontario and is one of the larger school boards in Ontario, operating 121 school locations and serving approximately 64,000 students in the Region of Waterloo.

1.4. Electronic Bid Submission and Bid Results

All Bids shall be submitted through the Bidding System only. Bidders must have a Bidding System Vendor Account and shall ensure the account is created with the Bidders full legal company name.

Hard copy Bid Submission will not be accepted by the Board.

Bids will not be accepted after the Closing Date and Time.

There will be no public opening for this Tender.

Once an award is made, the successful Bidder will be named on the Bidding System, and an award notification will be sent.

1.5. Bid Submission

- .1 Bidders must include the appropriate submission requirements and mandatory forms specified in this section.
- .2 Bidders shall have a "Vendor Account" in the Bidding System and be registered as a "plan taker" for this Bid Solicitation Document. Only the plan takers will have access to download this Bid Solicitation Document, receive addenda email notifications, download addenda and to submit their Bid electronically through the Bidding System.
- .3 The onus is on the Bidder to ensure that the Bid is received and acknowledged in the Bidding System on or before the Closing Time. The Closing Time shall be determined by the Bidding System's web clock. The timing of the Bid submission shall be based on when the Bid is RECEIVED by the Bidding System, not when a Bid is submitted by a Bidder.
- .4 Bidders shall allow sufficient time to upload their Bid submission and attachment(s) (if applicable) and to resolve any issues that may arise as Bid transmission can be delayed in an "internet traffic jam" due to file transfer size, transmission speed, and other electronic considerations.
- .5 Upon receiving a Bid, the Bidding System will send a confirmation email to the Bidder advising that the Bid was submitted successfully. If a Bidder does not receive a confirmation email despite submitting a Bid, the Bidder should contact technical support of the service provider hosting the Bidding System via email: support@bidsandtenders.ca
- .6 The Bidding System will not accept Bids after the Closing Time as determined by the Bidding System's web clock. Bids submitted by fax or paper copy or any other format will not be accepted.

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

1.6. Withdrawal of Bid Submission / Irrevocable Period

Bidders may withdraw or edit and resubmit a Bid in the Bidding System at any time prior to the Closing Date and Time. The most recent submission or withdrawal received in the Bidding System on or before the Closing Time shall prevail and shall overwrite all previous submission(s) and withdrawal(s). The Closing Time shall be determined by the web clock within the Bidding System. After such time, requests to withdraw Bid Submissions will not be considered.

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

1.7. Bid Review

- .1 All Bids received on or before the Closing Time will be reviewed for compliance based on this Bid Solicitation Document. Non-compliant Bids may be rejected. Bids not meeting any of the mandatory requirements included in this Bid Solicitation Document may be disqualified. Bidders may be contacted to clarify its submissions.
- .2 It is the Bidder's responsibility to satisfy the Board that the Bidder can comply with the requirements contained within this Bid Solicitation Document and that the Bidder possesses the necessary inventory, equipment, facilities, resources and staff to perform the Work specified in this Bid Solicitation Document. Bidders may be required to submit evidence of above in a form acceptable to the Board. Substitution of materials, equipment, or methods different from that outlined in the terms of reference will not be accepted unless provided for within this Bid Solicitation Document or with the written approval from the Board.
- .3 The Board also reserve the right to examine Bidder's facilities, equipment and visit the sub-contractors or sub-consultants proposed or Bidder's existing and past clients. The award decision may be revised based on the above.
- .4 The Board will not be responsible for travel costs (including, but not limited to, time and mileage) if travel is required. No additional charges will be accepted by the Board for any cost incurred by the Bidder or any other party in participating in the Bid evaluations.

- .5 The Board may, in their sole discretion, check references, conduct credit checks, review the litigation history and history of professional liability or other insurance claims, and obtain any other type of information that might aid the Board in its selection. The Board reserve the right to consider all or any information received from all available sources, whether internally or externally obtained. The Board may disqualify any Bid from further consideration based on results of reference or credit checks or review of litigation or claim history. The foregoing may include the Board's own experiences with the respective Bidder(s) or any of the subcontractors and sub-consultants proposed in its Bid.

1.8. Tie Bids

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

1.9. Award Recommendation

- .1 Subject to the reserved rights of the Board and availability of funds, the lowest compliant Bid will be recommended for award.
- .2 The documents listed below will be incorporated as deemed necessary by the Board, into the Contract with the Successful Bidder. If there is a discrepancy between the wording of one document and the wording of any other document that appears on the list, the wording of the document that first appears on the list shall take precedence:
- .3 Board approved change orders or Contract or Agreement amendment.
- .4 Purchase Order, Contract or Agreement executed with the Bidder including exhibits.
- .5 Bid Solicitation Document issued by the Board, including addenda, if applicable.
- .6 Bid submitted by the Bidder.
- .7 There shall be no obligation on the Board as a result of seeking Bids or conducting the procurement process and the Board reserve the right to cancel the Bid Solicitation, issue a revised request, or to pursue any other course of action which would aid in meeting their needs.

1.10. Documents Required for Award

Within ten (10) working days of receiving a request from the Board, the Bidder (the "Recommended Bidder") shall provide the following:

- .1 Insurance certificate with coverage specified in the Bid Solicitation Document.
- .2 WSIB clearance certificate valid on date of award or an exemption letter (if applicable and requested).
- .3 Contract security, if applicable as specified in the Bid Solicitation Document.
- .4 An executed Board issued Form of Agreement, duly signed by the authorized signatory.
- .5 Any other submittal specified in the Bid Solicitation Document as a requirement of award.

In addition to all of the Board' other remedies, if a Recommended Bidder fails to execute the Form of Agreement or satisfy any other applicable conditions within ten (10) days of notice of selection, the Board may, in their sole and absolute discretion and without incurring any liability, rescind the selection of that Bidder.

1.11. Confirmation to Proceed

No work shall commence until each of the Board's Procurement Services has issued a purchase order, contract, or letter of intent to the Successful Bidder. Goods/Service or Work, as described shall not commence until all the required documents have been submitted to Procurement Services and the Form of Agreement executed by the Successful Bidder and the Board. For payment purposes, a Purchase Order shall be generated and issued to the Successful Bidder. The Purchase Order number must appear on all invoices in order to ensure prompt payment.

1.12. Site Visit

Due to Covid-19, Proponents are to supply and wear medical grade masks and eye protection. Due to the nature of this Tender, a NON mandatory site visit has been deemed necessary. Failure to attend and register at the time and location(s) specified would NOT result in disqualification. Representatives for the Proponents are requested to sign in at the NON-mandatory site meet. The Board at its sole discretion may schedule additional non-mandatory site visits. Proponents are to reference 1.8 Timetable for site meet date and time.

The site visit will take place at: Hespeler Public School, 300 Winston Blvd, Cambridge
The site meet is NON-mandatory for Contractors
Proponents are to meet at the Main Office.

The size of the groups at the site meet(s) will be limited as per current Public Health Recommendations.

1.13. Supplemental Site Visits

Due to Covid-19, Proponents are to supply and wear medical grade masks and eye protection.

Supplemental site visits will be permitted for interested Proponents and subcontractors to gain access to the site in order to better prepare their bid submission and are not to be held prior to the mandatory or non-mandatory site visit.

When a supplemental site visit is required, the Proponent or subcontractors may only visit the school after 3:30 P.M., during a scheduled school day. The Proponent or subcontractors shall immediately report to the Main Office, sign in as per the school protocol and ask for the head custodian. The head custodian's role is to ensure that the Proponent or subcontractors are guided to the area of interest regarding this Tender document and to provide access where required.

Proponents or sub-trades may not direct any questions related to this Tender to the head custodian or any other Board staff present. Proponents asking the head custodian or Board staff questions related to the scope or Tender in general will be disqualified.

1.14. Communication

For the purpose of this Tender, the only contact for all Bidders, subcontractors if any, and any third-party suppliers of goods or services for all queries, questions and notifications, from the Tender issue date to the bid award notification date is to be directed to the submit a question feature in this bidding system:

1.15. From Issue Date to Deadline for Questions/Queries

Questions must be received by the Board's Single Point of Contact no later than the deadline for questions noted in the Anticipated Project Schedule.

If a Bidder finds any discrepancies, ambiguities or omissions within the Request for Tender (RFT) documents, or requires any clarifications regarding the RFT documents, questions and clarifications must be sent to the Board's Single Point of Contact through the Bidding System by clicking on the "Submit a Question" button found within the bid details page of that opportunity. Bidders are strongly

encouraged to ask clear and concise question(s) citing the relevant section of the Bid Solicitation Document.

The Board has endeavoured to provide complete, correct information and estimates to enable Bidders to properly assess and determine the scope and complexity of the Work prior to submitting a Bid. Bidders are solely responsible for determining if they require additional information or if anything appears incorrect or incomplete. The onus is on the Bidder to contact the Board's Single Point of Contact prior to the Deadline for Questions indicated in this document, if they have any questions or queries whatsoever or find omissions from or discrepancies in this Bid Solicitation document, unnecessary restrictions in the terms of reference, or should they be in doubt as to the meaning of any part of this document. Written answers or clarifications to issues of substance will be shared with all Bidders in the form of an Addendum.

1.16. After the release of the Bid Results Notification / Debriefing Requests

In accordance with the Broader Public Sector Procurement Directive, unsuccessful Bidders are entitled to a debriefing in order to receive feedback with respect to their Bid submission. In order to obtain a debriefing, Bidders shall contact the Board's Single Point of Contact listed in this Bid Solicitation Document in writing with their request within sixty (60) days of the award notification.

1.17. Consequences of not following the Proponent Contact Protocol

Communication initiated by the Proponent, subcontractors, or third-party suppliers of goods or services during the blackout period, to the Board or consultant may be grounds for disqualification from the Tender.

Communication by Proponents, subcontractors, or third-party suppliers of goods or services, to the consultant or the Board, other than the Board contact from the issue date to the Tender to receiving the award non award notification, may be grounds for disqualification from the Tender.

1.18. Anticipated Time Table

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

DESCRIPTION	DATE
Issue Date	March 16, 2022
Non-Mandatory Site Meeting	March 23, 2022, 3:30pm local time
Deadline for Questions	April 1, 2022
Closing Date and Time	April 6, 2022, 2:00 pm local time
Anticipated Contract Start / Work begins	July 04, 2022
Substantial Completion Date	September 30, 2022
Deemed Complete Date	October 28, 2022

1.19. Blackout Period

A black out period shall exist between the deadline for questions and the date of award. During this period, there shall be no communication between the Bidders, the Board or any Board consultants, unless initiated by the Board' Single Point of Contact.

1.20. Deadline for Questions

Questions must be received by the Single Point of Contact no later than the deadline for questions noted in the Anticipated Project Schedule.

If a Bidder finds any discrepancies or omissions within the Request for Tender (RFT) documents, or requires any clarifications regarding the RFT documents, questions and clarifications must be sent to the Single Point of Contact through the Bidding System by clicking on the "Submit a Question" button found within the bid details page of that opportunity.

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

1.21. Addenda

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

Any questions and clarifications regarding the terms of reference shall be requested through the Bidding System by the date noted above. Those that are deemed pertinent to the Tender document will be addressed in the form of an Addendum.

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

Where an Addendum is issued after a bid has been submitted, the Bidding System will automatically withdraw the submitted bid. The submission status will change to incomplete and will not be accepted by the Board as a submitted bid. It is the responsibility of the Bidder to acknowledge all Addenda and ensure the bid has been received by the Bidding System. Bidder should check the Bidding System for Addenda up until the closing date and time.

Addenda cannot be acknowledged after the Closing Date and Time.

1.22. Warranty and Maintenance

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

2.0 BOARD PURCHASE ORDER

Goods/Service or Work, as described shall not commence until all of the required documents have been submitted to Procurement Services and the CCDC 2 executed by the Awarded Bidder(s) and the Board. For Payment purposes, a Purchase Order shall be generated and issued to the Awarded Bidder(s). The Purchase Order number must appear on all invoices in order to ensure prompt payment.

3.0 THE BID CONTRACT

.1 The bidders and the Owner acknowledge that it is their intention to create a process contract (the "Bid Contract") between the Owner and any bidder whose Bid meets the Mandatory Requirements. The bidders and the Owner further acknowledge that, if a Bid Contract is created between the Owner and one or more of the bidders, the terms of the Bid Contract are represented by the Bid Documents.

4.0 DEFINITIONS

4.1. Capitalized terms not otherwise defined in this Section or elsewhere in these Instructions to Bidders shall have the meanings ascribed to them in the Contract. All references in these Instructions to Bidders to “Section” or “paragraph” shall, unless specifically indicated otherwise, refer to a Section or paragraph of these Instructions to Bidders.

- .1 **“Bid”** means the Base Bid Form and all other documents submitted by a bidder in accordance with these Instructions to Bidders.
- .2 **“Single Point of Contact”** means the Procurement Specialist of the WRDSB, NOT the prime Consultant.
- .3 **“Bid Documents”** has the meaning set out in item 7, Instructions to Bidders.
- .4 **“Bid Form”** means the Base Bid Form or any of the Supplementary Bid Forms listed in paragraph 6.1.2, section 00 21 13.
- .5 **“Black-Out Period”** is the period between the deadline for asking questions or making queries, to the Bid Award Notification.
- .6 **“Board”** means the Waterloo Region District School Board.
- .7 **“Consultant”** means Prime Consultant retained by the Board and identified in these documents.
- .8 **“Contract”** means the written agreement to be signed between the Owner and the successful bidder in the form of CCDC 2 – 2008 stipulated price contract, as amended by supplementary conditions.
- .9 **“Evaluation Score”** has the meaning set out in item 12.0 Bid Evaluation, Section 00 21 13.
- .10 **“Evaluation Team”** means the committee / team appointed to guide, monitor and direct this bid process and evaluate Bids.
- .11 **“Irrevocability Period”** has the meaning set out in Item 4.2, Section 00 72 13.
- .12 **“Mandatory Requirements”** has the meaning set out in item 12, Section 00 21 13.
- .13 **“Project Manager”** or Project Coordinator can be used interchangeably and is the Board’s representative for the project.
- .14 **“Submission Deadline”** is the date and time identified in Item 1.18, Section 00 21 13.

4.2. VENDORS OF RECORD

- .1 Bidders must be approved as a Vendor of Record by the Owner. Bids received from contractors who have not been approved prior to the Tender period will be returned unopened.

- .2 The Owner reserves the right to issue an addendum naming additional pre-qualified general contractors and additional pre-qualified Subcontractors and Suppliers.

5.0 BID DOCUMENTS

- .1 The following documents form the basis of this bid process (collectively the "Bid Documents"):
 - .1 Instructions to Bidders.
 - .2 Bid Forms comprising the Base Bid Form and, where required, the Supplementary Bid Form – List of Subcontractors, Supplementary Bid Form – Itemized, Separate and Alternative Prices, and Supplementary Bid Form – Unit Prices.
 - .3 CCDC 2 – 2008 stipulated price contract comprised of the Agreement Between Owner and Contractor, Definitions, and General Conditions of the Stipulated Price Contract.
 - .4 Supplementary Conditions.
 - .5 Specifications (as per table of contents).
 - .6 Drawings (as per list of Drawings).
 - .7 Any Reports or Studies, including, but not limited to, Asbestos, Hazardous Materials and Sub-Surface soil conditions included with the specifications or addenda.
 - .8 Addenda issued prior to the Submission Deadline.
- 5.2. Check Bid Documents for completeness upon receipt. Inform the Board's Single Point of Contact immediately, should any documents be missing or incomplete and/or upon finding any discrepancies or omissions.
- 5.3. The Bid Documents are made available only for the purpose of submitting Bids for the Project. Availability and/or use of the Bid Documents do not confer a license or grant for any other purpose.

6.0 PROHIBITION ON LOBBYING / COLLUSION

- 6.1. Bidders and/or any representatives employed or retained by them are strictly prohibited from engaging in conduct which is or could reasonably be considered as any form of political or other lobbying, or as an attempt to influence the outcome of this bid process.
- 6.2. A bidder shall not discuss or communicate directly or indirectly with any other bidder any information whatsoever regarding the preparation of a Bid. Bidders shall prepare and submit Bids independently and without any communication, knowledge, comparison of information, or arrangement, direct or indirect, with any other bidder.

- 6.3. Failure of any bidder to comply with this Section may result in the disqualification of the bidder and the rejection of its Bid.

7.0 CONFLICT OF INTEREST

- 7.1. Bidders shall disclose all perceived, potential and actual Conflicts of Interest. For the purposes of this bid process, "Conflict of Interest" includes:

- .1 any situation or circumstance where, in relation to this bid process and/or the Contract, the bidder's other commitments, relationships or financial interests could or could be perceived to exercise an improper influence over the objective, unbiased and impartial exercise of independent judgment by any member of the Evaluation Team, the Board, or the Owner;
- .2 any situation or circumstance where any person(s) employed by the Owner in any capacity, or any member of the Board:
 - .1 has a direct or indirect financial interest in the award of the Contract to any bidder;
 - .2 is currently employed by, or is a subcontractor or a consultant to a bidder;
 - .3 is negotiating or has an arrangement concerning future employment or contracting with any bidder;
 - .4 has an ownership interest in, or is an officer or director of, any bidder.

- 7.2. If a bidder discovers, at any time, any perceived, potential or actual Conflict of Interest, the bidder shall promptly disclose the perceived, potential or actual Conflict of Interest by sending a written statement in the manner described in paragraph 8. Failure of any bidder to comply with this Section may result in the disqualification of the bidder and the rejection of its Bid.

- 7.3. Without limiting the generality of Section 22, the Owner may, in its sole discretion:
- .1 exclude any bidder and its Bid on the grounds of Conflict of Interest;
 - .2 waive any and all perceived, potential or actual Conflicts of Interest upon such terms and conditions as the Owner, in its sole discretion, requires to satisfy itself that the Conflict of Interest has been appropriately managed, mitigated and minimized.

8.0 SITE INVESTIGATION

- .1 Any soils investigation, environmental, geotechnical or other reports prepared or obtained with respect to the Place of the Work (collectively the "Reports") are available from the Consultant. Where the Work involves existing buildings, structures, facilities, plant or equipment, any reports, data or as-built drawings concerning such buildings, structures, facilities, plant or equipment (collectively the "Data") are available from the Consultant. The Reports should not be considered a representation of the site conditions of the entire Place of the Work, and the Reports and Data are provided for

- general information and guidance purposes only. Neither the Owner nor the Consultant guarantees the accuracy or completeness of the Reports or the Data, nor does either assume any responsibility for any interpretations or conclusions that bidders may make or draw from the Reports or the Data.
- .2 Each bidder is solely responsible, at its own cost and expense, to carry out its own independent research and due diligence, or to perform any other investigations considered necessary by the bidder to satisfy itself as to all existing conditions, circumstances and limitations affecting the Work, including the existence and/or locations of utilities and underground services. The bidders' obligations set out in this paragraph apply irrespective of any Reports, Data or any information contained in the Bid Documents.
 - .3 No allowances will be made for additional costs and no claims will be entertained in connection with conditions which could reasonably have been ascertained by investigation or other due diligence undertaken prior to the Submission Deadline, and/or in connection with Work which is required and which is reasonably inferable from the Bid Documents, the Reports and/or Data as being necessary.

9.0 DESIGNATED SUBSTANCES

1. Asbestos Audit, prepared by MTE Consultants Inc. for each facility is available in the tender package as well as at the school's main office. A duplicate set is also available in the Facility Services department located at the Education Centre. Unless otherwise specifically covered by Cash Allowance or Contingency Allowance for known asbestos materials, include in this contract for the removal under abatement, in compliance with O.Reg. 278/05, of all known asbestos containing materials, as identified in the audit, within 600mm of all new services, materials, and equipment, and/or as required to complete the work. No claims for extra cost will be accepted for areas known to contain asbestos containing materials.
2. Comply with applicable legislation regarding asbestos. Should the Contractor encounter asbestos, not noted in the above Asbestos Audit, that would be disturbed during the course of the Work they should stop the work in that immediate area and report the same to the Board Contact.
3. Preliminary paint samples were collected within the work area to determine if lead-based paints are present. The analytical results are available in the tender package along with a Designated Substance Report (DSR) (for lead paint), where lead-based paints were identified or were deemed highly suspected.

4. Disturbance or demolition of lead-based paints, surface coatings, sheetings, mortar, piping or solders shall be conducted by the Contractor in accordance with the procedures noted in the Environmental Abatement Council of Canada (EACC) "Lead Guideline" (October 2014) and/or the Ministry of Labour (MOL) "Lead on Construction Projects" guideline (April 2011). The extent of procedures required depends on the type of work to be conducted.
5. In addition to asbestos and/or lead, silica, and mercury are present in all WRDSB facilities. New construction, renovations or alterations require compliance by the Contractor with the applicable legislation. Other designated substances (i. e. acrylonitrile, arsenic, benzene, coke oven emissions, isocyanates, ethyl oxide, and vinyl chloride) are not encountered in WRDSB facilities as significant constituents or in a form that would represent an exposure concern.
6. Examples of common building materials that are considered as containing the additional designated substances are listed below:
 1. Lead - paints and coatings, lead sheeting, pigment mortar, lead piping, lead solder and fittings. In addition to the procedures outlined for lead paint and coatings in the DSR, the Contractor shall inform all workers of the presence of paint finishes that are lead containing. Disturbance of lead-containing paints or surface coatings shall be conducted in accordance with the procedures outlined in the Environmental Abatement Council of Canada (EACC) "Lead Guideline" (October 2014) and/or the Ministry of Labour (MOL) "Lead on Construction Projects" guideline (April 2011). The extent of procedures required depends on the type of work to be conducted. Carefully demolish and recycle of any lead sheeting, piping, solder and fittings. Waste to be handled and disposed of in accordance with O.Reg. 347. Contractor to ensure workers use appropriate PPE and follow the appropriate methods for removal stipulated by the MOL Lead on Construction Guidelines.
 2. Silica - concrete, brick, stone, terrazzo, refractory brick as well as in plaster drywall, acoustic ceiling tiles, drywall joint compound, mortars, and adhesives in low concentrations. All work involving the demolition silica-containing materials shall follow the procedures outlined in the MOL "Silica on Construction Projects" guideline. Type 1 operations may be necessary based on the type of work conducted and the Contractor shall implement dust suppression methods and protect workers.
 3. Mercury - thermometers, barometers, thermostats, gauges, electrical switches, and lighting products including fluorescent light bulbs and a variety of High Intensity Discharge (HID) lamps as mercury vapour, metal halide and high pressure sodium lamps. Lamps and other devices that require demolition are to be handled with care and kept intact to avoid potential exposure. Any mercury-containing lamps or other equipment

that are demolished are to be recycled. Waste to be handled and disposed of in accordance with O.Reg. 347.

10.0 INSTRUCTIONS FOR COMPLETING THE BID

10.1. Listing of Subcontractors:

- .1 Where required by the Bid Documents, bidders shall complete and submit a Supplementary Bid Form – List of Subcontractors, naming the Subcontractors and Suppliers which the bidder will employ to perform an item of the Work called for by the Contract. Failure of the bidder to list Subcontractors and Suppliers, where required, may result in the Bid being declared non-compliant.
- .2 Where the Owner has provided a Vendor of Record list, for any one or more Subcontractors and/or Suppliers to perform or supply an item of the Work called for by the Contract, bidders shall select a subcontractor or supplier from that Vendor of Record list to perform or supply that item of Work. Failure to do so shall result in the Bid being declared non-compliant.
- .3 Where a bidder lists more than one Subcontractor or Supplier to perform or supply an item of the Work listed, the Subcontractor or Supplier that is listed last shall be deemed to be the Subcontractor or Supplier to be employed by the bidder to perform or supply such item of the Work.
- .4 Where a bidder lists “own forces” in place of a Subcontractor, the bidder shall carry out such item of the Work with its own forces. Where “own forces” have been listed by a bidder, the Owner reserves the right to obtain information from the bidder and from third parties respecting the qualifications and experience of the bidder’s “own forces” for such item of the Work.

10.2. Itemized, Separate and Alternative Prices:

- .1 Where required by the Bid Documents, bidders shall complete and submit a Supplementary Bid Form – Itemized, Separate and Alternative Prices. The Owner reserves the right to accept or reject any or all itemized, separate and alternative prices submitted, and such prices shall remain in effect for the duration of the Contract. Failure to submit an itemized, separate or alternative price where required may result in the Bid being declared non-compliant.

10.3. Unit Prices:

- .1 Where required by the Bid Documents, bidders shall complete and submit a Supplementary Bid Form – Unit Prices. Unit prices shall be in effect for the duration of the Contract and may be used to calculate the cost of additional work under the Contract. The Owner reserves the right to accept or reject any or all unit prices submitted, and such prices shall remain in effect for the

duration of the Contract. Failure to submit a unit price where required may result in the Bid being declared non-compliant.

11.0 BID EVALUATION

11.1. Mandatory Requirements. Only bidders that submit Bids which the Evaluation Team determines meet all of the mandatory requirements set out below (collectively the “Mandatory Requirements”) on a “pass/fail” basis will be eligible to be considered for an award of the Contract:

- .1 The Bid includes the Base Bid Form which bears the bidder’s original signature.
- .2 The bidder is a valid Vendor of Record.
- .3 Where a mandatory site meeting was scheduled and held, the bidder attended the mandatory site meeting.
- .4 The Bid includes the Security Documents.
- .5 The Bid includes valid Vendor of Record Subcontractors and/or Suppliers.
- .6 The Bid substantially complies with the other requirements of the Bid Documents.

11.2. Point Based Evaluation Criteria. Only Bids which meet all of the Mandatory Requirements will be evaluated by the Evaluation Team and awarded points based on criteria set out below.

- .1 As few as zero (0) points will be awarded for each evaluation category; the maximum points available for each evaluation category are set out below.
- .2 The total points awarded to a bidder will be that bidder’s “Evaluation Score”.

CRITERIA	Points Available
<i>Mandatory bid documents</i>	Pass/Fail
Bid price offered / bid price as adjusted by the amount of any itemized, separate and/or alternative price(s) which the Owner, in its discretion, decides to accept.	100%
MAXIMUM POINTS AVAILABLE	100

12.0 AWARD OF THE CONTRACT, DOCUMENTS TO BE DELIVERED, AND EXECUTION OF THE CONTRACT

12.1. Within ten (10) Working Days of receiving an award letter from the Owner, and prior to commencing the Work, the successful bidder shall deliver to the Owner:

- .1 the performance bond and the labour and material payment bond described in the Bid Documents, the forms of such bonds to comply with the requirements of the Contract;
 - .2 certified true copies of the insurance policies required by the Contract or certificates of insurance, at the option of the Owner;
 - .3 a current WSIB clearance certificate;
 - .4 the bidder's health and safety policy for the Project; and
 - .5 a copy of the notice of project issued by the Ministry of Labour for the Project.
- 12.2.** The successful bidder shall execute the Contract and shall deliver the executed original to the Owner within ten (10) Working Days of the bidder's receipt of the same.

13.0 PUBLIC STATEMENTS, CONFIDENTIALITY, AND MFIPPA

- 13.1.** Bidders shall not publish, issue or make any statements or news release, electronic or otherwise, concerning their or any other Bid, this bid process, the evaluation of the Bids, the award of the contract, or cancellation of this bid process, without the express written consent of the Owner. The Owner's award of the Contract to a bidder does not constitute a general endorsement of that bidder's products or services.
- 13.2.** All information provided by or obtained from the Owner in connection with this bid process is the sole property of the Owner and must be treated as confidential. Such information is not to be used for any purpose other than preparing a Bid.
- 13.3.** By submitting a Bid, bidders acknowledge that the contents of their Bids will be disclosed, on a confidential basis, to the Evaluation Team and may be disclosed to members of the Board and the Owner's staff, agents and advisors for the purpose of evaluating or participating in the evaluation of the Bids. The Owner will use reasonable efforts to protect pricing, commercial terms, and other sensitive and confidential information provided by the bidders as part of a Bid (the "Confidential Material"), however, the Owner accepts no liability in the event that the Confidential Material, or any part of it, is disclosed even if the Evaluation Team, the Owner, its staff, agents, advisors or any other person associated with the Board or the Owner may have been negligent with respect to such disclosure.
- 13.4.** Information provided in the Bids may be presented at public meetings of the Board and may be disclosed to the public. In addition, the Owner may be required to disclose information provided in the Bids pursuant to the provisions of the Municipal Freedom of Information and Protection of Privacy Act or other legislation. By submitting a Bid each bidder agrees to such disclosure and releases the Evaluation Team, the Owner, the Board, and the Consultant from any liability for the same.

14.0 RELEVANT POLICIES

- .1 The Board has a number of relevant policies regarding tenders and bidders should familiarize themselves with the following policies:
 - .1 Purchasing Policy- www.wrdsb.ca/about-the-wrdsb/procurement-services
 - .2 Conflict of Interest - Employees or Trustees - <https://www.wrdsb.ca/wp-content/uploads/4005-Procurement.pdf>
 - .3 Acceptance of Hospitality or Gifts - <https://www.wrdsb.ca/wp-content/uploads/4005-Procurement.pdf>
 - .4 The Board also has emergency response procedures: - www.wrdsb.ca

END OF SECTION

SECTION 00 21 14 – VENDORS OF RECORD

1.0 INTRODUCTION

- 1.1. The **Waterloo Region District School Board**, in an effort to build an improved supplier database and to obtain exceptional long term value, has implemented a Vendors of Record list. This tender is open to those who are currently registered under the Board's Vendor Registration System.
- 1.2. Only those General Contractors and Subcontractors noted below may submit bids in their particular fields. Refer to specification sections for products, suppliers and installers that will be required in addition to the Vendors of Record noted below.

2.0 VENDOR REGISTRATION PROCESS

- 2.1. To become a Vendor of Record for future business opportunities, go to the Board's public website at www.wrdsb.ca and refer to *About Us - Purchasing Services - Vendor Registration*, and submit the completed application, as per instructions on the website.

3.0 PRIME / GENERAL CONTRACTORS

- 3.1. Any bid submission from bidders other than Vendors of Record contractors listed below or identified by Addendum will have their bid ruled informal.
- 3.2. The Owner reserves the right to issue an addendum naming additional general contractors as a Vendor of Record.
- 3.3. The following Prime / General Contractors are Vendors of Record with the Board and are invited to submit bids:

General Contractor	Phone	Email
2SC Contracting Inc.	(416) 992-5437	nick@2SCcontracting.com
Bestco Construction (2005) Ltd	(905) 304-4597	estimating@bestcoconstruction.com
Caird-Hall Construction Inc.	(905) 634-0903	caird-hall@bell.net
Collaborative Structures Limited	(519) 658-2750	jblackler@collaborativestructures.com
Complete Building Systems Inc.	(519) 576-5800	estimating@completebuildingsystems.ca
CPM Group Inc	(416) 227-1612	harslan@cpmgroup.ca
CRD Construction	(519) 822-1801	sbock@crdconstruction.on.ca
Dakon Construction	(519) 746-0920	james@dakon.ca
Eldale Structures Ltd	(519) 823-5500	bmcleod@eldale.com
Elgin Contracting and Restoration Ltd.	(519) 633-9969	info@elgincontracting.com

Gateman-Milloy Inc.	(519) 748-6500	info@gatemanmilloy.com
Golden Gate Contracting Inc	(905) 844-1122	estimation@ggcontracting.ca
Gordner Construction	(519) 741-0052	gordner@sympatico.ca
Hall Construction	(905) 662-9200	info@hallconstruction.ca
Harrington Construction Inc	(519) 837-3581	jason@harrcon.ca
ICIR Construction Ltd	(647) 346-8528	icirconstruction@gmail.com
K&L Construction (Ontario) Ltd	(519) 472-7164	todd.hodgins@kandlconstruction.com
Mega Group Construction Ltd	(905) 799-1212	vijay@megagroupconstruction.com
Melloul Blamey Construction	(519) 886-8850	teresa.oreilly@melloul.com
Morris-Lee Construction Corp.	(519) 746-8545	morrisee@rogers.com
Nith Valley Construction Ltd	(519) 662-1324	mail@nithvalley.com
Norfield Construction Inc.	(905) 951-3030	alves@norfieldconstruction.ca
PM Contracting Ltd	(519) 576-8327	sarahziegler@pm.on.ca
Reid & Deleye Contractors Ltd	(519) 688-2600	gregd@reid-deleye.com
RENOKREW	(416) 604-7042	info@renokrew.com
RHC	(519) 249-0758	info@rhcbuilds.ca
SG Cunningham Ltd	(519) 886-2730	allan@cunningham.on.ca
Sierra Construction	(519) 421-7413	info@sierraconstruction.ca
SPEC Construction Inc.	(519) 650-4030	info@spec-build.com
STM Construction Ltd	(519) 756-7030	robertbox@stmconstruction.com
Tambro Construction	(519) 766-1234	btami@tambro.com
TRP Construction	(905) 336-1041	info@trpconstruction.ca
Van Horne Construction Ltd	(905) 677-5150	otekin@vanhorne.ca
Zehr Levesque Inc.	(519) 576-2233	estimating@zehrgroup.ca

4.0 SUBCONTRACTORS

- 4.1. Bidders shall select only a Subcontractor or Supplier listed below to perform or supply an item of Work indicated. Failure to do so shall result in a Bid being ruled informal.
- 4.2. The Owner reserves the right to issue an addendum naming additional Subcontractors and Suppliers as a Vendor of Record.
- 4.3. The following Subcontractors are Vendors of Record with the Board and are invited to submit bids to the General Contractors:

Mechanical Contractor	Phone	Email
AAA Air Conditioning Inc	(519) 747-9051	igrant.aaaac@gmail.com
AIM Industrial Inc.	(519) 747-2255	craigd@aimindustrial.ca
Arcadian Projects Inc.	(519) 804-9697	cory@arcadianprojects.ca
Black & McDonald Limited	(905) 560-3100	sfernandes@blackandmcdonald.com
Brenner Mechanical Inc	(519) 746-0439	clanglois@brenner.ca
C.N. Mechanical Contractors Limited	(519) 404-8235	mclaughlin5284@rogers.com
CJ's Express Plumbing & Electrical	(519) 621-3111	noliveira@cjsexpress.ca
Conestogo Mechanical Inc	(519) 579-6740	wquickfall@conestogomech.com
Dean Lane Contractors Inc	(519) 585-0903	dean@dean-lane.com
Dordan Mechanical Inc.	(519) 662-9900	danielg@dordanmech.com
Jas 3 Limited	(519) 741-8643	jeffs@jas3heatingcooling.ca
Jay Stewart Mechanical	(519) 576-2663	admin@jaystewart.ca
Keith's Plumbing & Heating Inc.	(905) 544-8118	andrena@keithsph.com
LJ Barton Mechanical Inc.	(905) 304-1976	estimating@ljbarton.com
Nelco Mechanical Ltd	(519) 744-6511	mhobson@nelcomech.com
Reitzel Heating & Sheet Metal	(519) 884-3510	alan@reitzelheating.ca
Roberts Bros Sheet Metal Contractors Ltd.	(519) 633-1507	robertsbros@bellnet.ca
Roberts Onsite Inc	(519) 578-2230	dmagnus@robertsonsite.ca
SCT Mechanical Inc.	(519) 626-0268	jscott@sctmechanical.com
Sutherland-Schultz Ltd	(519) 653-4123	info@sutherland-schultz.com
Touchstone Building Technologies Inc.	(519) 997-2792	info@touchstonebti.ca
Trade Mark Industrial Inc	(519) 570-1511	tmoore@trade-markind.com
Velocity Mechanical Inc	(519) 896-1119	quotes@velocitymechanical.com
Vollmer Inc.	(519) 966-6100	mshaw@vollmer.ca
Wellington Plumbing & Heating Ltd.	(519) 821-4130	kyle@wellington-plumbing-hvac.com
Yorktowne Air Inc.	(905) 532-9699	klipien@yorktownear.ca

Electrical Contractor	Phone	Email
AIM Industrial Inc.	(519) 747-2255	craigd@aimindustrial.ca
Arcadian Projects Inc.	(519) 804-9697	cory@arcadianprojects.ca
BCG Electrical/Pro Plumbing (a Lancaster Group Company)	(519) 304-8411	trankin@lancastergroup.ca
Boshart Electric Ltd.	(519) 662-1220	patf@boshartelectric.com
Cameron Electric	(519) 465-4614	greg@cameronelectric.ca
CJ's Express Plumbing & Electrical	(519) 621-3111	noliveira@cjsexpress.ca
Eby Electric Inc.	(519) 635-7642	todd@ebyelectric.com
Edge Electrical Solutions Inc.	(519) 747-3343	Kevin@EdgeElectricalSolutions.ca
Electri-tech Services Inc	(519) 743-6518	eric.karn@electri-tech.com
Energize Electric Canada	(519) 589-9630	energize@hotmail.ca
Fairway Electrical Services Incorporated	(905) 304-1133	cherd@fairwayelectrical.com
Harold Stecho Electric Ltd	(519) 746-0047	steves@stechoc.ca
JM Electrical Contracting	(519) 572-3148	johnmader@sympatico.ca
Jones Electric of Kitchener Inc.	(519) 745-5158	Office@JonesElectricofKitchener.ca
Juno Electric	(519) 821-4890	steno@junoelectric.ca
KW E Inc Electrical Contractors	(519) 653-6989	jim@kweinc.com
Live Electric	(519) 265-8566	estimates@live-electric.ca
Mendler Electric Inc.	(519) 616-1733	mendlers@rogers.com
Millers Electric Ltd	(519) 742-3465	scottg@meltd.on.ca
MJM Electric Limited	(519) 824-1989	mlang.mjm@gmail.com
Nadelec Contracting Inc	(905) 875-5239	john.nadelec@gmail.com
Nelco Mechanical Ltd	(519) 744-6511	mhobson@nelcomech.com
Pfaff Electric Limited	(519) 235-0909	jeff@pfaffelectric.com
Roberts Onsite Inc	(519) 578-2230	dmagnus@robertsonsite.ca
Sentry Electric Inc	(705) 436-4530	info@sentryelectric.ca
Sutherland-Schultz Ltd	(519) 653-4123	info@sutherland-schultz.com
Toth Inc	(519) 696-3916	tothelectric@rogers.com
Trade Mark Industrial Inc	(519) 570-1511	tmoore@trade-markind.com
Trade Service Group Inc.	(519) 591-8851	mikewernie@tradeservicegroup.com
Vollmer Inc.	(519) 966-6100	mshaw@vollmer.ca

Masonry Contractor	Phone	Email
1138483 On Ltd Bender Construction	(519) 323-2742	info@benderconstruction.ca
Advanced Masonry Inc	(519) 846-2121	dkocher@advancedmasonry.ca
Blockwall Masonry Ltd	(905) 669-0033	blockwall@bellnet.ca
Brownstone Masonry	(905) 856-3115	brownstonemason@bellnet.ca
Core Tec. Contracting	(519) 620-7100	eddy@coretec.ca
Elgin Contracting and Restoration Ltd.	(519) 633-9969	info@elgincontracting.com
G & B Masonry Ltd	(519) 220-8437	matt@gandbmasonry.ca
GA Masonry	(519) 648-2285	bgeorge@gamasonry.com
J.V.H. Masonry Ltd.	(905) 479-2959	jvhmasonry@rogers.com
Jeffrey Custom Masonry Ltd.	(519) 275-1279	brad_jeffrey@wightman.ca
Konia Masonry Corp.	(519) 664-1112	main@koniamasonry.com
R Dekoninck Masonry Inc.	(519) 582-3003	rdekoninckmasonry@gmail.com

Millwork Contractor	Phone	Email
Baywood Interiors Ltd	(519) 748-9577	johnl@baywoodinteriors.com
Bendt Kitchens and Millwork Inc.	(519) 743-7418	jody@bendt.ca
BEZ Industries	(519) 579-3880	john@bezindustries.com
CCW Inc	(519) 886-2728	hermes.alvarez@ccwinc.com
DM Millwork Ltd	(519) 743-1556	dmmillwork@gto.net
GL Industries Ltd	(519) 787-4379	gary@glindustries.ca
Leedwood Ltd.	(519) 805-3556	ryan@leedwood.ca
Second Generation Furnishings	(905) 738-1403	robert@2ndgen.ca
Top Millwork Interiors Inc.	(416) 736-9868	topmillwork@msn.com
VDCM Architectural Woodwork Inc.	(519) 743-4409	estimating@vdc.com
Wood Design Ltd	(905) 595-1281	wooddesign.ltd@gmail.com

Window Contractor	Phone	Email
Aerloc Industries Ltd.	(905) 628-6061	peterdendekkerjr@aerloc.com
Alwind Industries Ltd	(905) 738-4266	gm@alwind.com
Barton Glass	(905) 385-3599	pdbhbartonglass@quickclic.net

Festival City Glass Ltd.	(519) 271-5182	festivalcityglass@gmail.com
Glass Canada Limited	(519) 642-4100	rdamstra@glass-canada.com
Kitchener Glass Ltd	(519) 744-5201	paul@kitchenerglass.com
KW Glass Systems Inc	(519) 725-9305	rick@kwglass.com
Peninsula Glass Inc.	(905) 735-2901	tim@peninsulaglass.ca
Shantz Windows	(519) 669-2629	bruce@shantzwindows.com
Sherwood Windows Group	(416) 675-3262	bhorton@sherwoodwindows.com
Windspec Inc	(905) 738-8311	wferri@windspec.com

Flooring Contractor	Phone	Email
Flooring Plus	(519) 747-5131	vartan@flooringplus.ca
M&M Carpet Inc.	(905) 279-7875	mmcarpet@bellnet.ca
Nufloors Simcoe	(519) 426-2619	garnatfloor@eastlink.ca
Rick's Carpet and Flooring	(519) 449-2362	gcouwenberg@rickscarpet.ca
S L Marcella Carpets Ltd	(519) 885-2357	nick@marcellacarpets.ca
The Belluz Group Ltd.	(905) 385-8999	abraham@belluzgroup.ca
Twin City Tile Co Ltd	(519) 743-4179	matt@twincitytile.com
Voll's Contract Flooring	(519) 669-1151	dkirch@vollscontract.ca
Zet Master Limited	(905) 789-6560	konrad@zetmaster.com

Painting Contractor	Phone	Email
Aves & Shaw Painting	(519) 742-3486	avesandshawltd@rogers.com
CertaPro Painters of Waterloo	(519) 616-1167	adyck@certapro.com
Expert Painting Inc	(519) 635-8106	expertpainting@hotmail.com
Gateway Painting Ltd.	(519) 500-0772	info@gwpainting.ca
Mike McMahon's Painting Ltd	(519) 744-0169	mikes.painting.ltd@sympatico.ca
Northern Painters (div Connco Group Ltd)	(800) 465-6985	northpaint@conncogroup.com
Platinum Painting & Decorating Inc.	(905) 790-2111	sandro@platinumpaintdecor.com
Westwood Painting Services Inc.	(905) 575-8458	westwoodpainting@cogeco.net

Sprinkler Install Contractor	Phone	Email
C&H Fire Supression Systems	(519) 742-6030	Justin@chfireinc.com
EPI Fire Protection Inc	(416) 746-2225	jzafrani@epi-fps.ca
Georgian Bay Fire & Safety	(519) 543-5115	psmith@gbfire.com
Ideal Fire Suppression Systems	(519) 878-6776	ty@ifss.ca
LifeSafetySecurity Inc.	(844) 715-7288	rappleyard@lifesafetysecurity.com
Richardson Fire Systems Inc.	(519) 650-8057	matt.fromm@richardsonfire.com
Spira Fire Protection Ltd	(519) 823-1150	ken@spira.ca
Troy Life & Fire Safety	(519) 650-2972	tim.hallman@troylfs.com
Western Fire Protection Inc.	(519) 641-3059	todd@westernfire.ca

END OF SECTION

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SECTION 00 21 15 – SCOPE OF WORK

Scope of work include the renovation of the existing Main office and associated rooms and the addition of a new Meeting and Literacy room including all new finishes, lighting, and windows and new power & HVAC to suit the new layout.



**Waterloo Region
District School Board**

Appendix B – Price Bid Form Sample

Instructions: Bid price shall be submitted through the Bidding System only

SCHOOL	BID PRICE	HST	TOTAL
	\$	\$	\$
	\$	\$	\$
	\$	\$	\$

END OF SECTION

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Appendix D - VENDOR PERFORMANCE EVALUATION FORM AND GUIDELINES

The Board, in an effort to build an improved supplier base and to obtain exceptional long term value, has undertaken a project to register vendors. In conjunction, performance of vendors, either Prime and/or Sub that are involved with this project may be evaluated.

The evaluation may occur at or near substantial completion.

An evaluation may also occur at any stage of the project in order to request and implement a corrective action to facilitate the successful completion of the project.

The Board will evaluate prime contractors.

Prime contractors will evaluate sub-contractors that do not meet expectations and forward the results to the Board. The Board will initiate a request for corrective action to the subcontractor. This is separate from any corrective action that the prime contractor may have. Prime contractors may address the evaluation form and processes at the start up meeting, but it is the responsibility of the prime contractor and the subcontractors to communicate, understand and adhere to the evaluation form and guidelines.

The Board will forward Performance Evaluations to the evaluated prime contractor and/or Subcontractor, here after referred to as Vendor.

A Vendor Performance Evaluation that:

1) Meets or exceeds expectations:

Is a very powerful tool that the evaluated vendor can forward as references to prospective clients giving a very accurate indication of their performance and abilities.

As such, upon request, a vendor performance evaluation will be completed and forwarded to the same vendor, who can then forward it on to their prospective client.

2) Is below expectations:

Will be forwarded to the vendor with a Request for Corrective Action.

The Board will also lower the project size capability of the vendor at this time.

Upon the vendor's successful completion and demonstration of the Request for Corrective Action, the Board may increase the project size capability of the vendor.

The Board or vendor upon the successful completion of the Request for Corrective Action may request a meeting in order to move forward in a positive manner.

Procurement Services will provide clarification and/or direction regarding the Request for Corrective Action, if requested, however the Vendor Performance Evaluation will remain as issued.

The Vendor Performance Evaluation, Requests for corrective action, and the vendor's corresponding corrective action will be filed at the Board.

The Vendor Performance Evaluation may be revised and or modified at any time without notice.



Business Services Division

Procurement Services

VENDOR PERFORMANCE EVALUATION

Vendor Name: _____

Project Name: _____

Tender Number: _____

Classification: Prime Contractor Subcontractor

CHECK ONE					
Not Applicable	Far below expectations: inadequate, containing little detail insufficient knowledge	Does not fully meet expectations: limited knowledge and requirements	Meets expectations: demonstrates ability and knowledge to address basic requirements	Exceeds expectations: demonstrates clear, concise knowledge of requirements	Far exceeds expectations: highly comprehensive, excellent response

1. **Safety & Security:** (Understands & follows requirement guides)
Comments: _____

	1	2	3	4	5
--	---	---	---	---	---

2. **Site Supervision:**
Comments: _____

	1	2	3	4	5
--	---	---	---	---	---

3. **Billing Accuracy:**
Comments: _____

	1	2	3	4	5
--	---	---	---	---	---

4. **Ability to Minimize Deficiencies:**
(Timing, follow up, documentation of actions)
Comments: _____

	1	2	3	4	5
--	---	---	---	---	---

5. **Ability to Maintain Schedule & React to Changes:**
(Completeness of work, providing appropriate manpower)
Comments: _____

	1	2	3	4	5
--	---	---	---	---	---

6. **Ability to stay focused on Scope:** (Does not seek additional work)
Comments: _____

	1	2	3	4	5
--	---	---	---	---	---

7. **Approximate dollar value evaluated:**

0-50,000	50,000. – 500,000.	500,000. +
----------	--------------------	------------

8. **Additional Comments:** _____

Score:

General Contractor: _____ Date: _____
(If evaluating subcontractor) (company name) (Project Manager) (signature)

Project Evaluator: _____ Date: _____
(print name) (signature)

Manager: _____ Date: _____
(print name) (signature)

Procurement Services action taken: File Corrective Action (overall average score <3/individual score<3)

Procurement Manager: _____ Date: _____
(or designate) (print name) (signature)

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SECTION 00 41 73 - SUPPLEMENTARY BID INFORMATION

If requested, the **Supplementary Bid Information** must be completed and submitted at time of the tender closing. **All pricing where requested in this form is plus HST.**

GENERAL CONTRACTOR

1.1 The following personnel will be assigned to manage and supervise the Work. Personnel will be subject to approval by the Board, and cannot be changed without prior written approval from the Board.

Site Supervisor: _____

Project Manager: _____

Part 2 ALTERNATIVE PRICES

2.1 The following are the prices for the alternative work listed hereunder. Such Alternative Work and amounts are NOT included in the Bid Price.

ITEM	AMOUNT
	\$
	\$
	\$

Part 3 ITEMIZED PRICES

3.1 The following are the prices for the items of work listed hereunder. Such Work and amounts ARE included in the Bid Price.

3.2 The Board reserves the right to modify the Scope of Work and reduce the contract price accordingly, based upon the prices indicated

ITEM	AMOUNT
	\$
	\$
	\$

Part 4 IDENTIFIED PRICES

4.1 The following are the values of work listed hereunder. Such work and amounts ARE included in the Bid Price.

4.2 The Board has requested these prices for information purposes only and does not intend to modify any Scope of Work based on the prices indicated.

ITEM	AMOUNT
	\$
	\$
	\$

1.0 GENERAL

1.1. DEFINITIONS DECLARATION

- .1 CCDC 2-2008 Edition, Stipulated Price Contract as may be amended, forms the basis of Definitions between the Owner and Contractor.
- .2 These Definitions are bound to the CCDC 2 Definitions and CCDC 2 General Conditions.

1.2. SUPPLEMENTARY WORDS AND TERMS TO CCDC 2-2008

- .1 The following words and terms are additional to the CCDC 2 Definitions.
- .2 Addendum: A document that amends the Bid Documents during the Bidding Period and becomes part of the Contract Documents when a Contract is executed. (Plural: Addenda).
- .3 Agreement: The signed and sealed legal instrument binding parties in a Contract, describing in strict terms their mutual arrangement, roles and responsibilities, commencement, and completion responsibilities.
- .4 Alternative Price: The amount stipulated by a Bidder for an Alternative and stated as an addition, a deduction, or no change to the Bid Price.
- .5 Authorities: Those having jurisdiction under law over Work or Parts thereof.
- .6 Bid: To offer as a Bid stating for what price a Contractor will assume a Contract.
- .7 Bid Documents: A set of documents consisting of the Instructions to Bidders, Bid Form, Contract Documents, and other information issued for the benefit of Bidders to prepare and submit a Bid.
- .8 Bid Form: The specific and detailed form used to collect information about a Bid.
- .9 Bidding: The process of preparing and submitting a Bid.
- .10 Construction Documents: The Drawings and Project Manual. When combined with a Contract and Contract conditions, these documents form the Contract Documents.
- .11 Contingency Allowance: An additional monetary amount added to a Project cost estimate and designated to cover unpredictable or unforeseen items of Work. The amount is usually based on some percentage of the estimated cost and expended and adjusted by Change Order. It is not intended to cover additions to the scope of Work.
- .12 General Conditions: That part of the Contract Documents which sets forth many of the rights, responsibilities and relationships of the parties involved in a Contract.

- .13 Exposed: Visible at completion of Work, in useable areas as well as interior of closets, cabinets, drawers, storage and service rooms, stairwells and exterior surfaces.
- .14 Instructions To Bidders: Instructions contained in the Bid Documents to convey an Owner's expectations and criteria associated with submitting a Bid.
- .15 Section: A portion of a Project Specification covering one or more segments of the total Work or requirements. Sections are included in a Project manual as required to meet Project requirements.
- .16 Standard: A document describing a grade or a level of quality, which has been established by a recognized agency or organization, utilizing an internal voting process.
- .17 Separate Price: A separate price for work to be added to the base price if selected by the Owner. This price type is not a part of the base bid price.
- .18 Stipulated Price: An amount set forth in a Stipulated Price Contract as the total payment for the performance of the Work. Sometimes referred to as a stipulated sum or a lump sum stipulated price.
- .19 Tender: Refer to definition of Bid.
- .20 Unit Price: The amount payable for a single unit of Work as stated in a Schedule of Prices.
- .21 Install: To remove from site storage, move or transport to intended location, install in position, connect to utilities, repair site caused damage, and make ready for use.
- .22 Supply: To acquire or purchase, ship or transport to the site, unload, remove packaging to permit inspection for damage, re-package, replace damaged items, and safely store on-site.
- .23 Provide: To Supply and Install
- .24 Wherever words 'approved', 'selected', 'satisfactory', 'directed', 'permitted', 'inspected', 'instructed', 'required', 'submit', 'ordered', 'reviewed', 'reported to', or similar words or phrases are used in Contract Documents, it shall be understood, unless context provides otherwise, that words 'by Consultant' or 'to Consultants' follow.
- .25 Words 'by others' when used in Specifications or on Drawings shall not mean by someone other than Contractor. Only means by which something shown or specified shall be indicated as not being in Contract is by initials 'NIC' or words 'not in Contract', 'by Owner', or 'by Other Contractor'.

END OF SECTION

SECTION 00 72 13 – TERMS AND CONDITIONS

1.0 PROVISIONS

1.1. Proceedings Against the Board

- .1 The Proponent represents and warrants that the Proponent is not a party to any suits, actions, litigation proceedings, arbitration's, alternative dispute resolutions, investigations or claims by or against or otherwise involving the Board and the Proponent. The Board will reject the bid in the view of the current, pending or threatened litigation, arbitration, alternative dispute resolution or disputes involving the Board and Proponent. The Awarded Bidder may also be required, at the discretion of the Board, to sign a Certificate in a form satisfactory to the Board confirming that the Awarded Bidder is not associated with any company involved in litigation with the Board.

1.2. Standard of Behaviour

- .1 The Board will not knowingly purchase goods and/or services from Awarded Bidders who operate in contravention of local and international laws. Proponents submitting bids are in fact agreeing that they do not purchase or use products that are in contravention of local and international laws. If a product and/or service supplied to the Board is discovered to be in contravention, the Board reserves the right to rectify the issue with the Awarded Bidder that may include the cancellation of the contract.

1.3. Federal, Provincial, Regional and Municipal Laws

- .1 The Awarded Bidder must stay current and comply with, for the durations of the agreement, all current laws and bylaws.
- .2 No Smoking and Scent –Free
 - .1 The Province has legislated under the Smoke Free Ontario Act that smoking is not permitted on any Board owned properties. Furthermore, most Board properties are “scent free”. Smoking will not be permitted on-site. Offenders will be asked to leave the site, and infractions could result in corrective action and or fine.

1.4. Professional Conduct

- .1 All contractors must conduct themselves in a professional manner at all times when dealing with Board staff, with the public, and while working on site. Unprofessional conduct could result in immediate termination of the contract.

1.5. Sustainable Purchasing

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

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

1.6. Paramountcy Clause

.1 Proponents who have additional and/or supplementary agreements that require the Board's signature prior to providing the required products and/or services to the Board must submit that said draft agreement with their bid. No additional agreements will be accepted by the Board after the closing date Tender time of the Tender. In the event of any conflict between the provisions of the terms of the Awarded Bidder's additional and/or supplementary agreement(s) and the provisions of this Tender document, the terms of the Tender contract shall govern.

1.7. Freedom of Information

.1 To comply with the Freedom of Information and Protection of Privacy Act, all bids submitted to the Board become the property of the Board, and as such, are subject to the Freedom of Information and Protection of Privacy Act. Clearly identify any portion of the bid submission that could cause injury if disclosed.

1.8. Criminal Background Checks and Collection of Personal Information

.1 The Board must comply with Regulation 521 (Collection of Personal Information) to the Education Act with respect to criminal background checks and offence declarations.

.2 If required by the Board, the Awarded Bidder will provide the Board, or designate with a Criminal Background Check covering offences under the Criminal Code, the Controlled Drugs and Substances Act, and any other offences which would be revealed by a search of the automated Criminal Records Retrieval System.

- .3 An Offence Declaration in a Board-approved form for every individual or employee of the Awarded Bidder who may come into direct contact with Board staff and/or students on a regular basis at any Board site prior to the occurrence, and on or before September 1 each year thereafter is required. The Board will determine in its sole discretion whether an individual or employee of the Awarded Bidder come into direct contact with pupils on a regular basis.
- .4 Termination of contracts and indemnification by the Awarded Bidder will result from noncompliance.

1.9. Accessibility

- .1 Proponents shall comply with the provisions of the Accessibility for Ontarians with Disabilities Act, 2005, and the Regulations there under with regard to the provision of its goods or service to persons with disabilities. Proponents acknowledge that pursuant to the Accessibility for Ontarians with Disabilities Act, 2005, the Board must, in deciding to purchase goods or service through its procurement process, consider the accessibility for persons with disabilities to such goods or service.

2.0 COMMUNICATION

2.1. Verbal Communication

- .1 Neither the Board nor Board consultant will provide verbal direction or clarification during the tender process. As a result, verbal recollections will not be considered valid.

2.2. Request for Clarification

- .1 The Board reserves the right to seek clarification and supplementary information from Proponents after the Bid Submission Deadline. The response received by the Board from a Proponent shall, if accepted by the Board, form an integral part of that Proponent's proposal.

3.0 SPECIFICATIONS

3.1. Materials

- .1 Bid only on new materials in perfect condition. Demonstrators, seconds or defective materials are unacceptable. Any materials found not to be in a new

condition or as specified will be returned to the Awarded Bidder at the Awarded Bidder's expense.

- .2 Proponents, if requested by the Board, must furnish with their bid a materials safety data sheet (M.S.D.S.), for all products they are bidding on, where applicable. This is a requirement of the Occupational Health and Safety Act. Subsequently, should any business result from this Tender, the Board will not accept any additional charges or surcharges related to the supplying of M.S.D.S. for any item(s) on this Tender.
- .3 All electrical equipment and components must bear a C.S.A. or Electrical Safety Association (E.S.A.) label.
- .4 Bid prices must be for goods and/or services exactly as specified.

4.0 BID PREPARATION

The Board will not be liable for any costs incurred by the Proponent for the preparation of their bid.

4.1. Online Submission Forms

- .1 All forms are submitted online through the bidding system.
- .2 The bidder's signature has the authority to bind the Proponent.

4.2. Bid Price

- .1 Bid prices are to be shown as all applicable taxes extra.
- .2 Bid prices must be held firm until the project is completed to the satisfaction of the Board.
- .3 The bid price herein constitutes the total costs to the Board for all work involved in the respective items and that this cost also includes all insurance, transportation charges, use of all tools and equipment, supervision, bonds, overhead expense, warranty, all profits and all other work, services, conditions furnished in accordance with the requirements of the contract documents.
- .4 Bid prices must be in Canadian Funds.
- .5 Period for which bids are irrevocable after the tender submission deadline is: 60 days.

4.3. Bonding Requirements

- .1 **Bid Amount**

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

Bonding is requested if the Board estimates that the project is equal or greater than \$200,000.00.

.2 Bid Deposit Bond and Agreement to Bond

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

Bidders shall upload their digital Bid Bond and Agreement to Bond separately to the Bidding System, in the bid submission files labeled "Bid Deposit Bond" & "Agreement to Bond". All instruction and details for accessing authentication shall be included with the digital Bond uploaded in the Bidding System. Do not include and/or upload Performance Bond and Labour and Materials Bond in this section.

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

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

For bid amounts where Bonding is not requested, the Awarded Bidder agrees to pay to the Board the difference in costs between the bid submitted and the final contract should the Awarded Bidder fail to either execute or deliver the contract documents in accordance with the Bid Solicitation within ten (10) working days of written notification of the award of the contract.

.3 Performance Securities

For bid amounts where bonding is required, inclusive of all taxes, upon award the successful Bidder shall provide a digital Bid Performance and Labour and Materials Bond in an electronically verifiable and enforceable (e-Bond) format in the amount(s) of not less than 50% Performance Bond and a 50% Labour and Materials Bond of the total Bid Submission made payable to the Waterloo Region District School Board (the 'Board') as surety that, if the Bid is accepted, a Contract will be entered into for the proper performance of the work. For more information, contact your surety company or visit the Surety Association of Canada website.

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

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

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

Bonds must be submitted through the Bidding System within ten (10) days of receiving the Intent to Award.

4.4. INSURANCE

.1 Proof of WSIB Coverage (Onsite work only)

If the Proponent does not provide a policy endorsement for Employer's Liability and Voluntary Compensation, the Proponent shall submit a valid certificate of WSIB coverage to the Board, with the tender submission and any subsequent policy renewal, referencing this Agreement. The Proponent shall ensure that each Subcontractor complies with the WSIB requirements set out in this Article by obtaining similar types of coverage if the Subcontractor does not provide a policy endorsement for Employer's Liability and Voluntary Compensation.

.2 Insurance (Onsite Construction work only)

The proponent is to reference CCDC2-2008 GC 11.1 Insurance and ensure that this section is adhered to.

.3 General & Vehicle

General and vehicle liability insurance covering incidents of property damage or bodily injury (including death) for owned and non-owned vehicle accidents occurring during the work in this Tender, or actions of the employees of the Awarded Bidder while acting within the scope of their duties as required in this Tender shall be maintained. Verification of current "Good Standing" may be requested.

The inclusive per incident minimum amount of coverage is: Two Million Dollars (\$2,000,000).

5.0 BID EVALUATION

Preference will be given to the lowest compliant bid.

The "lowest bid price" shall be used to determine the lowest compliant bid. Alternate prices, separate prices and any substitutions that may affect the contract price shall not be considered in determining the "lowest bid price".

The Proponent will not be awarded the tender if the Site Supervisor and/or Project Manager identified by the Proponent are not deemed suitable by the Board.

If the Board has a sense that the Proponent with "lowest bid price" has capacity issues, then the Board will meet with the Proponent after the tender closing date and prior to the Board awarding the Tender.

At the meeting the Proponent will present the following in written form:

1. The Proponent's capacity resource plan documents which illustrates how the Proponent determines capacity.
2. The level of capacity the Proponent and its resources would be with the award of the Tender.
3. An evaluation of recent projects that the Proponent has completed, where the Proponent was at equal or greater capacity as it relates to the capacity resources available.

In order for the Proponent's bid to be considered the lowest compliant bid the Proponent will to the Board's satisfaction have presented in written from the information requested.

6.0 BID RESULTS NOTIFICATION

The Board will forward the results notification to <https://wrdsb.bidsandtenders.ca> listing the Awarded Bidder and Bid Price.

7.0 AWARD NOTIFICATION

No shipment is to be made or work to commence until a purchase order, contract, or letter of intent is issued by Procurement Services to the Awarded Bidder.

Construction Projects

For construction projects above \$200,000 the Awarded Bidder may be required to execute a “Canadian Standard Form of Construction Contract to a Stipulated Sum” (revised 2008) CCDC 2, 2008 including amendments thereto as set out in this Tender.

The Awarded Bidder shall execute the said formal contract as called for, within seven (7) working days after notification of acceptance of their Tender or forfeit the amount of Bid Bond enclosed in the Tender.

8.0 POST AWARD

8.1. Bonding (Construction)

Upon receiving the Intent to Award letter, the Bidder is solely responsible for submitting Bonding documents through the Bidding System. Payments to the Awarded Bidder will not be processed without bonding being submitted. Failure to submit bonding within seven (7) working days may result in the cancellation of the contract.

8.2. Purchase Order

For Payment purposes, a Purchase Order shall be generated and issued to the Awarded Bidder(s). The Purchase Order number must appear on all invoices in order to ensure prompt payment.

8.3. Changes

The Board may order changes in the material or work, in writing, with the contract sum being adjusted accordingly. All changes for additional material or work must be agreed upon and submitted in writing to the Board.

9.0 SUBCONTRACTING

9.1. Subcontracting

Subcontracting, beyond the original list of subcontractors submitted with bid submission, of any portion of the work outlined in these specifications will not be permitted without prior written consent of the Board.

If approval is granted, any work undertaken by subcontractors shall be as set forth in this Tender document and the use of subcontractors shall in no way relieve the Awarded Bidder of their responsibilities.

The Board reserves the right to reject a proposed subcontractor for any reasonable cause.

9.2. Assignment

Any business resulting from this Tender call shall not be assigned to any other company (or individual) without prior written approval of the Board.

10.0 FORCE MAJEURE

If Delays in a failure of performance by either party under the Contract shall not constitute default hereunder or give rise to any claim for damages if and to the extent caused by occurrences beyond the control of the party affected, including but not limited to decrees of Government, acts of God, fires, floods, explosions, pandemics, riots, war, rebellion, sabotage and atomic or nuclear incidents, lawful acts of public authorities, or delays caused by common carriers, which cannot reasonably be foreseen or provided against. However, lack of finances, strikes, or other concerted acts by workers, delay or failure arising out to the nature of the work to be done, or from the normal actions of the elements or from any normal difficulties which may be encountered in the performance of the Work, having regard to the nature thereof, shall in no event be deemed to be a cause beyond a party's control. If in the reasonable opinion of either party to this Contract that performance of the Contract is made impossible by force majeure, then either party shall notify the other in writing and the Board shall either terminate the Contract forthwith without any future payments being made or authorize the Vendor to continue performance of the Contract with such adjustments as may be required by the existence of the force majeure and agreed upon by both parties.

11.0 TERMINATION

11.1. Sufficient Cause

The Board reserves the right to terminate any contract Tender purchase order resulting from this Tender call for sufficient cause, such as: non-performance, late

deliveries, inferior quality, pricing problems, customer service, etc. Should such action be necessary, the Board would provide written notice to the Awarded Bidder.

11.2. Funding Out

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

12.0 RESULT DISPUTE PROCESS

Subsequent to a debriefing a Proponent may dispute the decision of the Board. The process outlined below is to be followed:

The Proponent is to file in writing their protest with the Manager of Procurement by certified mail, within force 15 business days of the Debriefing. The Protest Notice shall include:

- (i) The name and address of the Proponent.
- (ii) Identification of the RFX.
- (iii) Detailed and factual statement of the grounds for protest.
- (iv) Supporting documentation.
- (v) Desired relief, action ruling.

The Manager of Procurement will respond to the Proponent, by certified mail, within 20 business days of receiving the written notice.

If a resolution cannot be met, the Proponent must contact the Superintendent of Business and Financial Services by certified mail, within 10 business days of receiving the first response from the Manager of Procurement. The decision by the Superintendent of Business and Financial Services will be deemed final and the Proponent will receive written notice within 20 business days.

13.0 RIGHTS OF THE BOARD

In addition to any other express rights or any other rights which may be implied in the circumstances, the Board reserves the right to:

- (i) Reject any bid received from a Proponent which is party to any past or existing suits, actions, and litigation proceedings, arbitration's, alternative dispute resolutions, investigations, vendor performance evaluations that are below expectations or claims by or against or otherwise involving the Board and the Proponent. Note: the Awarded Bidder(s) may also be required, at the discretion of the Board, to sign a Certificate in a form satisfactory to the Board confirming that the Awarded Bidder(s) is not associated with any company involved in litigation with the Board.
- (ii) make public the names of any or all Proponents;
- (iii) request written clarification or the submission of supplementary written information from any Proponent;
- (iv) waive formalities and accept Bids which substantially comply with the requirements of this tender;
- (v) verify with any Proponent or with a third party any information set out in a Bid;
- (vi) disqualify any Proponent whose Bid contains misrepresentations or any other inaccurate or misleading information;
- (vii) disqualify any Proponent or the Bid of any Proponent who has engaged in conduct prohibited by this tender;
- (viii) make changes, including substantial changes, to this tender provided that those changes are issued by way of addenda in the manner set out in this tender;
- (ix) accept or reject a Bid if only one Bid is submitted;
- (x) accept or reject the lowest or any bid not necessarily accepted by the Board;
- (xi) select any Proponent other than the Proponent whose Bid reflects the highest compliant score to the Board;
- (xii) cancel this TENDER process at any stage;
- (xiii) cancel this TENDER process at any stage and issue a new TENDER for the same or similar services with a minimum substantial change in scope of 10%;
- (xiv) accept any Bid in whole or in part;
- (xv) discuss with any Proponent different or additional terms to those contemplated in this tender or in any Proponent's Bid;

(xvi) reject any or all Bids in its absolute discretion;

(xvii) negotiate with the leading Proponent prior to award;

(xviii) evaluate and accept Proponent's alternatives whereby possible efficiencies may prove to be advantageous to the Board;

(xix) to all Bids, responses, inquiries, or other related correspondence in reference to this tender , and all reports, charts, and other documentation submitted by Proponents shall become the property of the Waterloo Region District School the Board when received; and the Board shall not be liable for any expenses, costs associated with the preparation and submittal of any proposal(s), or for any travel and or per diem costs that are incurred including any or all product samples that may be requested during the evaluation stage of the proposal, losses or any direct or indirect damages incurred or suffered by any Proponent or any third party resulting from the Board exercising any of its rights under this TENDER or exercising any rights, which may be implied in the circumstances.

By submitting its Bid, the Proponent authorizes the collection by the Board of the information set out under (v), (vi) and (vii) in the manner contemplated in those subparagraphs.

13.1. Volume and Exclusivity

The Board makes no guarantee of the value or volume of work to be assigned to the Awarded Bidder. Any agreement executed with the Awarded Bidder may not be an exclusive contract for the provision of the described goods/services.

END OF SECTION

**SUPPLEMENTARY CONDITIONS & AMENDMENTS TO STANDARD CONSTRUCTION
DOCUMENT CCDC2 -2008 STIPULATED PRICE SUBCONTRACT**

(the “Supplementary Conditions”)

**AGREEMENT, DEFINITIONS, AND
GENERAL CONDITIONS**

The Standard Construction Document CCDC 2 2008 for a Stipulated Price Contract, English version, consisting of the Agreement Between *Owner* and Contractor, Definitions and General Conditions of the Stipulated Price Contract, Parts 1 to 12 inclusive, governing same, together with the changes with the new *Construction Act* is hereby made part of these *Contract Documents*, with the following amendments, additions and modifications:

AGREEMENT BETWEEN OWNER AND CONTRACTOR

SC1 ARTICLE A-3 – CONTRACT DOCUMENTS

SC1.1	3.1	<p><u>Add</u> the following documents to the list of <i>Contract Documents</i> in Article A-3.1:</p> <ul style="list-style-type: none"> • Waterloo Region District School Board’s Supplementary Conditions & Amendments to Standard Construction Document CCDC2 -2008 Stipulated Price Subcontract, November 2020 Version, including any Special Supplementary Conditions listed in Appendix 2 thereto • <i>Drawings</i> • <i>Specifications</i> • Performance Bond (Form 32 -Performance Bond under Section 85.1 of the <i>Act</i>) • Labour and Material Payment Bond (Form 31 – Labour and Material Payment Bond under Section 85.1 of the <i>Act</i>) [NTD: Remove documents and references if not applicable.]
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SC2 ARTICLE A-5 – PAYMENT

SC2.1	5.1	<p>In Article A-5.1 after the word “Subject to” <u>insert</u> the words “GC 13.2 and”</p> <p>-and-</p> <p><u>delete</u> the words “and, where such legislation or regulations do not exist or apply, subject to a holdback of ten + two percent (10+2%)” and <u>replace</u> them with “and the <i>Owner’s</i> right to issue <i>Notices of Non-Payment.</i>”</p>
SC2.2	5.1.1	<p><u>Delete</u> the words “amount certified by the <i>Consultant</i> together” in subparagraph 5.1.1 and <u>replace</u> them with “allowable amount set out in a <i>Proper Invoice</i>”.</p>

SC2.3	5.1.2	<p><u>Delete</u> subparagraph 5.1.2 in its entirety and <u>replace</u> it with the following:</p> <p>“.2 upon <i>Substantial Performance of the Work</i>, as certified by the <i>Consultant</i>, and on the 61st day after the publication of the certificate of <i>Substantial Performance of the Work</i> in accordance with the <i>Act</i>, there being no claims for lien registered against the title to the <i>Place of the Work</i>, pay the <i>Contractor</i> the unpaid balance of the holdback together with such <i>Value Added Taxes</i> as may be applicable to such payment, less any amount stated in the <i>Owner’s Notice of Non-Payment</i>,”</p>
SC2.4	5.1.3	<p><u>Delete</u> subparagraph 5.1.3 in its entirety and <u>replace</u> it with the following:</p> <p>“.3 upon receipt of the final certificate for payment from the <i>Consultant</i>, and on the 61st day after the date on which the <i>Contractor</i> completes the <i>Work</i>, there being no claims for lien registered against the title to the <i>Place of the Work</i>, pay the <i>Contractor</i> the unpaid balance of the <i>Contract Price</i> together with such <i>Value Added Taxes</i> as may be applicable to such payment , and”</p>
SC2.5	5.3.1	<p><u>Delete</u> paragraph 5.3.1 in its entirety and <u>replace</u> it with the following:</p> <p>“.1 Should either party fail to make payments as they become due under the terms of the <i>Contract</i> or in an award by arbitration or court, interest shall also become due and payable on such unpaid amounts at the prejudgment interest rate prescribed by the <i>Courts of Justice Act</i> (Ontario), as it may change from time to time.”</p>

SC3 *NEW* ARTICLE A-9 – CONFLICT OF INTEREST

SC3.1	Article A-9	<p><u>Add</u> new ARTICLE A-9 CONFLICT OF INTEREST as follows:</p> <p>“ARTICLE A-9 CONFLICT OF INTEREST</p> <p>9.1 The <i>Contractor</i>, <i>Subcontractors</i> and <i>Suppliers</i> and any of their respective advisors, partners, directors, officers, employees, agents, and volunteers shall not engage in any activity or provide any services where such activity or the provision of such services creates a conflict of interest (actually or potentially, in the sole opinion of the <i>Owner</i>) with the provision of the <i>Work</i> pursuant to the <i>Contract</i>. The <i>Contractor</i> acknowledges and agrees that a conflict of interest, as</p>
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		<p>described in this Article A-9, includes, but is not limited to, the use of <i>Confidential Information</i> where the <i>Owner</i> has not specifically authorized such use.</p> <p>9.2 The <i>Contractor</i> shall disclose to the <i>Owner</i>, in writing, without delay, any actual or potential situation that may be reasonably interpreted as either a conflict of interest or a potential conflict of interest, including the retention of any <i>Subcontractor</i> or <i>Supplier</i> that is directly or indirectly affiliated with or related to the <i>Contractor</i>.</p> <p>9.3 The <i>Contractor</i> covenants and agrees that it will not hire or retain the services of any employee or previous employee of the <i>Owner</i> where to do so constitutes a breach by such employee or previous employee of the <i>Owner's</i> conflict of interest policy, as it may be amended from time to time, until after completion of the <i>Work</i> under the <i>Contract</i>.</p> <p>9.4 It is of the essence of the <i>Contract</i> that the <i>Owner</i> shall not have direct or indirect liability to any <i>Subcontractor</i> or <i>Supplier</i>, and that the <i>Owner</i> relies on the maintenance of an arm's-length relationship between the <i>Contractor</i> and its <i>Subcontractors and Suppliers</i>. Consistent with this fundamental term of the <i>Contract</i>, the <i>Contractor</i> will not enter into any agreement or understanding with any <i>Subcontractor</i> or <i>Supplier</i>, whether as part of any contract or any written or oral collateral agreement, pursuant to which the parties thereto agree to cooperate in the presentation of a claim for payment against the <i>Owner</i>, directly or through the <i>Contractor</i>, where such claim is, in whole or in part, in respect of a disputed claim by the <i>Subcontractor</i> or <i>Supplier</i> against the <i>Contractor</i>, where the payment to the <i>Subcontractor</i> or <i>Supplier</i> by the <i>Contractor</i> is agreed to be conditional or contingent on the ability to recover those amounts or a portion thereof from the <i>Owner</i>, failing which the <i>Contractor</i> shall be saved harmless from all or a portion of those claims. The <i>Contractor</i> acknowledges that any such agreement would undermine the required arm's-length relationship and constitute a conflict of interest. For greater certainty, the <i>Contractor</i> shall only be entitled to advance claims against the <i>Owner</i> for amounts pertaining to <i>Subcontractor</i> or <i>Supplier</i> claims where the <i>Contractor</i> has actually paid or unconditionally acknowledged liability for those claims or where those claims are the subject of litigation or binding arbitration between the <i>Subcontractor</i> or <i>Supplier</i> and the <i>Contractor</i> has been found liable for those claims.</p>
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		<p>9.5 Notwithstanding paragraph 7.1.2 of GC 7.1 - OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, OR TERMINATE THE CONTRACT, a breach of this Article A-9 by the <i>Contractor</i>, any of the <i>Subcontractors</i>, or any of their respective advisors, partners, directors, officers, employees, agents, and volunteers shall entitle the <i>Owner</i> to terminate the <i>Contract</i>, in addition to any other rights and remedies that the <i>Owner</i> has in the <i>Contract</i>, in law, or in equity."</p>
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SC4 *NEW* ARTICLE A-10 TIME OF THE ESSENCE

SC4.1	Article A-10	<p><u>Add</u> the following new Article A-10 as follows:</p> <p>"ARTICLE A-10 TIME OF THE ESSENCE</p> <p>10.1 It is agreed that one of the reasons the <i>Contractor</i> was selected by the <i>Owner</i> for this <i>Contract</i> is the <i>Contractor's</i> representation and covenant that it will attain <i>Substantial Performance of the Work</i> within the <i>Contract Time</i> stated in Article A-1 of this <i>Contract</i>.</p> <p>10.2 The <i>Contractor</i> acknowledges and agrees that it is responsible to marshal its resources and those of its <i>Subcontractors and Suppliers</i> in a manner which will permit timely attainment of the <i>Substantial Performance of the Work</i>. The <i>Contractor</i> agrees that time is of the essence of this <i>Contract</i>."</p>
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SC5 DEFINITIONS

SC5.1	Consultant	<p><u>Amend</u> the definition of "Consultant" by <u>adding</u> the following to the end of the definition:</p> <p>"For the purposes of the <i>Contract</i>, the terms "<i>Consultant</i>", "<i>Architect</i>" and "<i>Engineer</i>" shall be considered synonymous."</p>
SC5.2	Act	<p><u>Add</u> the following definition:</p> <p>"27. Act</p> <p><i>Act</i> means the <i>Construction Act</i>, R.S.O. 1990, c. C.30, as amended, including all regulations passed under it that are</p>

		enforceable as of the date of execution of this <i>Contract</i> . For certainty, the first procurement process for the <i>Project</i> (i.e. the “improvement” as that term is defined in the <i>Act</i>) was commenced on or after October 1, 2019).”
SC5.3	Adjudication	<p><u>Add</u> the following definition:</p> <p>“28. Adjudication</p> <p><i>Adjudication</i> means construction dispute interim adjudication as defined under the <i>Act</i>.”</p>
SC5.4	Confidential Information	<p><u>Add</u> the following definition:</p> <p>“29. Confidential Information</p> <p><i>Confidential Information</i> means all the information or material of the <i>Owner</i> that is of a proprietary or confidential nature, whether it is identified as proprietary or confidential or not, including but not limited to information and material of every kind and description (such as drawings and move-lists) which is communicated to or comes into the possession or control of the <i>Contractor</i> at any time, but <i>Confidential Information</i> shall not include information that:</p> <ul style="list-style-type: none"> .1 is or becomes generally available to the public without fault or breach on the part of the <i>Contractor</i>, including without limitation breach of any duty of confidentiality owed by the <i>Contractor</i> to the <i>Owner</i> or to any third party, but only after that information becomes generally available to the public; .2 the <i>Contractor</i> can demonstrate to have been rightfully obtained by the <i>Contractor</i> from a third party who had the right to transfer or disclose it to the <i>Contractor</i> free of any obligation of confidence; .3 the <i>Contractor</i> can demonstrate to have been rightfully known to or in the possession of the <i>Contractor</i> at the time of disclosure, free of any obligation of confidence; or .4 is independently developed by the <i>Contractor</i> without use of any <i>Confidential Information</i>.”
SC5.5	Construction Schedule	<p><u>Add</u> the following definition:</p> <p>“30. Construction Schedule or construction schedule</p> <p><i>Construction Schedule</i> means the schedule for the performance of the <i>Work</i> provided by the <i>Contractor</i> pursuant to GC 3.5,</p>

		including any amendments to the <i>Construction Schedule</i> made pursuant to the <i>Contract Documents</i> .”
SC5.6	Construction Schedule Update	<p><u>Add</u> the following definition:</p> <p>“31. Construction Schedule Update</p> <p><i>Construction Schedule Update</i> means an update to the <i>Construction Schedule</i> by the <i>Contractor</i> using Microsoft Project (or other approved scheduling software) that accurately depicts the progress of the <i>Work</i> relative to the critical path established in the <i>Construction Schedule</i> approved in GC 3.5.1 (or any approved successor <i>Construction Schedule</i>), aligns with the currently approved date for <i>Substantial Performance of the Work</i>, shows up-to-date projected major activity sequences and durations, and shows any changes or delays in anticipated completion dates of major activities in the <i>Work</i> relative to the last <i>Construction Schedule Update</i>, and includes the following minimum deliverables:</p> <p>(a) a record version of the updated <i>Construction Schedule</i> in .pdf format;</p> <p>(b) an editable copy of the updated <i>Construction Schedule</i> in native format (e.g. .mpp format for Microsoft Project).”</p>
SC5.7	Direct Costs	<p><u>Add</u> the following definition:</p> <p>“32. Direct Costs</p> <p><i>Direct Costs</i> are the reasonable costs of performing the contract or subcontract including costs related to the additional supply of services or materials (including equipment rentals), insurance and surety bond premiums, and costs resulting from seasonal conditions, that would not have been incurred, but do not include indirect damages suffered, such as loss of profit, productivity or opportunity, or any head office overhead costs.”</p>
SC5.8	EFT	<p><u>Add</u> the following definition:</p> <p>“33. EFT</p> <p><i>EFT</i> has the definition given to it under GC 5.3.2.”</p>
SC5.9	Force Majeure	<p><u>Add</u> the following definition:</p> <p>“34. Force Majeure</p>

		<p><i>Force Majeure</i> means any cause, beyond either parties' control, other than bankruptcy or insolvency, which prevents the performance by a party, or both, of any of their respective obligations under the <i>Contract</i> and the event of <i>Force Majeure</i> did not arise from a party's default and could not be avoided or mitigated by the exercise of reasonable effort or foresight. <i>Force Majeure</i> includes: <i>Labour Disputes</i>; fire; unusual delay by common carriers or unavoidable casualties; delays in obtaining permits or licenses; civil disturbance; emergency acts, orders, legislation, regulations or directives of any government or other public authority; acts of a public enemy; war; riot; sabotage; blockage embargo; lightning; earthquake; adverse weather conditions but only if substantially beyond the weather norms of the <i>Place of the Work</i>; acts of God; or declared epidemic or pandemic outbreak or other public health emergency (e.g. SARS, COVID-19)."</p>
SC5.10	Install	<p><u>Add</u> the following definition:</p> <p>“35. Install</p> <p><i>Install</i> means install and connect. <i>Install</i> has this meaning whether or not the first letter is capitalized.”</p>
SC5.11	Labour Dispute	<p><u>Add</u> the following definition:</p> <p>“36. Labour Dispute</p> <p><i>Labour Dispute</i> means any lawful or unlawful labour problems, work stoppage, labour disruption, strike, job action, slow down, lock-outs, picketing, refusal to work or continue to work, refusal to supply materials, cessation or work or other labour controversy which does, or might, affect the <i>Work</i>.”</p>
SC5.12	Notice of Non-Payment	<p><u>Add</u> the following definition:</p> <p>“37. Notice of Non-Payment</p> <p><i>Notice of Non-Payment</i> means a notice of non-payment of holdback (Form 6) or a notice of non-payment (Form 1.1) under the <i>Act</i>, as applicable to the circumstances.”</p>
SC5.13	OHSA	<p><u>Add</u> the following definition:</p> <p>“38. OHSA</p> <p><i>OHSA</i> means the <i>Occupational Health and Safety Act</i>, R.S.O. 1990, c. O.1, as amended, including all regulations thereto.”</p>

SC5.14	Overhead	<p><u>Add</u> the following definition:</p> <p>“39. Overhead</p> <p><i>Overhead</i> means all site and head office operations and facilities, all site and head office administration and supervision; all duties and taxes for permits and licenses required by the authorities having jurisdiction at the <i>Place of the Work</i>; all requirements of Division 1, including but not limited to submittals, warranty, quality control, calculations, testing and inspections; meals and accommodations; and, tools, expendables and clean-up costs.”</p>
SC5.15	Payment Period	<p><u>Add</u> the following definition:</p> <p>“40. Payment Period</p> <p><i>Payment Period</i> has the definition given to it under GC 5.2.1.”</p>
SC5.16	Pre-Invoice Submission Meeting	<p><u>Add</u> the following definition:</p> <p>“41. Pre-Invoice Submission Meeting</p> <p><i>Pre-Invoice Submission Meeting</i> has the definition given to it under GC 5.2.1.”</p>
SC5.17	Proper Invoice	<p><u>Add</u> the following definition:</p> <p>“42. Proper Invoice</p> <p><i>Proper Invoice</i> means a “proper invoice” as that term is defined in Section 6.1 of the <i>Act</i>, including the minimum requirements set out in Appendix “1” of the Supplementary Conditions.”</p>
SC5.18	Proper Invoice Submission Date	<p><u>Add</u> the following definition:</p> <p>“43. Proper Invoice Submission Date</p> <p><i>Proper Invoice Submission Date</i> has the definition given to it under GC 5.2.2.1.”</p>
SC5.19	Request for Information (RFI)	<p><u>Add</u> the following definition:</p> <p>“44. Request for Information (RFI)</p> <p><i>Request for Information</i> or <i>RFI</i> means written documentation sent by the <i>Contractor</i> to the <i>Owner</i> or to the <i>Owner’s</i> representative or the <i>Consultant</i> requesting written clarification(s) and/or interpretation(s) of the <i>Drawings</i> and/or <i>Specifications</i>, <i>Contract</i> requirements and/or other pertinent</p>

		information required to complete the <i>Work</i> of the <i>Contract</i> without applying for a change or changes to the <i>Work</i> .”

GENERAL CONDITIONS OF THE STIPULATED PRICE CONTRACT

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

PART 1 GENERAL PROVISIONS

sc6 GC 1.1 CONTRACT DOCUMENTS

SC6.1	1.1.6	<p><u>Add</u> the following to the end of paragraph 1.1.6:</p> <p>“The <i>Specifications</i> are divided into divisions and sections for convenience but shall be read as a whole and neither such division nor anything else contained in the <i>Contract Documents</i> will be construed to place responsibility on the <i>Owner</i> or the <i>Consultant</i> to settle disputes among the <i>Subcontractors</i> and <i>Suppliers</i> with respect to such divisions. The <i>Drawings</i> are, in part, diagrammatic and are intended to convey the scope of the <i>Work</i> and indicate general and appropriate locations, arrangements and sizes of fixtures, equipment and outlets. The <i>Contractor</i> shall obtain more accurate information about the locations, arrangements and sizes from study and coordination of the <i>Drawings</i>, including <i>Shop Drawings</i> and shall become familiar with conditions and spaces affecting those matters before proceedings with the <i>Work</i>. Where site conditions require reasonable minor changes where the change requires only the additional labour of one half hour or less, the <i>Contractor</i> shall make such changes at no additional cost to the <i>Owner</i>. Similarly, where known conditions or existing conditions interfere with new installation and require relocation, the <i>Contractor</i> shall include such relocation in the <i>Work</i>. The <i>Contractor</i> shall arrange and install fixtures and equipment in such a way as to conserve as much headroom and space as possible. The schedules are those portions of the <i>Contact Documents</i>, wherever located and whenever issued, which compile information of similar content and may consist of drawings, tables and/or lists.”</p>
SC6.2	1.1.7.1	<p><u>Delete</u> paragraph 1.1.7.1 in its entirety and <u>replace</u> it with the following:</p>

		<p>“.1 the order of priority of documents, from highest to lowest, shall be:</p> <ul style="list-style-type: none"> - the Supplementary Conditions; - the Agreement between the <i>Owner</i> and the <i>Contractor</i>, - the Definitions - the General Conditions, - Division 1 of the <i>Specifications</i>, - technical <i>Specifications</i>, - material and finishing schedules - the <i>Drawings</i>.”
SC6.3	1.1.7.5 to 1.1.7.8	<p><u>Add</u> new subparagraphs 1.1.7.5, 1.1.7.6, 1.1.7.7 and 1.1.7.8 as follows:</p> <p>“1.1.7.5 Noted materials and annotations on the <i>Drawings</i> shall govern over the graphic representation of the <i>Drawings</i>.</p> <p>1.1.7.6 Finishes in the room finish schedules shall govern over those shown on the <i>Drawings</i>.</p> <p>1.1.7.7 Architectural drawings shall have precedence over structural, plumbing, mechanical, electrical and landscape drawings insofar as outlining, determining and interpreting conflicts over the required design intent of all architectural layouts and architectural elements of construction, it being understood that the integrity and installation of the systems designed by the <i>Consultant</i> or its sub-<i>Consultants</i> are to remain with each of the applicable drawing disciplines.</p> <p>1.1.7.8 Should reference standards contained in the <i>Specifications</i> conflict with the <i>Specifications</i>, the <i>Specifications</i> shall govern. Should reference standards and <i>Specifications</i> conflict with each other or if certain requirements of the <i>Specifications</i> conflict with other requirements of the <i>Specifications</i>, the more stringent requirements shall govern.”</p>
SC6.4	1.1.8	<p><u>Delete</u> paragraph 1.1.8 in its entirety and <u>replace</u> it with the following:</p> <p>“1.1.8 The <i>Consultant</i>, on behalf of the <i>Owner</i> shall provide the <i>Contractor</i> without charge, PDF copies of the <i>Contract Documents</i>.</p>

SC7 GC 1.3 RIGHTS AND REMEDIES

SC7.1	1.3.2	<p>In paragraph 1.3.2 <u>delete</u> the word “No” from the beginning of the paragraph and <u>replace</u> it with the words:</p> <p>“Except with respect to the requirements set out in paragraphs 2.2.13, 6.4.1, 6.5.4, 6.6.1 and 8.2.2, no...”</p>
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SC8 *NEW* GC 1.5 EXAMINATION OF DOCUMENTS AND SITE

SC8.1	1.5	<p><u>Add</u> new GC 1.5 – EXAMINATION OF DOCUMENTS AND SITE as follows:</p> <p>“GC 1.5 EXAMINATION OF DOCUMENTS AND SITE</p> <p>1.5.1 The <i>Contractor</i> declares and represents that in tendering for the <i>Work</i>, and in entering into a <i>Contract</i> with the <i>Owner</i> for the performance of the <i>Work</i>, it has investigated for itself the character of the <i>Work</i> to be done, based on information generally available from a visit to the <i>Place of the Work</i> and to the standard set out under GC 3.14.1 The <i>Contractor</i> has assumed and does hereby assume all risk of known conditions now existing or arising in the course of the <i>Work</i> which might or could make the <i>Work</i>, or any items thereof more expensive in character, or more onerous to fulfil, than was contemplated or known when the tender was made or the <i>Contract</i> signed.</p> <p>1.5.2 The <i>Contractor</i> also declares that in tendering for the <i>Work</i> and in entering into this <i>Contract</i>, the <i>Contractor</i> did not and does not rely upon information furnished by the <i>Owner</i> or any of its agents or servants respecting the nature or confirmation of the ground at the site of the <i>Work</i>, or the location, character, quality or quantity of the materials to be removed or to be employed in the construction of <i>Work</i>, or the character of the construction machinery and equipment or facilities needed to perform the <i>Work</i>, or the general and local performance of the work under the <i>Contract</i> and expressly waives and releases the <i>Owner</i> from all claims with respect to the said information with respect to the <i>Work</i>.</p> <p>1.5.3 <i>Contractor</i> further represents, warrants and acknowledges that it considered and took into account in the <i>Contract Price</i> all reasonably known impacts and restrictions arising from the COVID-19 pandemic, including without limitation corresponding legislative changes that may impact performance of the <i>Project</i>, various weather conditions that</p>
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		may affect the <i>Work</i> , the availability of supplies and labour or other conditions or risks that the <i>Contractor</i> knew about or reasonably ought to have known about prior to the date of the <i>Contract</i> .”
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PART 2 ADMINISTRATION OF THE CONTRACT

SC9 GC 2.2 ROLE OF THE CONSULTANT

SC9.1	2.2.4	<u>Delete</u> paragraph 2.2.4 in its entirety.
SC9.2	2.2.5	<u>Delete</u> paragraph 2.2.5 and <u>replace</u> it with the following: “2.2.5 Upon receipt of an application for payment that satisfies the requirement of a <i>Proper Invoice</i> , based on the <i>Consultant's</i> observations and evaluation of the <i>Contractor's</i> application for payment, the <i>Consultant</i> will determine the amounts owing to the <i>Contractor</i> under the <i>Contract</i> and will issue certificates for payment as provided in Article A-5 - PAYMENT, GC 5.3 PROGRESS PAYMENT, GC 5.5 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK, and GC 5.7 - FINAL PAYMENT. If the <i>Consultant</i> determines that the amount payable to the <i>Contractor</i> differs from the amount stated in a <i>Proper Invoice</i> , the <i>Consultant</i> shall notify the <i>Owner</i> as provided in GC 5.3.1.2 and prepare a draft of the applicable <i>Notice of Non-Payment</i> for the amount in dispute.”
SC9.3	2.2.7	<u>Delete</u> the words “Except with respect to GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER”.
SC9.4	2.2.13	At paragraph 2.2.13, <u>insert</u> the following at end of that paragraph: “If, in the opinion of the <i>Contractor</i> , the <i>Supplemental Instruction</i> involves an adjustment in the <i>Contract Price</i> or in the <i>Contract Time</i> , it shall, within ten (10) <i>Working Days</i> of receipt of a <i>Supplemental Instruction</i> , provide the <i>Consultant</i> with a notice in writing to that effect. Failure to provide written notification within the time stipulated in this paragraph 2.2.13 shall be deemed an acceptance of the <i>Supplemental Instruction</i> by the <i>Contractor</i> , without any adjustment in the <i>Contract Price</i> or <i>Contract Time</i> .”

SC10 GC 2.3 REVIEW AND INSPECTION OF THE WORK

SC10.1	2.3.2	<u>Amend</u> paragraph 2.3.2 by <u>adding</u> the words “and <i>Owner</i> ” after the words “ <i>Consultant</i> ” in the second and third lines.
SC10.2	2.3.3	<u>Delete</u> paragraph 2.3.3 in its entirety and <u>replace</u> it with the following: “2.3.3 The <i>Contractor</i> shall furnish promptly two copies to the <i>Consultant</i> and one copy to the <i>Owner</i> of all certificates and inspection reports relating to the <i>Work</i> .”
SC10.3	2.3.4	In paragraph 2.3.4 <u>add</u> the word “review” after the word “inspections” in the first and second lines of paragraph 2.3.4.
SC10.4	2.3.5	In paragraph 2.3.5 in the first line after the word “ <i>Consultant</i> ”, <u>add</u> “or the <i>Owner</i> ”.
SC10.5	2.3.8	<u>Add</u> a new paragraph 2.3.8 as follows: “2.3.8 The <i>Consultant</i> will conduct periodic reviews of the <i>Work</i> in progress, to determine general conformance with the requirements of the <i>Contract Documents</i> . Such reviews, or lack thereof, shall not give rise to any claims by the <i>Contractor</i> in connection with construction means, methods, techniques, sequences and procedures, nor in connection with construction safety at the <i>Place of Work</i> , responsibility for which belongs exclusively to the <i>Contractor</i> .”

SC11 GC 2.4 DEFECTIVE WORK

SC11.1	2.4.1	<u>Amend</u> GC 2.4.1 by inserting “, the <i>Owner</i> and/or its agent” in the first sentence following “rejected by the <i>Consultant</i> ”.
SC11.2	2.4.1.1 to 2.4.1.2	<u>Add</u> new paragraphs 2.4.1.1 and 2.4.1.2 as follows: “2.4.1.1 The <i>Contractor</i> shall rectify, in a manner acceptable to the <i>Consultant</i> and to the <i>Owner through the Consultant</i> all defective work and deficiencies throughout the <i>Work</i> , whether or not they are specifically identified by the <i>Consultant</i> . 2.4.1.2 The <i>Contractor</i> shall prioritize the correction of any defective work, which, in the sole discretion of the <i>Owner through the Consultant</i> , adversely affects the day to day operations of the <i>Owner</i> or which, in the sole discretion of the <i>Consultant</i> , adversely affects the progress of the <i>Work</i> .”

SC11.3	2.4.2	<p><u>Delete</u> paragraph 2.4.2 in its entirety and <u>replace</u> it with the following:</p> <p>“2.4.2 The <i>Contractor</i> shall promptly pay the <i>Owner</i> for costs incurred by the <i>Owner</i>, the <i>Owner’s</i> own forces or the <i>Owner’s</i> other contractors, for work destroyed or damaged or any alterations necessitated by the <i>Contractor’s</i> removal, replacement or re-execution of defective work.”</p>
SC11.4	2.4.4	<p><u>Add</u> new paragraph 2.4.4 as follows:</p> <p>“2.4.4 Neither acceptance of the <i>Work</i> by the <i>Consultant</i> or the <i>Owner</i>, nor any failure by the <i>Consultant</i> or the <i>Owner</i> to identify, observe or warn of defective <i>Work</i> or any deficiency in the <i>Work</i> shall relieve the <i>Contractor</i> from the sole responsibility for rectifying such defect or deficiency at the <i>Contractor’s</i> sole cost, even where such failure to identify, observe or warn is negligent.”</p>

PART 3 EXECUTION OF THE WORK

SC12 GC 3.1 CONTROL OF THE WORK

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

SC13 GC 3.2 CONSTRUCTION BY OWNER OR OTHER CONTRACTORS

SC13.1	3.2.2.1	<u>Delete</u> paragraph 3.2.2.1 in its entirety.
SC13.2	3.2.2.2	<u>Delete</u> paragraph 3.2.2.2 in its entirety.
SC13.3	3.2.2.3	<u>Delete</u> paragraph 3.2.2.3 in its entirety.
SC13.4	3.2.2.4	<u>Delete</u> paragraph 3.2.2.4 in its entirety.
SC13.5	3.2.3.2	<u>Delete</u> paragraph 3.2.3.2 and <u>replace</u> it with the following: “.2 co-ordinate and schedule the activities and work of other contractors and the <i>Owner's</i> own forces with the <i>Work</i> of the <i>Contractor</i> and connect as specified or shown in the <i>Contract Documents</i> .”
SC13.6	3.2.3.4	<u>Add</u> new paragraph 3.2.3.4 as follows: “.4 Subject to GC 9.4 CONSTRUCTION SAFETY, for the <i>Owner's</i> own forces and for other contractors, assume overall responsibility for compliance with all aspects of the applicable health and safety legislation in force at the <i>Place of the Work</i> , including all of the responsibilities of the “constructor”, pursuant to the <i>OHSA</i> .”

SC14 GC 3.3 TEMPORARY WORK

SC14.1	3.3.2	In paragraph 3.3.2, in the second line after the words “where required by law”, insert “or by the <i>Consultant</i> ”.
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SC15 GC 3.4 DOCUMENT REVIEW

SC15.1	3.4.1	<u>Delete</u> paragraph 3.4.1 in its entirety and <u>replace</u> it with the following: “3.4.1 The <i>Contractor</i> shall review the <i>Contract Documents</i> and shall report promptly to the <i>Consultant</i> any error, inconsistency, or omission the <i>Contractor</i> may discover. Such review by the <i>Contractor</i> shall be undertaken with the standard of care described in paragraph 3.14.1 of the <i>Contract</i> . Except for its obligation to make such review and report the result, the <i>Contractor</i> does not assume any responsibility to the <i>Owner</i> or to the <i>Consultant</i> for the accuracy of the <i>Contract Documents</i> . Provided it has exercised the degree of care and skill described in this paragraph 3.4.1, the <i>Contractor</i> shall not be liable for damage or costs resulting from such errors, inconsistencies, or
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		omissions in the <i>Contract Documents</i> , which the <i>Contractor</i> could not reasonably have discovered through the exercise of the required standard of care.”
SC15.2	3.4.2 & 3.4.3	<p><u>Add</u> new paragraphs 3.4.2 and 3.4.3 as follows:</p> <p>“3.4.2 If, at any time, the <i>Contractor</i> finds errors, inconsistencies, or omissions in the <i>Contract Documents</i> or has any doubt as to the meaning or intent of any part thereof, including laying out of the Work, the <i>Contractor</i> shall immediately notify the <i>Consultant</i>, and request instructions, a <i>Supplemental Instruction</i>, <i>Change Order</i>, or <i>Change Directive</i>, as the case may require, and the <i>Contractor</i> shall not proceed with the work affected until the <i>Contractor</i> has received such instructions, a <i>Supplemental Instruction</i>, <i>Change Order</i> or <i>Change Directive</i>. Neither the <i>Owner</i> nor the <i>Consultant</i> will be responsible for the consequences of any action of the <i>Contractor</i> based on oral instructions.</p> <p>3.4.3 Errors, inconsistencies and/or omissions in the <i>Drawings</i> and/or <i>Specifications</i> which do not allow completion of the <i>Work</i> of the <i>Contract</i> shall be brought to the <i>Consultant’s</i> attention prior to the execution of the <i>Contract</i> by means of an <i>RFI</i>.”</p>

SC16 GC 3.5 CONSTRUCTION SCHEDULE

SC16.1	3.5.1	<p><u>Delete</u> paragraph 3.5.1 in its entirety and <u>replace</u> with the following:</p> <p>“3.5.1 The <i>Contractor</i> shall:</p> <p>.1 within five (5) calendar days of receiving written confirmation of the award of the <i>Contract</i>, prepare and submit to the <i>Owner</i> and the <i>Consultant</i> for their review and approval, a construction schedule in the format indicated below that indicates the timing of the activities of the <i>Work</i> and provides sufficient detail of the critical events and their inter-relationship to demonstrate the <i>Work</i> will be performed in conformity with the <i>Contract Time</i> and in accordance with the <i>Contract Documents</i>. Such schedule is to include a delivery schedule for <i>Products</i> whose delivery is critical to the schedule for the <i>Work</i> or are required by the <i>Contract</i> to be included in a <i>Products</i> delivery schedule. The <i>Contractor</i> shall employ construction scheduling software, being the latest version of “Microsoft Project”, that permits the progress of the <i>Work</i></p>
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		<p>to be monitored in relation to the critical path established in the schedule. The <i>Contractor</i> shall provide such schedule and any successor or revised schedules in both electronic format and hard copy. Once accepted by the <i>Owner</i> and the <i>Consultant</i>, the construction schedule submitted by the <i>Contractor</i> shall become the baseline “Construction Schedule”;</p> <p>.2 provide the expertise and resources, such resources including manpower and equipment, as are necessary on a best efforts basis to maintain progress under the accepted baseline <i>Construction Schedule</i> or revised construction schedule accepted by the <i>Owner</i> pursuant to GC 3.5 CONSTRUCTION SCHEDULE, which includes without limitation, the <i>Contractor’s</i> use of all possible and, if necessary, extraordinary measures, to bring the progress of the <i>Work</i> into compliance with the <i>Construction Schedule</i>, such as (i) increasing the presence of its own forces at the <i>Place of the Work</i>; (ii) directing any <i>Subcontractors</i> or <i>Suppliers</i> to increase their labour forces and equipment; (iii) working overtime and extra shifts; and (iv) providing any additional supervision and coordination of the <i>Project</i>, all at the <i>Contractor’s</i> own cost and expense save and except where GC 6.5.1, 6.5.2, or 6.5.3 apply; and,</p> <p>.3 monitor the progress of the <i>Work</i> on a weekly basis relative to the baseline <i>Construction Schedule</i>, or any revised <i>Construction Schedule</i> accepted by the <i>Owner</i> pursuant to GC 3.5 CONSTRUCTION SCHEDULE, deliver a <i>Construction Schedule Update</i> to the <i>Consultant</i> and <i>Owner</i> with each application for payment, at a minimum, or as may be reasonably required by the <i>Consultant</i> and advise the <i>Consultant</i> and the <i>Owner</i> weekly in writing of any variation from the baseline or slippage in the schedule; and,</p> <p>.4 if after applying the expertise and resources required under paragraph 3.5.1.2, the <i>Contractor</i> forms the opinion that the slippage in schedule reported in paragraph 3.5.1.3 cannot be recovered by the <i>Contractor</i>, it shall, in the same notice provided under paragraph 3.5.1.3, indicate to the <i>Consultant</i> if the <i>Contractor</i> intends to apply for an extension of <i>Contract Time</i> as provided in PART 6 — CHANGES IN THE WORK; and,</p>
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		.5 ensure that the <i>Contract Price</i> shall include all costs required to phase or stage the <i>Work</i> .”
SC16.2	3.5.2 & 3.5.3	<p><u>Add</u> new paragraphs 3.5.2 and 3.5.3 as follows:</p> <p>“3.5.2 If, at any time, it should appear to the <i>Owner</i> or the <i>Consultant</i> that the actual progress of the <i>Work</i> is behind schedule or is likely to become behind schedule, or if the <i>Contractor</i> has given notice of such to the <i>Owner</i> or the <i>Consultant</i> pursuant to subparagraph 3.5.1.3, the <i>Contractor</i> shall, either at the request of the <i>Owner</i> or the <i>Consultant</i>, or following giving notice pursuant to subparagraph 3.5.1.3, take appropriate steps to cause the actual progress of the <i>Work</i> to conform to the schedule or minimize the resulting delay. Within five (5) calendar days of the request by the <i>Owner</i> or the <i>Consultant</i> or the notice being given pursuant to subparagraph 3.5.1.3, the <i>Contractor</i> shall produce and present to the <i>Owner</i> and the <i>Consultant</i> a plan demonstrating how the <i>Contractor</i> will achieve the recovery of the last accepted schedule.</p> <p>3.5.3 The <i>Contractor</i> is responsible for performing the <i>Work</i> within the <i>Contract Time</i>. Any schedule submissions revised from the accepted baseline construction schedule or revised schedule accepted by the <i>Owner</i> pursuant to GC 3.5 CONSTRUCTION SCHEDULE, during construction are not deemed to be approved extensions to the <i>Contract Time</i>. All extensions to the <i>Contract Time</i> must be made in accordance with PART 6 – CHANGES IN THE WORK. “</p>

sc17 GC 3.6 SUPERVISION

SC17.1	3.6.1	<p><u>Delete</u> paragraph 3.6.1 in its entirety and <u>replace</u> with the following:</p> <p>“3.6.1 The <i>Contractor</i> shall employ a competent full-time superintendent, acceptable to the <i>Owner</i> and <i>Consultant</i>, who shall be in full time attendance at the <i>Place of Work</i> while the <i>Work</i> is being performed. The superintendent shall not be changed by the <i>Contractor</i> without valid reason which shall be provided in writing and shall not be changed without prior consultation with and agreement by the <i>Owner</i> and the <i>Consultant</i>. The <i>Contractor</i> shall replace the superintendent within 7 <i>Working Days</i> of the <i>Owner</i>’s written notification, if the superintendent’s performance is not acceptable to the <i>Owner</i>. The <i>Contractor</i> shall provide the <i>Owner</i> and the <i>Consultant</i> with the names, addresses and telephone numbers of the</p>
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		superintendent referred to in this paragraph 3.6.1 and other responsible persons who may be contacted for emergency and other reasons during non-working hours.”
SC17.2	3.6.2	<p><u>Delete</u> paragraph 3.6.2 in its entirety and <u>replace</u> with the following:</p> <p>“3.6.2 The superintendent, and any project manager appointed by the <i>Contractor</i>, shall represent the <i>Contractor</i> at the <i>Place of Work</i> and shall have full authority to act on written instructions given by the <i>Consultant</i> and/or the <i>Owner</i>. Instructions given to the superintendent or the project manager shall be deemed to have been given to the <i>Contractor</i> and both the superintendent and any project manager shall have full authority to act on behalf of the <i>Contractor</i> and bind the <i>Contractor</i> in matters related to the <i>Contract</i>.”</p>
SC17.3	3.6.3 to 3.6.6	<p><u>Add</u> new paragraph 3.6.3, 3.6.4, 3.6.5 and 3.6.6 as follows:</p> <p>“3.6.3 The <i>Owner</i> may, at any time during the course of the <i>Work</i>, request the replacement of the appointed representative(s). Immediately upon receipt of the request, the <i>Contractor</i> shall make arrangements to appoint an acceptable replacement, which is approved by the <i>Owner</i>.</p> <p>SC40 3.6.4 The supervisory staff assigned to the <i>Project</i> shall also be fully competent to implement efficiently all requirements for scheduling, coordination, field engineering, reviews, inspections and submittals defined in the <i>Specifications</i>, and have a minimum 5 years documented “Superintendent/Project Management” experience.</p> <p>SC41 3.6.5 The <i>Consultant and Owner</i> shall reserve the right to review the record of experience and credentials of supervisory staff assigned to the <i>Project</i> prior to commencement of the <i>Work</i>.</p> <p>SC42 3.6.6 A superintendent assigned to the <i>Work</i> shall be “Gold Seal Certified” as per the Canadian Construction Association; or a superintendent that can demonstrate the requisite experience and success related to the <i>Project</i> to the sole satisfaction of the <i>Owner</i>.”</p>

SC18 GC 3.7 SUBCONTRACTORS AND SUPPLIERS

SC18.1	3.7.1.1	In paragraph 3.7.1.1 <u>add</u> to the end of the second line the words “including any warranties and service agreements which extend beyond the term of the <i>Contract</i> .”
SC18.2	3.7.1.2	In subparagraph 3.7.1.2 after the words “the <i>Contract Documents</i> ” <u>add</u> the words “including any required surety bonding”.
SC18.3	3.7.2	<u>Delete</u> paragraph 3.7.2. in its entirety and <u>replace</u> it with the following: “3.7.2 The substitution of any <i>Subcontractor</i> and/or <i>Suppliers</i> after submission of the <i>Contractor’s</i> bid will not be accepted unless a valid reason is given in writing to and approved by the <i>Owner</i> , whose approval may be arbitrarily withheld. The reason for substitution must be provided to the <i>Owner</i> and to the original <i>Subcontractor</i> and/or <i>Supplier</i> and the <i>Subcontractor</i> and/or <i>Supplier</i> shall be given the opportunity to reply to the <i>Contractor</i> and <i>Owner</i> . The <i>Contractor</i> shall be fully aware of the capability of each <i>Subcontractor</i> and/or <i>Supplier</i> included in its bid, including but not limited to technical ability, financial stability and ability to maintain the proposed construction schedule.”
SC18.4	3.7.7, 3.7.8 & 3.7.9	<u>Add</u> new paragraphs 3.7.7, 3.7.8, and 3.7.9 as follows: “3.7.7 The <i>Consultant</i> or the <i>Owner</i> , acting reasonably, may from time to time require the <i>Contractor</i> to remove from the <i>Project</i> any personnel of the <i>Contractor</i> , including project managers, superintendents or <i>Subcontractors</i> . Such persons shall be replaced by the <i>Contractor</i> in a timely fashion to the satisfaction of the <i>Consultant</i> or the <i>Owner</i> , as the case may be, at no cost to the <i>Owner</i> . 3.7.8 Where provided in the <i>Contract</i> , the <i>Owner</i> may assign to the <i>Contractor</i> , and the <i>Contractor</i> agrees to accept, any contract procured by the <i>Owner</i> for <i>Work</i> or services required on the <i>Project</i> that has been pre-tendered or pre-negotiated by the <i>Owner</i> , and upon such assignment, the <i>Owner</i> shall have no further liability to any party for such contract. 3.7.9 The <i>Contractor</i> covenants that each subcontract or supply contract which the <i>Contractor</i> enters into for the purpose of performing the <i>Work</i> shall expressly provide for the assignment thereof to the <i>Owner</i> (at the option of the <i>Owner</i>) and the assumption by the <i>Owner</i> of the obligations of the <i>Contractor</i>

		thereunder, upon the termination of the <i>Contract</i> and upon written notice by the <i>Owner</i> to the other parties to such subcontracts or supply contracts, without the imposition of further terms or conditions; provided, however, that until the <i>Owner</i> has given such notice, nothing herein contained shall be deemed to create any contractual or other liability upon the <i>Owner</i> for the performance of obligations under such subcontracts or supply contracts and the <i>Contractor</i> shall be fully responsible for all of its obligations and liabilities (if any) under such subcontracts and supply contracts.”
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SC19 GC 3.8 LABOUR AND PRODUCTS

SC19.1	3.8.2	<u>Delete</u> paragraph 3.8.2 and <u>substitute</u> with the following: “3.8.2 <i>Products</i> provided shall be new and shall conform to all current applicable specifications of the Canadian Standards Association, Canadian Standards Board or General Standards Board, ASTM, National Building Code, provincial and municipal building codes, fire safety standards, and all governmental authorities and regulatory agencies having jurisdiction at the <i>Place of the Work</i> , unless otherwise specified. <i>Products</i> which are not specified shall be of a quality consistent with those specified and their use acceptable to the <i>Consultant</i> . <i>Products</i> brought on to the <i>Place of the Work</i> by the <i>Contractor</i> shall be deemed to be the property of the <i>Owner</i> , but the <i>Owner</i> shall be under no liability for loss thereof or damage thereto arising from any cause whatsoever. The said <i>Products</i> shall be at the sole risk of the <i>Contractor</i> . Workmanship shall be, in every respect, first class and the <i>Work</i> shall be performed in accordance with the best modern industry practice.”
SC19.2	3.8.3	<u>Amend</u> paragraph 3.8.3 by <u>adding</u> the words, “..., agents, <i>Subcontractors</i> and <i>Suppliers</i> ...” after the word “employees” in the first line.
SC19.3	3.8.4 to 3.8.8	<u>Add</u> new paragraphs 3.8.4, 3.8.5, 3.8.6, 3.8.7, and 3.8.8 as follows: “3.8.4 Upon receipt of a <i>Notice in Writing</i> from the <i>Owner</i> , the <i>Contractor</i> shall immediately remove from the <i>Place of the Work</i> , tradesmen and labourers or anyone whose conduct jeopardizes the safety of the <i>Owner’s</i> operations or who are considered by the <i>Owner</i> or the <i>Consultant</i> to be unskilled or otherwise objectionable. Immediately upon receipt of the

		<p>request, the <i>Contractor</i> shall make arrangements to appoint an acceptable replacement.</p> <p>3.8.5 The <i>Contractor</i> shall cooperate with the <i>Owner</i> and its representatives and shall take all reasonable and necessary actions to maintain stable and harmonious labour relations with respect to the <i>Work</i> at the <i>Place of the Work</i>, including cooperation to attempt to avoid <i>Work</i> stoppages, trade union jurisdictional disputes and other <i>Labour Disputes</i>. Any costs arising from labour disputes shall be at the sole expense of the <i>Contractor</i>.</p> <p>3.8.6 The cost for overtime required beyond the normal <i>Working Day</i> to complete individual construction operations of a continuous nature, such as pouring or finishing of concrete or similar work, or <i>Work</i> that the <i>Contractor</i> elects to perform at overtime rates without the <i>Owner</i> requesting it, shall not be chargeable to the <i>Owner</i>.</p> <p>3.8.7 All manufactured <i>Products</i> which are identified by their proprietary names or by part or catalogue number in the <i>Specifications</i> shall be used by the <i>Contractor</i>. No substitutes for such specified <i>Products</i> shall be used without the written approval of the <i>Owner</i> and the <i>Consultant</i>. Substitutes will only be considered by the <i>Consultant</i> when submitted in sufficient time to permit proper review and investigation. When requesting approval for the use of substitutes, the <i>Contractor</i> shall include in its submission any proposed change in the <i>Contract Price</i>. The <i>Contractor</i> shall use all proprietary <i>Products</i> in strict accordance with the manufacturer's directions. Where there is a choice of proprietary <i>Products</i> specified for one use, the <i>Contractor</i> may select any one of the <i>Products</i> so specified for this use.</p> <p>3.8.8 Materials, appliances, equipment and other <i>Products</i> are sometimes specified by reference to brand names, proprietary names, trademarks or symbols. In such cases, the name of a manufacturer, distributor, <i>Supplier</i> or dealer is sometimes given to assist the <i>Contractor</i> to find a source <i>Supplier</i>. This shall not relieve the <i>Contractor</i> from its responsibility from finding its own source of supply even if the source names no longer supplies the <i>Product</i> specified. If the <i>Contractor</i> is unable to obtain the specified <i>Product</i>, the <i>Contractor</i> shall supply a substitute product equal to or better than the specified <i>Product</i>, as approved by the <i>Consultant</i> with no extra compensation.</p>
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		Should the <i>Contractor</i> be unable to obtain a substitute <i>Product</i> equal to or superior to the specified <i>Product</i> and the <i>Owner</i> accepts a different <i>Product</i> , the <i>Contract Price</i> shall be adjusted accordingly, as approved by the <i>Consultant</i> .”
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SC20 GC 3.9 DOCUMENTS AT THE SITE

SC20.1	3.9.1	<u>Delete</u> paragraph 3.9.1 in its entirety and <u>substitute</u> the following: “3.9.1 The <i>Contractor</i> shall keep one copy of the current <i>Contract Documents</i> , <i>Supplemental Instructions</i> , contemplated <i>Change Orders</i> , <i>Change Orders</i> , <i>Change Directives</i> , cash allowance disbursement authorizations, reviewed <i>Shop Drawings</i> , submittals, reports and records of meeting at the <i>Place of the Work</i> , in good order and available to the <i>Owner</i> and <i>Consultant</i> .”
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SC21 GC 3.10 SHOP DRAWINGS

SC21.1	3.10.1	<u>Delete</u> paragraph 3.10.1 in its entirety and <u>replace</u> with the following: “3.10.1 The <i>Contractor</i> shall provide shop drawings as described in the <i>Contract Documents</i> and as the <i>Consultant</i> may reasonably request.”
SC21.2	3.10.3	<u>Delete</u> paragraph 3.10.3 and <u>replace</u> it with the following: “3.10.3 The <i>Contractor</i> shall prepare a <i>Shop Drawings</i> schedule acceptable to the <i>Owner</i> and the <i>Consultant</i> prior to the first application for payment. A draft of the proposed <i>Shop Drawings</i> schedule shall be submitted by the <i>Contractor</i> to the <i>Consultant</i> and the <i>Owner</i> for approval. The draft <i>Shop Drawings</i> schedule shall clearly indicate the phasing of <i>Shop Drawings</i> submissions. The <i>Contractor</i> shall periodically re-submit the <i>Shop Drawings</i> schedule to correspond to changes in the <i>Construction Schedule</i> .”
SC21.3	3.10.9	<u>Delete</u> paragraph 3.10.9 in its entirety and <u>substitute</u> the following: “3.10.9 At the time of providing <i>Shop Drawings</i> , the <i>Contractor</i> shall advise the <i>Consultant</i> in writing of any deviations in <i>Shop Drawings</i> from the requirements of the <i>Contract Documents</i> . The <i>Consultant</i> shall indicate the acceptance of such deviation expressly in writing. Where manufacturers’ literature is submitted in lieu of scaled drawings, it shall be clearly marked

		in ink, to indicate the specific items for which review is requested.”
SC21.4	3.10.1 3 to 3.10.1 7	<p><u>Add</u> new paragraphs 3.10.13, 3.10.14, 3.10.15, 3.10.16, and 3.10.17 as follows:</p> <p>“3.10.13 Reviewed <i>Shop Drawings</i> shall not authorize a change in the <i>Contract Price</i> and/or the <i>Contract Time</i>.</p> <p>3.10.14 Except where the parties have agreed to a different <i>Shop Drawings</i> schedule pursuant to paragraph 3.10.3, the <i>Contractor</i> shall comply with the requirements for <i>Shop Drawings</i> submissions stated in the <i>Specifications</i>.</p> <p>3.10.15 The <i>Contractor</i> shall not use the term “by others” on <i>Shop Drawings</i> or other submittals. The related trade, <i>Subcontractor</i> or <i>Supplier</i> shall be stated.</p> <p>3.10.16 Certain <i>Specifications</i> sections require the <i>Shop Drawings</i> to bear the seal and signature of a professional engineer. Such professional engineer must be registered in the jurisdiction of the <i>Place of the Work</i> and shall have expertise in the area of practice reflected in the <i>Shop Drawings</i>.</p> <p>3.10.17 The <i>Consultant</i> will review and return <i>Shop Drawings</i> and submittals in accordance with the schedule agreed upon in paragraph 3.10.3, The <i>Contractor</i> shall allow the <i>Consultant</i> a minimum of 10 <i>Working Days</i> to review <i>Shop Drawings</i> from the date of receipt. If resubmission of <i>Shop Drawings</i> is required, a further 10 <i>Working Day</i> period is required for the <i>Consultant’s</i> review.”</p>

SC22 GC 3.11 USE OF THE WORK

SC22.1	3.11.1	In the second line between the words “permits, or” <u>add</u> , “by direction of the <i>Owner</i> or <i>Consultant</i> ”.
SC22.2	3.11.3	<p><u>Add</u> new paragraph 3.11.3 as follows:</p> <p>“3.11.3 The <i>Owner</i> shall have the right to enter or occupy the <i>Work</i> in whole or in part for the purpose of placing fittings and equipment, or for other use before <i>Substantial Performance of the Work</i>, if, in the opinion of the <i>Consultant</i>, such entry and occupation does not prevent or substantially interfere with the</p>

		<p><i>Contractor</i> in the performance of the <i>Contract</i> within the <i>Contract Time</i>. Such entry or occupation shall neither be considered as acceptance of the <i>Work</i>, nor in any way relieve the <i>Contractor</i> from its responsibility to complete the <i>Contract</i>.”</p>
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SC23 GC 3.12 CUTTING AND REMEDIAL WORK

SC23.1	3.12.5 & 3.12.6	<p><u>Add</u> new paragraphs 3.12.5 and 3.12.6 as follows:</p> <p>“3.12.5 Unless specifically stated otherwise in the <i>Specifications</i>, the <i>Contractor</i> shall do all cutting and making good necessary for the proper installation and performance of the <i>Work</i>.</p> <p>3.12.6 To avoid unnecessary cutting, the <i>Contractor</i> shall lay out its work and advise the <i>Subcontractors</i>, when necessary, where to leave holes for installation of pipes and other work.”</p>
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SC24 GC 3.13 CLEAN UP

SC24.1	3.13.1	<p>At the end of the paragraph 3.13.1, <u>add</u> the following:</p> <p>“The <i>Contractor</i> shall remove accumulated waste and debris at least once a week as a minimum or as required by the nature of the <i>Work</i>.”</p>
SC24.2	3.13.2	<p>In paragraph 3.13.2, in the fourth line <u>Add</u> the word “materials” between the word “tools” and the words “<i>Construction Equipment</i>”.</p>
SC24.3	3.13.3	<p>In paragraph 3.13.3, in the first and second lines <u>Add</u> the word “materials” between the word “tools” and the words “<i>Construction Equipment</i>”</p> <p>-and-</p> <p>In paragraph 3.13.3 <u>delete</u> the words “Prior to application for the final payment,” and <u>replace</u> them with “As a condition precedent to submitting its application for final payment,”.</p>
SC24.4	3.13.4 & 3.13.5	<p><u>Add</u> new paragraphs 3.13.4 and 3.13.5 as follows:</p> <p>“3.13.4 The <i>Contractor</i> shall clean up garbage during and after construction and maintain the <i>Place of the Work</i> in a neat and orderly condition on a daily basis. Prior to leaving the <i>Place of the Work</i> and following completion of the <i>Work</i>, the <i>Contractor</i> shall make good all damage to the building and its components</p>

		<p>caused by the performance of the <i>Work</i> or by any <i>Subcontractor</i> or <i>Supplier</i>. The <i>Contractor</i> shall leave the <i>Place of the Work</i> in a clean and finished state; remove all <i>Construction Equipment</i> and materials; remove all paint, stains, labels, dirt, etc. from the <i>Place of the Work</i>; and touch up all damaged painted areas (if applicable). The <i>Contractor</i> shall be responsible for restoring those areas of the <i>Place of the Work</i>, impacted by the <i>Work</i>, to their original condition.”</p> <p>3.13.5 Without limitation to or waiver of the <i>Owner’s</i> other rights and remedies, the <i>Owner</i> shall have the right to back charge to the <i>Contractor</i> the cost of damage to the site caused by transportation in and out of the <i>Place of the Work</i> by the <i>Contractor</i>, <i>Subcontractors</i> or <i>Suppliers</i>, if not repaired before final payment.</p> <p>3.13.6 The <i>Contractor</i> shall dispose of debris at a location and in a manner acceptable to the <i>Owner</i> (and to the authorities having jurisdiction at the <i>Place of the Work</i> and at the disposal area) and the <i>Contractor</i> shall cover containers with tarpaulins.”</p>
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SC25 *NEW* GC 3.14 CONTRACTOR STANDARD OF CARE

SC25.1	3.14	<p><u>Add</u> a new GC 3.14 – CONTRACTOR STANDARD OF CARE as follows:</p> <p>“GC 3.14 CONTRACTOR STANDARD OF CARE</p> <p>“3.14.1 In performing its services and obligations under the <i>Contract</i>, the <i>Contractor</i> shall exercise the standard of care, skill and diligence that would normally be provided by an experienced and prudent contractor supplying similar services for similar projects. The <i>Contractor</i> acknowledges and agrees that throughout the <i>Contract</i>, the performance of the <i>Contractor’s</i> obligations, duties and responsibilities shall be interpreted in accordance with this standard. The <i>Contractor</i> shall exercise the same standard of care, skill and diligence in respect of any <i>Products</i>, personnel or procedures which it may recommend to the <i>Owner</i> or employ on the <i>Project</i>.</p> <p>3.14.2 The <i>Contractor</i> further represents, covenants and warrants to the <i>Owner</i> that:</p>
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		<p>.1 the personnel it assigns to the <i>Project</i> are appropriately experienced;</p> <p>.2 it has a sufficient staff of qualified and competent personnel to replace any of its appointed representatives, subject to the <i>Owner's</i> approval, in the event of death, incapacity, removal or resignation; and</p> <p>.3 there are no pending, threatened or anticipated claims, liabilities or contingent liabilities that would have a material effect on the financial ability of the <i>Contractor</i> to perform its work under the <i>Contract</i>.”</p>
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SC26 *NEW* GC 3.15 OCCUPANCY OF THE WORK

SC26.1	3.15.1	<p><u>Add</u> a new GC 3.15 – OCCUPANCY OF THE WORK as follows:</p> <p>“GC 3.15 OCCUPANCY OF THE WORK</p> <p>3.15.1 The <i>Owner</i> reserves the right to take possession of and use for any intended purpose any portion or all of the undelivered portion of the <i>Project</i> even though the <i>Work</i> may not be substantially performed, progress of the work shall continue in such a way that it will not interfere with use of the occupied space or operation of the facility. The taking of possession or use of any such portion of the <i>Project</i> shall not be deemed to be the <i>Owner's</i> acknowledgement or acceptance of the <i>Work</i> or the <i>Project</i>, nor shall it relieve the <i>Contractor</i> of any of its obligations under the <i>Contract</i>.</p> <p>3.15.2 Whether the <i>Project</i> contemplates <i>Work</i> by way of renovations in buildings which will be in use or be occupied during the course of the <i>Work</i> or where the <i>Project</i> involves <i>Work</i> that is adjacent to a structure which is in use or is occupied, the <i>Contractor</i>, without in any way limiting its responsibilities under the <i>Contract</i>, shall take all reasonable steps to avoid interference with fire exits, building access and egress, continuity of electric power and all other utilities, the operation of HVAC systems, to suppress dust and noise and to avoid conditions likely to propagate mould or fungus of any kind and all other steps reasonably necessary to promote and maintain the safety and comfort of the users and occupants of such structures or adjacent structures.”</p>
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PART 4 ALLOWANCES

SC27 GC 4.1

CASH ALLOWANCES

SC27.1	4.1.1	<u>Delete</u> the second sentence in paragraph 4.1.1.
SC27.2	4.1.4	<u>Delete</u> paragraph 4.1.4 in its entirety and <u>replace</u> it with the following: “4.1.4 Where the actual cost of the <i>Work</i> under any cash allowance exceeds the amount of the allowance, any unexpended amounts from other cash allowances shall be reallocated, at the <i>Consultant’s</i> direction, to cover the shortfall, and, in that case, there shall be no additional amount added to the <i>Contract Price</i> for overhead and profit. Only where the actual cost of the <i>Work</i> under all cash allowances exceeds the total amount of all cash allowances shall the <i>Contractor</i> be compensated for the excess incurred and substantiated, plus an amount for overhead and profit on the excess only, as set out in the <i>Contract Documents</i> .”
SC27.3	4.1.5	<u>Delete</u> paragraph 4.1.5 in its entirety and <u>substitute</u> the following: “4.1.5 The net amount of any unexpended cash allowances, after providing for any reallocations as contemplated in paragraph 4.1.4, shall be deducted from the <i>Contract Price</i> by <i>Change Order</i> without any adjustment for the <i>Contractor’s</i> overhead and profit on such amount.”
SC27.4	4.1.8 & 4.1.9	<u>Add</u> new paragraphs 4.1.8 and 4.1.9 as follows: “4.1.8 The <i>Owner</i> reserves the right to call, or to have the <i>Contractor</i> call, for competitive bids for portions of the <i>Work</i> , which are to be paid for from cash allowances. 4.1.9 Cash allowances cover the net cost to the <i>Contractor</i> of services, <i>Products</i> , <i>Construction Equipment</i> , freight, unloading, handling, storage, installation, provincial sales tax, and other authorized expenses incurred in performing any <i>Work</i> stipulated under the cash allowances but does not include any <i>Value Added Taxes</i> payable by the <i>Owner</i> and the <i>Contractor</i> .”

PART 5 PAYMENT

SC28 GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

SC28.1	5.1	<u>Delete</u> GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER and all paragraphs thereunder, including any reference to GC 5.1 throughout the <i>Contract</i> .
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SC29 GC 5.2 APPLICATIONS FOR PROGRESS PAYMENT

SC29.1	5.2.1	<p><u>Delete</u> paragraph 5.2.1 and <u>replace</u> it with the following:</p> <p>“5.2.1 Upon execution of the <i>Contract</i>, and in any event prior to the <i>Contractor</i> submitting its first application for payment, the <i>Owner</i> shall issue a purchase order to the <i>Contractor</i> for the performance of the <i>Contract</i>. The number indicated on such purchase order must be clearly identifiable on all applications for payment. Applications for payment shall be dated the last day of each month or an alternative day of each month agreed to in writing by the parties, with each month representing one payment period under the <i>Contract</i> (each a “Payment Period”). Within 3 calendar days of the end of each <i>Payment Period</i>, the <i>Contractor</i> will submit a draft application for payment to the <i>Owner</i> and the <i>Consultant</i>. Upon receipt of the draft application for payment, and within 7 calendar days, a representative of each of the <i>Contractor</i>, <i>Owner</i>, and the <i>Consultant</i> shall attend a meeting to discuss and review the work completed during the <i>Payment Period</i>, including quantities, if applicable (the “Pre-Invoice Submission Meeting”). In the event that the scheduled date for the <i>Pre-Invoice Submission Meeting</i> is not a <i>Working Day</i>, the <i>Pre-Invoice Submission Meeting</i> shall occur on the next <i>Working Day</i>. The <i>Contractor</i> shall bring with it to the <i>Pre-Invoice Submission Meeting</i> the following:</p> <ul style="list-style-type: none"> .1 a copy of the draft application for payment; .2 any documents the <i>Contractor</i> is required to bring to the <i>Pre-Invoice Submission Meeting</i> as stipulated in the <i>Contract Documents</i> or as reasonably requested by the <i>Owner</i>, and .3 any other documents reasonably requested, in advance, by the <i>Owner</i> or the <i>Consultant</i>.”
SC29.2	5.2.2	<u>Delete</u> paragraph 5.2.2 in its entirety and <u>replace</u> it with the following:

		<p>“5.2.2 Applications for payment shall be given in accordance with the following requirements:</p> <ul style="list-style-type: none"> .1 within 5 calendar days following the <i>Pre-Invoice Submission Meeting</i>, the <i>Contractor</i> shall deliver its application for payment to the <i>Owner</i> and to the <i>Consultant</i> for <i>Work</i> performed during the <i>Payment Period</i> (“Proper Invoice Submission Date”) subject to the following: <ul style="list-style-type: none"> .1 if the fifth calendar day following the <i>Pre-Invoice Submission Meeting</i>, to which an invoice relates falls on a day that is not a <i>Working Day</i>, the <i>Proper Invoice Submission Date</i> shall be deemed to fall on the next <i>Working Day</i>. .2 the application for payment must be delivered to the <i>Owner</i> and to the <i>Consultant</i> in the same manner as a <i>Notice in Writing</i> during the hours of 9:00 am to 4:00pm (EST) on the <i>Proper Invoice Submission Date</i>. Delivery to the <i>Owner</i> shall be to the following address: finance-ap@wrdsb.ca .3 If an application for payment is received after 4:00 p.m. (EST) on the applicable <i>Proper Invoice Submission Date</i>, the application for payment will not be considered or reviewed by the <i>Owner</i> and <i>Consultant</i> until the next <i>Proper Invoice Submission Date</i>. Notwithstanding the foregoing, the <i>Owner</i> in its sole and absolute discretion may elect to accept an application for payment submitted after 4:00 p.m. on the applicable <i>Proper Invoice Submission Date</i>; however, such acceptance shall not be construed as a waiver of any of its rights or waive or release the <i>Contractor’s</i> obligations to strictly comply with the requirements prescribed in this subparagraph 5.2.2.3. .4 No applications for payment shall be accepted by the <i>Owner</i> prior to the <i>Proper Invoice Submission Date</i>.”
SC29.3	5.2.3	<p><u>Delete</u> paragraph 5.2.3 and <u>replace</u> it with the following:</p> <p>“5.2.3 The amount claimed shall be for the value, proportionate to the amount of the <i>Contract</i>, of <i>Work</i> performed and <i>Products</i> delivered and incorporated into the <i>Work</i> as of the last date of</p>

		the applicable <i>Payment Period</i> . Materials may also be deemed to be supplied to an improvement, for payment purposes, when, in the <i>Owner's</i> opinion, they are placed and properly secured on the land on which the improvement is made, or placed upon land designated by the <i>Owner</i> or agent of the <i>Owner</i> , but placing the materials on the land so designated does not, of itself, make that land subject to a lien. No amount claimed shall include products delivered and incorporated into the work, unless the products are free and clear of all security interests, liens and other claims of third parties. No amount claimed shall include <i>Products</i> delivered to the <i>Place of the Work</i> unless the <i>Products</i> are free and clear of all security interests, liens, and other claims of third parties."
SC29.4	5.2.4	After the word " <i>Consultant</i> " in paragraph 5.2.4 <u>add</u> the words "and the <i>Owner</i> "
SC29.5	5.2.5	After the word " <i>Consultant</i> " in the first line of paragraph 5.2.5 <u>add</u> the words "or the <i>Owner</i> " -and- In the second line, <u>delete</u> the word " <i>Consultant</i> " and <u>replace</u> it with " <i>Owner</i> ".
SC29.6	5.2.7	<u>Delete</u> paragraph 5.2.7 and <u>replace</u> it with the following: "5.2.7 The <i>Contractor</i> shall prepare and maintain current as-built drawings which shall consist of the <i>Drawings</i> and <i>Specifications</i> revised by the <i>Contractor</i> during the <i>Work</i> , showing changes to the <i>Drawings</i> and <i>Specifications</i> , which current as-built drawings shall be maintained by the <i>Contractor</i> and made available to the <i>Consultant</i> for review with each application for progress payment. The <i>Consultant</i> shall recommend to the <i>Owner</i> that the <i>Owner</i> retain a reasonable amount for the value of the as-built drawings not presented for review."

SC30 GC 5.3

PROGRESS PAYMENT

SC30.1	5.3.1. 1	<u>Add</u> the following words to the end of subparagraph 5.3.1.1: "and confirm whether all of the criteria for a <i>Proper Invoice</i> are satisfied. If not, the application for payment will be returned to the
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		<i>Contractor</i> with reasons from the <i>Owner</i> or the <i>Consultant</i> setting out why the application for payment is not a valid <i>Proper Invoice</i> .”
SC30.2	5.3.1.2	<p><u>Delete</u> paragraph 5.3.1.2 and <u>replace</u> it with the following:</p> <p>“5.3.1.2 Following receipt of a <i>Proper Invoice</i>, the <i>Consultant</i>:</p> <p>.1 will issue to the <i>Owner</i> with a copy to the <i>Contractor</i>, a certificate for payment in the amount applied for, or</p> <p>.2 if the <i>Consultant</i> finds that such other amount is properly due under the application for payment or otherwise finds that the application for payment must be amended, it shall notify the <i>Owner</i> and prepare an applicable <i>Notice of Non-Payment</i> (Form 1.1) with reasons for the amendment.”</p>
SC30.3	5.3.1.3	<p><u>Delete</u> subparagraph 5.3.1.3 in its entirety and <u>substitute</u> as follows:</p> <p>“.3 the <i>Owner</i> shall make payment to the <i>Contractor</i> on account no later than 28 calendar days after the receipt by the <i>Owner</i> of a <i>Proper Invoice</i>, subject to the delivery by the <i>Owner</i> of a <i>Notice of Non-Payment</i> (Form 1.1).”</p>
SC30.4	5.3.2 to 5.3.7	<p><u>Add</u> new paragraphs 5.3.2, 5.3.3, 5.3.4, 5.3.5, 5.3.6, and 5.3.7 as follows:</p> <p>“5.3.2 All payments to the <i>Contractor</i> shall be processed using electronic funds transfer (“EFT”) and deposited directly to the <i>Contractor’s</i> bank account unless agreed to otherwise by the <i>Contractor</i> and the <i>Owner</i> in writing. Prior to the <i>Contractor</i> submitting its <i>Proper Invoice</i>, the <i>Owner</i> shall provide the <i>Contractor</i> with the necessary documents to facilitate EFT payments.</p> <p>5.3.3 Payment shall be deemed to have been made to the <i>Contractor</i> on the date in which funds are transferred via EFT to the <i>Contractor’s</i> bank account.</p> <p>5.3.4 In the event that the <i>Owner</i> disputes the amount claimed as payable in the <i>Proper Invoice</i>, within 14 calendar days of receipt of the <i>Proper Invoice</i>, the <i>Owner</i> shall provide to the <i>Contractor</i>, a <i>Notice of Non-Payment</i> (Form 1.1).</p> <p>5.3.5 Where the <i>Owner</i> has delivered a <i>Notice of Non-Payment</i>, as specified under paragraph 5.3.1.3 or 5.3.4, the <i>Owner</i> and the</p>

		<p><i>Contractor</i> shall first engage in good faith negotiations to resolve the dispute. If within 10 calendar days following the issuance of a <i>Notice of Non-Payment</i>, the <i>Owner</i> and the <i>Contractor</i> cannot resolve the dispute, either party may issue a notice of adjudication in a form prescribed under the <i>Act</i>. The <i>Owner</i> and <i>Contractor</i> will then submit the dispute to <i>Adjudication</i> as set out under PART 8 – DISPUTE RESOLUTION.</p> <p>5.3.6 The amounts disputed and described under the <i>Notice of Non-Payment</i> shall be held by the <i>Owner</i> until all disputed amounts of the <i>Proper Invoice</i> have been resolved pursuant to PART 8 – DISPUTE RESOLUTION. Any portion of the <i>Proper Invoice</i> which is not the subject of the <i>Notice of Non-Payment</i> shall be payable within the time period set out in paragraph 5.3.1.3.</p> <p>5.3.7 The <i>Contractor</i> represents, warrants, and covenants to the <i>Owner</i> that it is familiar with its prompt payment and trust obligations under the <i>Act</i> and will take all required steps and measures to ensure that it complies with the applicable prompt payment and trust provisions under the <i>Act</i> including, without limitation, section 8.1 of the <i>Act</i>. Evidence of the <i>Contractor’s</i> compliance under this GC 5.3.7, including evidence demonstrating that all EFTs by the <i>Owner</i> to the <i>Contractor</i> are kept in a bank account in the <i>Contractor’s</i> name, will be made available to the <i>Owner</i> within 5 <i>Working Days</i> following receipt by the <i>Contractor</i> of a <i>Notice in Writing</i> making such request.”</p>
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SC31 GC 5.4

SUBSTANTIAL PERFORMANCE OF THE WORK

SC31.1	5.4.2	<p><u>Delete</u> paragraph 5.4.2 in its entirety and <u>substitute</u> the following:</p> <p>“5.4.2 The <i>Consultant</i> will review the <i>Work</i> to verify the validity of the application and shall promptly, and in any event, no later than 30 calendar days after receipt of the <i>Contractor’s</i> complete deficiency list and application:</p> <p>.1 prepare a final deficiency list incorporating all items to be completed or corrected. Each item is to have an indicated value for correction or completion. Determination of the value for <i>Substantial Performance</i> of the <i>Work</i> is defined in GC 5.10 – DEFICIENCY HOLDBACK. The final deficiency list complete with values is to be included with</p>
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		<p>the <i>Consultant's</i> draft verification and shall be reviewed with the <i>Owner</i> prior to 5.4.2.2.</p> <p>.2 having completed 5.4.2.1:</p> <p>.1 the <i>Consultant</i> shall advise the <i>Contractor</i> in writing that the <i>Work</i> or the designated portion of the <i>Work</i> is not substantially performed and give reasons why, or</p> <p>.2 the <i>Consultant</i> shall state the date of <i>Substantial Performance of the Work</i> in a certificate and issue a copy of that certificate to each the <i>Owner</i> and the <i>Contractor</i>.”</p>
SC31.2	5.4.3	<p><u>Delete</u> paragraph 5.4.3 in its entirety and <u>substitute</u> the following:</p> <p>“5.4.3 Following the issuance of the certificate of <i>Substantial Performance of the Work</i> referenced in subparagraph 5.4.2.2.2:</p> <p>.1 the <i>Contractor</i> shall complete the <i>Work</i> within sixty (60) calendar days;</p> <p>.2 no payments will be processed nor will any <i>Proper Invoices</i> be received by the <i>Owner</i> between <i>Substantial Performance of the Work</i> and the completion of the <i>Work</i>;</p> <p>.3 The <i>Owner</i> reserves the right to contract out any or all unfinished <i>Work</i> if it has not been completed within sixty (60) days of <i>Substantial Performance of the Work</i> without prejudice to any other right or remedy and without affecting the warranty period. The cost of completing the <i>Work</i> including <i>Owner</i> and <i>Consultant</i> wages and materials shall be deducted from the <i>Contract Price</i>.”</p>
SC31.3	5.4.4 to 5.4.6	<p><u>Add</u> new paragraphs 5.4.4, 5.4.5 and 5.4.6:</p> <p>“5.4.4 The <i>Contractor</i> shall publish, in a construction trade newspaper in the area of the location of the <i>Work</i>, a copy of the certificate of <i>Substantial Performance of the Work</i> referred to in GC 5.4.2.2.2 within seven (7) days of receiving a copy of the certificate signed by the <i>Consultant</i>, and the <i>Contractor</i> shall provide suitable evidence of the publication to the <i>Consultant</i> and the <i>Owner</i>. If the <i>Contractor</i> fails to publish such notice, the <i>Owner</i> shall be at liberty to publish said certificate and back-charge the <i>Contractor</i> its reasonable costs for doing so.</p>

		<p>5.4.5 Prior to submitting its written application for <i>Substantial Performance of the Work</i>, the <i>Contractor</i> shall submit to the <i>Consultant</i>:</p> <ul style="list-style-type: none">.1 statutory declaration in the form of CCDC 9;.2 WSIB clearance certificate showing good standing;.3 updated insurance certificate;.4 guarantees;.5 warranties;.6 certificates;.7 final testing and balancing reports;.8 distribution system diagrams;.9 spare parts;.10 maintenance manuals;.11 samples;.12 reports and correspondence from authorities having jurisdiction in the <i>Place of the Work</i>;.13 shop drawings;.14 inspection certificates;.15 red-lined record drawings from the construction trailer in two copies. <p>and other materials or documentation required to be submitted under the <i>Contract</i>, together with written proof acceptable to the <i>Owner</i> and the <i>Consultant</i> that the <i>Work</i> has been substantially performed in conformance with the requirements of municipal, governmental, and utility authorities having jurisdiction in the <i>Place of the Work</i>. The <i>Consultant</i> shall refuse to certify <i>Substantial Performance of the Work</i> if the submittals referred to in this paragraph 5.4.5 are not provided by the <i>Contractor</i>.</p> <p>5.4.6 The <i>Owner</i> shall withhold, from amounts otherwise payable to the <i>Contractor</i>, an amount not to exceed one (1) percent of the <i>Contract Price</i> as security for the obligation of the <i>Contractor</i> to deliver two copies of the red-lined record drawings.”</p>
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SC32 GC 5.5 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK

SC32.1	5.5.1.3	<p><u>Add</u> new subparagraph 5.5.1.3 as follows:</p> <p>“.3 submit a statement that no written notices of lien have been received by the <i>Contractor</i>.”</p>
SC32.2	5.5.2	<p><u>Amend</u> paragraph 5.5.2 by <u>adding</u> the following sentence to the end of that paragraph:</p> <p>“Where after thirty (30) days following the publication of the certificate of <i>Substantial Performance of the Work</i>, pursuant to GC 5.4.4, the value of the <i>Work</i> remaining to be complete under the <i>Contract</i>, plus the estimated cost to repair any remaining deficiencies, exceeds the amount of the unpaid balance of the <i>Contract Price</i> (as determined by the <i>Payment Certifier</i>, acting reasonably), the <i>Owner</i> may publish a <i>Notice of Non-Payment</i> of holdback in accordance with the <i>Act</i> (Form 6) and retain an amount from the holdback to supplement the unpaid value of the <i>Contract Price</i> to secure the correction of deficiencies and completion of the <i>Work</i>. Such amounts may include all <i>Consultant</i> and <i>Owner</i> costs including any and all staff and material costs, design, tendering and contractor and supplier costs related to the correction of deficiencies and/or warranty claims.”</p>
SC32.3	5.5.3	<p><u>Delete</u> paragraph 5.5.3 in its entirety.</p>
SC32.4	5.5.4	<p><u>Delete</u> the first and second sentences in paragraph 5.5.4 and <u>replace</u> them with the following:</p> <p>“There being no claims for lien registered against title to the <i>Place of the Work</i>, as confirmed by a title search of the <i>Place of the Work</i> and there being no claims for lien or written notices of lien delivered to the <i>Owner</i>, the holdback amount authorized by the certificate for payment of the holdback amount issued by the <i>Consultant</i>, pursuant to GC 5.5.2, is due and payable on the 61st calendar day following the publication of the certificate of <i>Substantial Performance of the Work</i> referred to in GC 5.4.4. ”</p>
SC32.5	5.5.5	<p><u>Delete</u> paragraph 5.5.5 in its entirety and <u>replace</u> it with the following:</p> <p>“5.5.5 Notwithstanding the <i>Owner’s</i> obligation to make payment of the holdback amount in accordance with GC 5.5.4, the processing of such payment remains subject to the <i>Owner’s</i> internal EFT timing limitations. The <i>Owner</i> covenants, and the <i>Contractor</i> agrees, that payment of the holdback shall be made by EFT at the first opportunity during the <i>Owner’s</i> normal processing of</p>

		EFTs upon the holdback becoming due in accordance with GC 5.5.4.”
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SC33 GC 5.6 PROGRESSIVE RELEASE OF HOLDBACK

SC33.1	5.6	<u>Delete</u> GC 5.6 in its entirety.
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SC34 GC 5.7 FINAL PAYMENT

SC34.1	5.7.1	<p>In paragraph 5.7.1, <u>delete</u> the words “an application for final payment” and <u>replace</u> them with the following:</p> <p>“an application for final payment that complies with the requirements for a <i>Proper Invoice</i>, accompanied by any documents or materials not yet delivered pursuant to paragraph 5.4.5, together with complete and final as-built drawings. The <i>Contractor</i> shall also provided written certification that there are no outstanding claims, pending claims or future claims from the <i>Contractor</i> or their <i>Subcontractors</i> or <i>Suppliers</i>. The <i>Consultant</i> shall promptly inform the <i>Owner</i> of the receipt the application for final payment and confirm whether all of the criteria for a <i>Proper Invoice</i> are satisfied. If not, the application for payment will be returned to the <i>Contractor</i> with reasons from the <i>Owner</i> or the <i>Consultant</i> setting out why it is not a valid <i>Proper Invoice</i>.”</p>
SC34.2	5.7.2	<p><u>Delete</u> the words “10 calendar days” and <u>replace</u> them with “5 calendar days” from paragraph 5.7.2.</p> <p>-and-</p> <p><u>delete</u> the words “advise the <i>Contractor</i> in writing that the application is valid or give reasons why it is not valid.” and <u>replace</u> them with the following:</p> <p>.1 no later than 5 calendar days after the receipt of the <i>Proper Invoice</i> for final payment, the <i>Consultant</i> will issue to the <i>Owner</i> and copy to the <i>Contractor</i>, a certificate for final payment in the amount applied for, or</p> <p>.2 if the <i>Consultant</i> finds that such other amount is properly due under the <i>Proper Invoice</i> for final payment or otherwise finds that the <i>Proper Invoice</i> for final payment must be amended, it</p>

		shall notify the <i>Owner</i> and prepare a draft <i>Notice of Non-Payment</i> (Form 1.1) with reasons for the amendment.”
SC34.3	5.7.3	<u>Delete</u> paragraph 5.7.3 in its entirety and <u>replace</u> it with the following: “5.7.3 Where the <i>Owner</i> has delivered a <i>Notice of Non-Payment</i> , as specified under paragraph 5.7.2, the <i>Owner</i> and the <i>Contractor</i> shall first engage in good faith negotiations to resolve the dispute. If within 10 calendar days following the issuance of a <i>Notice of Non-Payment</i> , the <i>Owner</i> and <i>Contractor</i> cannot resolve the dispute, either party may issue a notice of adjudication in a form prescribed under the <i>Act</i> . The <i>Owner</i> and <i>Contractor</i> will then submit the dispute to <i>Adjudication</i> as set out under PART 8 – DISPUTE RESOLUTION.”
SC34.4	5.7.4	<u>Delete</u> from the second line of paragraph 5.7.4 the words, “5 calendar days after the issuance of” and <u>substitute</u> the words “28 calendar days after receipt of a <i>Proper Invoice</i> for final payment, subject to the delivery by the <i>Owner</i> of a <i>Notice of Non-Payment</i> (Form 1.1)”.
SC34.5	5.7.5	<u>Add</u> new paragraph 5.7.5 as follows: “5.7.5 The amounts disputed and described under the <i>Notice of Non-Payment</i> shall be held by the <i>Owner</i> until all disputed portions of the <i>Proper Invoice</i> for final payment have been resolved pursuant to PART 8 – DISPUTE RESOLUTION. Any portion of the <i>Proper Invoice</i> which is not the subject of the <i>Notice of Non-Payment</i> shall be payable within the time period set out in paragraph 5.7.4.”

SC35 GC 5.8 WITHHOLDING OF PAYMENT

SC35.1	5.8.1	<u>Delete</u> paragraph 5.8.1 and <u>replace</u> with the following: “5.8.1 If because of conditions reasonably beyond the control of the <i>Contractor</i> , there are items of work that cannot be performed, payment in full for that portion of the <i>Work</i> which has been performed as certified by the <i>Consultant</i> shall not be withheld or delayed by the <i>Owner</i> on account thereof, but the <i>Owner</i> may withhold, subject to its requirement to issue a <i>Notice of Non-Payment</i> under the <i>Act</i> , until the remaining portion of the <i>Work</i> is finished, only such an amount that the <i>Consultant</i> determines is sufficient and reasonable to cover the cost of performing such remaining work. The remaining work shall be valued as deficient work as defined in GC 5.10.1.”
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SC36 *NEW* GC 5.10 DEFICIENCY HOLDBACK

SC36.1	5.10.1	<p><u>Add</u> new GC 5.10 – DEFICIENCY HOLDBACK as follows:</p> <p>“GC 5.10 DEFICIENCY HOLDBACK</p> <p>5.10.1 Notwithstanding any provisions contained in the <i>Contract Documents</i> concerning certification and release of monies to the <i>Contractor</i>, the <i>Owner</i> reserves the right to establish a deficiency holdback, at the time of the review for <i>Substantial Performance of the Work</i>, based on a 200% dollar value of the deficiencies listed by the <i>Consultant</i>. The value of work outstanding for the calculation of <i>Substantial Performance of the Work</i> under the <i>Act</i> shall utilize the 100% dollar value. No individual deficiency will be valued at less than two hundred dollars (\$200.00). The deficiency holdback shall be due and payable to the <i>Contractor</i> on the 61st day following completion of all of the deficiencies listed by the <i>Consultant</i>, there being no claims for lien registered against the title to the <i>Place of the Work</i> issued in accordance with the <i>Act</i>, and less any amounts disputed under an <i>Owner’s Notice of Non-Payment</i> (Form 1.1).”</p>
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PART 6 CHANGES IN THE WORK

SC37 GC 6.1 OWNER’S RIGHT TO MAKE CHANGES

SC37.1	6.1.2	<p><u>Add</u> the following to the end of paragraph 6.1.2:</p> <p>“This requirement is of the essence and it is the express intention of the parties that any claims by the <i>Contractor</i> for a change in the <i>Contract Price</i> and/or <i>Contract Time</i> shall be barred unless there has been strict compliance with PART 6 - CHANGES IN THE WORK. No verbal dealings between the parties and no implied acceptance of alterations or additions to the <i>Work</i> and no claims that the <i>Owner</i> has been unjustly enriched by any alteration or addition to the <i>Work</i>, whether in fact there is any such unjust enrichment or not, shall be the basis of a claim for additional payment under this <i>Contract</i> or a claim for any extension of the <i>Contract Time</i>.”</p>
SC37.2	6.1.3 to 6.1.8	<p><u>Add</u> new paragraphs 6.1.3, 6.1.4, 6.1.5, 6.1.6, 6.1.7 and 6.1.8 as follows:</p> <p>“6.1.3 The <i>Contractor</i> agrees that changes resulting from construction coordination, including but not limited to, site surface</p>

	<p>conditions, site coordination, and <i>Subcontractor and Supplier</i> coordination are included in the <i>Contract Price</i> and the <i>Contractor</i> shall be precluded from making any claim for a change in the <i>Contract Price</i> as a result of such changes.</p> <p>6.1.4 Labour costs shall be actual, prevailing rates at the <i>Place of the Work</i> paid to workers, plus statutory charges on labour including WSIB, unemployment insurance, Canada pension, vacation pay, hospitalization and medical insurance. The <i>Contractor</i> shall provide these rates, when requested by the <i>Consultant</i>, for review and/or agreement.</p> <p>6.1.5 Quotations for changes to the <i>Work</i> shall only include <i>Direct Costs</i> and be accompanied by itemized breakdowns together with detailed, substantiating quotations or cost vouchers from <i>Subcontractors</i> and <i>Suppliers</i>, submitted in a format acceptable to the <i>Consultant</i> and shall include any <i>Direct Costs</i> associated with extensions in <i>Contract Time</i>.</p> <p>6.1.6 When both additions and deletions covering related <i>Work</i> or substitutions are involved in a change to the <i>Work</i>, payment, including <i>Overhead</i> and profit, shall be calculated on the basis of the net difference, if any, with respect to that change in the <i>Work</i>.</p> <p>6.1.7 No extension to the <i>Contract Time</i> shall be granted for changes in the <i>Work</i> unless the <i>Contractor</i> can clearly demonstrate that such changes significantly alter the overall construction schedule submitted at the commencement of the <i>Work</i>. Extensions of <i>Contract Time</i> and all associated costs, if approved, shall be included in the relevant <i>Change Order</i>.</p> <p>6.1.8 When a change in the <i>Work</i> is proposed or required, the <i>Contractor</i> shall within 10 calendar days submit to the <i>Consultant</i> for review a claim for a change in <i>Contract Price</i> and/or <i>Contract Time</i>. Should 10 calendar days be insufficient to prepare the submission, the <i>Contractor</i> shall within 5 calendar days, advise the <i>Consultant</i> in writing of the proposed date of submission of the claim. Claims submitted after the dates prescribed herein will not be considered.”</p>
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SC38 GC 6.2 CHANGE ORDER

SC38.1	6.2.1	<p>In paragraph 6.2.1 after the last sentence in the paragraph <u>add</u> the following:</p> <p>“The adjustment in the <i>Contract Time</i> and the <i>Contract Price</i> shall include an adjustment, if any, for delay or for the impact that the change in the <i>Work</i> has on the <i>Work</i> of the <i>Contractor</i>, and once such adjustment is made, the <i>Contractor</i> shall be precluded from making any further claims for delay or impact with respect to the change in the <i>Work</i>.”</p>
SC38.2	6.2.3 to 6.2.5	<p><u>Add</u> new paragraphs 6.2.3, 6.2.4, and 6.2.5 as follows:</p> <p>“6.2.3 The value of a change shall be determined in one or more of the following methods as directed by the <i>Consultant</i>:</p> <ul style="list-style-type: none"> .1 by estimate and acceptance of a lump sum; .2 by negotiated unit prices which include the <i>Contractor’s</i> overhead and profit, or; .3 by the actual <i>Direct Cost</i> to the <i>Owner</i>, such costs to be the actual cost after all credits included in the change have been deducted, plus the following ranges of mark-up on such costs: <ul style="list-style-type: none"> .1 Contractor on Work of their own forces, 5% overhead, 5 % profit .2 Sub-Contractor on Work of their own forces, 5% overhead, 5% profit .3 Contractor on Work of Sub-Contractor, 5% overhead only, <p style="margin-left: 40px;">the above includes for all site and office related overhead costs.</p> <p>6.2.4 All quotations shall include <i>Direct Costs</i> and be submitted in a complete manner listing:</p> <ul style="list-style-type: none"> .1 quantity of each material, .2 unit cost of each material, .3 man hours involved,

		<p>.4 cost per hour, .5 <i>Subcontractor</i> quotations submitted listing items 1 to 4 above and item 6 below. .6 mark-up.</p> <p>6.2.5 The <i>Owner</i> and the <i>Consultant</i> will not be responsible for delays to the <i>Work</i> resulting from late, incomplete or inadequately broken-down valuations submitted by the <i>Contractor</i>.”</p>
SC38.3		

SC39 GC 6.3 CHANGE DIRECTIVE

SC39.1	6.3.6.1	<p><u>Amend</u> paragraph 6.3.6.1 by deleting the final period and adding the following:</p> <p>“.1 Five percent (5%) for profit plus five percent (5%) for overhead on work by the <i>Contractor’s</i> own forces up to the value of \$15,000 and five percent (5%) for profit plus three percent (3%) for <i>Overhead</i> on work by the <i>Contractor’s</i> own forces in excess of \$15,000 and,</p> <p>.2 5 percent (5%) fee on amounts paid to <i>Subcontractors</i> or <i>Suppliers</i> under subparagraph 6.3.7.9 for changes up to the value of \$15,000 and five percent (5%) on changes over \$15,000.</p> <p>Unless a <i>Subcontractor’s</i> or <i>Supplier’s</i> price has been approved by the <i>Owner</i>, the <i>Subcontractor</i> or <i>Supplier</i> shall be entitled to its actual net cost as determined in accordance with paragraph 6.3.7, plus ten percent (5%) for profit and five percent (5%) for <i>Overhead</i> on such actual net cost for changes in the <i>Work</i>, up to the value of \$15,000 and five percent (5%) for profit and three percent (3%) for overhead on such actual net cost changes in the <i>Work</i> in excess of \$15,000.”</p>
SC39.2	6.3.6.2	<p><u>Delete</u> paragraph 6.3.6.2 and <u>replace</u> it with the following:</p> <p>“.2 If a change in the <i>Work</i> results in a net decrease in the <i>Contract Price</i> in excess of \$15,000 the amount of the credit shall be the net cost, with deduction for <i>Overhead</i> and profit. If a change in the <i>Work</i> results in a net decrease in the <i>Contract Price</i> of \$15,000 or less, the amount of the credit shall be the net cost, without deduction for <i>Overhead</i> or profit.</p>

SC39.3	6.3.7. 1	In subparagraph 6.3.7.1 after the words “in the direct employ of the <i>Contractor</i> ” <u>add</u> the words “while directly engaged in the work attributable to the change”.
SC39.4	6.3.7	At the end of paragraph 6.3.7 <u>add</u> the following: “All other costs attributable to the change in the <i>Work</i> including the costs of all administrative or supervisory personnel are included in <i>Overhead</i> and profit calculated in accordance with the provisions of paragraph 6.1.5.”

SC40 GC 6.4 CONCEALED OR UNKNOWN CONDITIONS

SC40.1	6.4.1	<p><u>Delete</u> paragraph 6.4.1 in its entirety and <u>replace</u> with the following:</p> <p>6.4.1.1 Prior to the submission of the bid on which the <i>Contract</i> was awarded, the <i>Contractor</i> confirms that it carefully investigated the <i>Place of the Work</i> and carried out such tests as it deemed appropriate and, in doing so, applied to that investigation the degree of care and skill required by paragraph 3.14.1. If the <i>Contractor</i> has not conducted such careful investigation, it is deemed to assume all risk of conditions or circumstances now existing or arising in the course of the <i>Work</i> which could make the <i>Work</i> more expensive or more difficult to perform than was contemplated at the time the <i>Contract</i> was executed. No allowances will be made for additional costs and no claims by the <i>Contractor</i> will be entertained in connection with conditions which could reasonably have been ascertained by such investigation or other due diligence undertaken prior to the execution of the <i>Contract</i>.</p> <p>6.4.1.2 No claim by the <i>Contractor</i> will be considered by the <i>Owner</i> or the <i>Consultant</i> in connection with conditions which could reasonably have been ascertained by such investigation or other due diligence undertaken prior to the execution of the <i>Contract</i>.</p> <p>6.4.1.3 The <i>Contractor</i> expressly acknowledges that, prior to the submission of the bid on which the <i>Contract</i> was awarded, the <i>Contractor</i> may have been prevented from carefully investigating the <i>Place of the Work</i> as a result of <i>Force Majeure</i>. Understanding such limitations, the <i>Contractor</i> proceeded with its bid. The <i>Contractor</i> shall not, therefore, make any claim arising from <i>Force Majeure</i> conditions which</p>
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		may have prevented the <i>Contractor</i> from fulfilling its obligations under this GC 6.4.”
SC40.2	6.4.2	<p><u>Amend</u> paragraph 6.4.2 by <u>adding</u> a new first sentence as follows:</p> <p>“Having regard to paragraph 6.4.1, if the <i>Contractor</i> believes that the conditions of the <i>Place of the Work</i> differ materially from those reasonably anticipated, differ materially from those indicated in the <i>Contract Documents</i> or were concealed from discovery notwithstanding the conduct of the investigation described in paragraph 6.4.1, it shall provide the <i>Owner</i> and the <i>Consultant</i> with <i>Notice in Writing</i> no later than five (5) <i>Working Days</i> after the first observation of such conditions.”</p> <p>-and-</p> <p><u>amend</u> the existing second sentence of paragraph 6.4.2 in the second line, following the word “materially” by <u>adding</u> the words “or were concealed from discovery notwithstanding the conduct of the investigation described in paragraph 6.4.1,”.</p>
SC40.3	6.4.3	<p><u>Delete</u> paragraph 6.4.3 in its entirety and <u>substitute</u> the following:</p> <p>“6.4.3 If the <i>Consultant</i> makes a finding pursuant to paragraph 6.4.2 that no change in the <i>Contract Price</i> or the <i>Contract Time</i> is justified, the <i>Consultant</i> shall report in writing the reasons for this finding to the <i>Owner</i> and the <i>Contractor</i>.”</p>
SC40.4	6.4.5	<p><u>Add</u> new paragraph 6.4.5 as follows:</p> <p>“6.4.5 No claims for additional compensation or for an extension of <i>Contract Time</i> shall be allowed if the <i>Contractor</i> fails to give <i>Notice in Writing</i> to the <i>Owner</i> or <i>Consultant</i>, as required by paragraph 6.4.2.”</p>

SC41 GC 6.5

DELAYS

SC41.1	6.5.1	In paragraph 6.5.1 <u>delete</u> the words after the word “for” in the fourth line and <u>replace</u> them with the words “...reasonable <i>Direct Costs</i> directly flowing from the delay, but excluding any consequential, indirect or special damages (including, without limitation, loss of profits, loss of opportunity or loss of productivity).”
SC41.2	6.5.2	In paragraph 6.5.2,

		<p><u>delete</u> the words “not issued as the result of an act or fault of the <i>Contractor</i> or any person employed or engaged by the <i>Contractor</i> directly or indirectly,” and <u>replace</u> them with “issued on account of a direct breach, violation, contravention, or a failure to abide by any laws, ordinances, rules, regulations, or codes by the <i>Owner</i>, the <i>Owner’s</i> other contractor(s), or the <i>Consultant</i>, and relating to the <i>Work</i> or the <i>Place of the Work</i>,”</p> <p>-and-</p> <p><u>delete</u> the words after the word “for” in the fourth line of paragraph 6.5.2, and <u>replace</u> them with the words “...reasonable <i>Direct Costs</i> directly flowing from the delay, but excluding any consequential, indirect or special damages (including, without limitation, loss of profits, loss of opportunity or loss of productivity).”</p>
SC41.3	6.5.3	<p><u>Delete</u> paragraph 6.5.3 in its entirety and <u>replace</u> with the following:</p> <p>“6.5.3 If either party is delayed in the performance of their obligations under this <i>Contract</i> by <i>Force Majeure</i>, then the <i>Contract Time</i> shall be extended for such reasonable time as the <i>Owner</i> and the <i>Contractor</i> shall agree. The extension of time shall not be less than the time lost as a result of the event causing the delay, unless the parties agree to a shorter extension. Neither party shall be entitled to payment for costs incurred by such delays. Upon reaching agreement on the extension of the <i>Contract Time</i> attributable to the <i>Force Majeure</i> event, the <i>Owner</i> and the <i>Contractor</i> shall execute a <i>Change Order</i> indicating the length of the extension to the <i>Contract Time</i> and confirming that there are no costs payable by the either party for the extension of <i>Contract Time</i>. However, if at the time an event of <i>Force Majeure</i> arises a party is in default of its obligations under the <i>Contract</i> and has received a notice of default pursuant to PART 7 – DEFAULT NOTICE, this paragraph 6.5.3 shall not excuse a party from its obligation to cure the default(s). For greater certainty, the defaulting party, to the extent possible, must continue to address and cure the default notwithstanding an event of <i>Force Majeure</i>.”</p>
SC41.4	6.5.4	<p><u>Delete</u> paragraph 6.5.4 in its entirety and <u>replace</u> it with the following:</p> <p>“6.5.4 No extension or compensation shall be made for delay or impact on the <i>Work</i> unless notice in writing of a claim is given to the <i>Consultant</i> not later than ten (10) <i>Working Days</i> after the commencement of the delays or impact on the <i>Work</i>, provided</p>

		however, that, in the case of a continuing cause of delay or impact on the <i>Work</i> , only one notice of claim shall be necessary.”
SC41.5	6.5.6 to 6.5.8	<p><u>Add</u> new paragraphs 6.5.6, 6.5.7 and 6.5.8 as follows:</p> <p>“6.5.6 If the <i>Contractor</i> is delayed in the performance of the <i>Work</i> by an act or omission of the <i>Contractor</i> or anyone directly or indirectly employed or engaged by the <i>Contractor</i>, or by any cause within the <i>Contractor’s</i> control, then (i) firstly, at its expense, and to the extent possible, the <i>Contractor</i> shall accelerate the work and/or provide overtime work to recover time lost by a delay arising under this paragraph 6.5.6, and (ii) secondly, where it is not possible for the <i>Contractor</i> to recover the time lost by implementing acceleration measures and/or overtime work, the <i>Contract Time</i> may be extended for such reasonable time as the <i>Owner</i> may decide in consultation with the <i>Consultant</i> and the <i>Contractor</i>. The <i>Owner</i> shall be reimbursed by the <i>Contractor</i> for all reasonable costs incurred by the <i>Owner</i> as the result of such delay, including, but not limited to, <i>Owner’s</i> staff costs, the cost of all additional services required by the <i>Owner</i> from the <i>Consultant</i> or any sub-consultants, project managers, or others employed or engaged by the <i>Owner</i>, and in particular, the costs of the <i>Consultant’s</i> services during the period between the date of <i>Substantial Performance of the Work</i> stated in Article A-1 herein, as the same may be extended through the provision of these General Conditions, and any later or actual date of <i>Substantial Performance of the Work</i> achieved by the <i>Contractor</i>.</p> <p>6.5.7 Without limiting the obligations of the <i>Contractor</i> described in GC 3.2 – CONSTRUCTION BY OWNER OR OTHER CONTRACTORS or GC 9.4 – CONSTRUCTION SAFETY, the <i>Owner</i> or <i>Consultant</i> may, by <i>Notice in Writing</i>, direct the <i>Contractor</i> to stop the <i>Work</i> where the <i>Owner</i> or <i>Consultant</i> determines that there is an imminent risk to the safety of persons or property at the <i>Place of the Work</i>. In the event that the <i>Contractor</i> receives such notice, it shall immediately stop the <i>Work</i> and secure the site. The <i>Contractor</i> shall not be entitled to an extension of the <i>Contract Time</i> or to an increase in the <i>Contract Price</i> unless the resulting delay, if any, would entitle the <i>Contractor</i> to an extension of the <i>Contact Time</i> or the reimbursement of the <i>Contractor’s</i> costs as provided in paragraphs 6.5.1, 6.5.2 or 6.5.3.</p>

		6.5.8 No claim for delay shall be made and the <i>Contract Time</i> shall not be extended due to climatic conditions or arising from the <i>Contractor's</i> efforts to maintain the <i>Construction Schedule</i> ."
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PART 7 DEFAULT NOTICE

SC42 GC 7.1 OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK OR TERMINATE THE CONTRACT

SC42.1	7.1.3.4	<u>Add</u> a new subparagraph 7.1.3.4 as follows: ".4 an "acceptable schedule" as referred to in subparagraph 7.1.3.2. means a schedule approved by the <i>Consultant</i> and the <i>Owner</i> wherein the default can be corrected within the balance of the <i>Contract Time</i> and shall not cause delay to any other aspect of the <i>Work</i> or the work of other contractors, and in no event shall it be deemed to give a right to extend the <i>Contract Time</i> ."
SC42.2	7.1.4.1	<u>Delete</u> subparagraph 7.1.4.1 and <u>replace</u> it with the following: ".1 correct such default and deduct the cost, including <i>Owner's</i> expenses, thereof from any payment then or thereafter due the <i>Contractor</i> ."
SC42.3	7.1.4.2	<u>Delete</u> subparagraph 7.1.4.2 and <u>replace</u> it with the following: ".2 by providing <i>Notice in Writing</i> to the <i>Contractor</i> , terminate the <i>Contractor's</i> right to continue with the <i>Work</i> in whole or in part or terminate the <i>Contract</i> , and publish a notice of termination (Form 8) in accordance with the <i>Act</i> ."
SC42.4	7.1.5.3	In subparagraph 7.1.5.3 <u>delete</u> the words: "however, if such cost of finishing the <i>Work</i> is less than the unpaid balance of the <i>Contract Price</i> , the <i>Owner</i> shall pay the <i>Contractor</i> the difference"
SC42.5	7.1.6	<u>Delete</u> paragraph 7.1.6 in its entirety.
SC42.6	7.1.6 to 7.1.10	<u>Add</u> new paragraphs 7.1.6, 7.1.7, 7.1.8, 7.1.9 and 7.1.10 as follows: "7.1.6 In addition to its right to terminate the <i>Contract</i> set out herein, the <i>Owner</i> may terminate this <i>Contract</i> at any time for any other reason and without cause upon giving the <i>Contractor</i> fifteen (15) <i>Working Days Notice in Writing</i> to that effect. In such event, the <i>Contractor</i> shall be entitled to be paid for all <i>Work</i> performed including reasonable profit, for loss sustained

		<p>upon <i>Products</i> and <i>Construction Equipment</i>, and such other damages as the <i>Contractor</i> may have sustained as a result of the termination of the <i>Contract</i>, but in no event shall the <i>Contractor</i> be entitled to be compensated for any loss of profit on unperformed portions of the <i>Work</i>, or indirect, special, or consequential damages incurred.</p> <p>7.1.7 The <i>Owner</i> may suspend <i>Work</i> under this <i>Contract</i> at any time for any reason and without cause upon giving the <i>Contractor</i> <i>Notice in Writing</i> to that effect. In such event, the <i>Contractor</i> shall be entitled to be paid for all <i>Work</i> performed to the date of suspension and be compensated for all actual costs incurred arising from the suspension, including reasonable profit, for loss sustained upon <i>Products</i> and <i>Construction Equipment</i>, and such other damages as the <i>Contractor</i> may have sustained as a result of the suspension of the <i>Work</i>, but in no event shall the <i>Contractor</i> be entitled to be compensated for any indirect, special, or consequential damages incurred. In the event that the suspension continues for more than thirty (30) calendar days, the <i>Contract</i> shall be deemed to be terminated and the provisions of paragraph 7.1.6 shall apply.</p> <p>7.1.8 In the case of either a termination of the <i>Contract</i> or a suspension of the <i>Work</i> under GC 7.1 - OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, OR TERMINATE THE CONTRACT or GC 7.2 - CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the <i>Contractor</i> shall use its best commercial efforts to mitigate the financial consequences to the <i>Owner</i> arising out of the termination or suspension, as the case may be.</p> <p>7.1.9 Upon the resumption of the <i>Work</i> following a suspension under GC 7.1 - OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK, OR TERMINATE THE CONTRACT or GC 7.2 - CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the <i>Contractor</i> will endeavour to minimize the delay and financial consequences arising out of the suspension.</p> <p>7.1.10 The <i>Contractor's</i> obligations under the <i>Contract</i> as to quality, correction, and warranty of the <i>Work</i> performed by the <i>Contractor</i> up to the time of termination or suspension shall</p>
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		continue after such termination of the <i>Contract</i> or suspension of the <i>Work</i> .”
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SC43 GC 7.2 CONTRACTOR’S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT

SC43.1	7.2.2	<u>Delete</u> paragraph 7.2.2 and <u>replace</u> it with the following: “7.2.2 If the <i>Work</i> is suspended or otherwise delayed for a period of 40 consecutive <i>Working Days</i> or more under a stop work order issued by a court or other public authority on account of a breach, violation, contravention, or a failure to abide by any laws, ordinances, rules, regulations, or codes directly by the <i>Owner</i> , the <i>Owner’s</i> other contractor(s), or the <i>Consultant</i> , and relating to the <i>Work</i> or the <i>Place of the Work</i> , the <i>Contractor</i> may, without prejudice to any other right or remedy the <i>Contractor</i> may have, terminate the <i>Contract</i> by giving the <i>Owner</i> Notice in <i>Writing</i> to that effect.”
SC43.2	7.2.3 .1	<u>Delete</u> subparagraph 7.2.3.1 in its entirety.
SC43.3	7.2.3 .2	<u>Delete</u> subparagraph 7.2.3.2 in its entirety.
SC43.4	7.2.3 .4	In subparagraph 7.2.3.4, <u>delete</u> the words "except for GC 5.1 - FINANCING INFORMATION REQUIRED OF THE OWNER".
SC43.5	7.2.5	<u>Renumber</u> paragraph 7.2.5 as paragraph 7.2.6. and <u>add</u> a new paragraph 7.2.5 as follows: “7.2.5 If the default cannot be corrected within the 5 <i>Working Days</i> specified in paragraph 7.2.4, the <i>Owner</i> shall be deemed to have cured the default if it: .1 commences correction of the default within the specified time; .2 provides the <i>Contractor</i> with an acceptable schedule for such correction; and, .3 completes the correction in accordance with such schedule.”

SC43.6	7.2.6	<p><u>Delete</u> paragraph 7.2.6 entirely and <u>replace</u> with the following:</p> <p>“7.2.6 If the <i>Contractor</i> terminates the <i>Contract</i> under the conditions described in GC 7.2 – CONTRACTOR’S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the <i>Contractor</i> shall be entitled to be paid for all <i>Work</i> performed to the date of termination, as determined by the <i>Consultant</i>. The <i>Contractor</i> shall also be entitled to recover the direct costs associated with termination, including the costs of demobilization and losses sustained on <i>Products</i> and <i>Construction Equipment</i>. The <i>Contractor</i> shall not be entitled to any recovery for any special, indirect or consequential losses, including loss of profit.”</p>
SC43.7	7.2.7 to 7.2.9	<p><u>Add</u> new paragraphs 7.2.7, 7.2.8 and 7.2.9 as follows:</p> <p>“7.2.7 The <i>Contractor</i> shall not be entitled to give notice of the <i>Owner’s</i> default or terminate the <i>Contract</i> in the event the <i>Owner</i> withholds certificates or payment or both in accordance with the <i>Contract</i> because of:</p> <p>.1 the <i>Contractor’s</i> failure to pay all legitimate claims promptly,</p> <p>or</p> <p>.2 the failure of the <i>Contractor</i> to discharge construction liens which are registered against the title to the <i>Place of the Work</i>.</p> <p>7.2.8 The <i>Contractor’s</i> obligations under the <i>Contract</i> as to quality, correction and warranty of the <i>Work</i> performed by the <i>Contractor</i> up to the effective date of termination shall continue in force and shall survive termination of this <i>Contract</i> by the <i>Contractor</i>.</p> <p>7.2.9 If the <i>Contractor</i> suspends the <i>Work</i> or terminates the <i>Contract</i> as provided for in GC 7.2 – CONTRACTOR’S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT, the <i>Contractor</i> shall ensure the site and the <i>Work</i> are left in a safe, secure condition as required by authorities having jurisdiction at the <i>Place of the Work</i> and the <i>Contract Documents</i>.”</p>

SC44 GC 8.1

AUTHORITY OF THE CONSULTANT

SC44.1	8.1.3	<u>Delete</u> paragraph 8.1.3 in its entirety and <u>substitute</u> as follows:
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		“8.1.3 If a dispute is not resolved promptly, the <i>Consultant</i> will give such instruction as in the <i>Consultant’s</i> opinion are necessary for the proper performance of the <i>Work</i> and to prevent delays pending settlement of the dispute. The parties shall act immediately according to such instructions, it being understood that by doing so neither party will jeopardize any claim the party may have.”
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SC45 GC 8.2

NEGOTIATION, MEDIATION AND ARBITRATION

SC45.1	8.2.1	<u>Amend</u> paragraph 8.2.1 by changing part of the second line from “shall appoint a <i>Project Mediator</i> ” to “may appoint a <i>Project Mediator</i> , except that such an appointment shall only be made if both the <i>Owner</i> and the <i>Contractor</i> agree.”
SC45.2	8.2.4	<u>Amend</u> paragraph 8.2.4 by changing part of the second line from “the parties shall request the <i>Project Mediator</i> ” to “and subject to paragraph 8.2.1 the parties may request the <i>Project Mediator</i> ”.
SC45.3	8.2.6 to 8.2.8	<u>Delete</u> paragraphs 8.2.6, 8.2.7 and 8.2.8 in their entirety.
SC45.4	8.2.6	<u>Add</u> new paragraph 8.2.6 as follows: “8.2.6 The dispute may be finally resolved by arbitration under the Rules for Arbitration of Construction Disputes as provided in CCDC 40 in effect at the time of bid closing, provided that both the <i>Contractor</i> and the <i>Owner</i> agree. If the <i>Contractor</i> and the <i>Owner</i> agree to resolve the dispute by arbitration, the arbitration shall be conducted in the jurisdiction of the <i>Place of the Work</i> .”
SC45.5	8.2.9 , 8.2.1 0 & 8.2.1 1	<u>Add</u> a new paragraphs 8.2.9, 8.2.10, and 8.2.11 as follows: “8.2.9 Prior to delivering a notice of <i>Adjudication</i> in a form prescribed by the <i>Act</i> , the parties agree to first address all disputes by attending at least one meeting with the <i>Owner’s</i> representative, the <i>Consultant’s</i> representative, and the <i>Contractor’s</i> representative, prior to commencing an <i>Adjudication</i> . The parties agree that such steps will be taken to resolve any disputes in a timely and cost effective manner. If a resolution to the dispute(s) is not made at such a meeting, any party who plans to commence an <i>Adjudication</i> shall provide the other party with 5 <i>Working Days’ Notice in Writing</i> of its intention to issue a notice of <i>Adjudication</i> .”

		<p>8.2.10 Other than where the <i>Contractor</i> is obliged to commence an <i>Adjudication</i> pursuant to an undertaking under the <i>Act</i>, neither the <i>Owner</i> nor the <i>Contractor</i> shall commence an <i>Adjudication</i> during the <i>Restricted Period</i>.</p> <p>8.2.11 Where either party has delivered a notice of <i>Adjudication</i> in a form prescribed by the <i>Act</i>, the procedures and rules set out under the <i>Act</i> and the regulations thereto shall govern the <i>Adjudication</i>.”</p>
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SC46 GC 9.1 PROTECTION OF WORK AND PROPERTY

SC46.1	9.1.1 .1	<p><u>Delete</u> subparagraph 9.1.1.1 in its entirety and <u>substitute</u> the following: “.1 errors in the <i>Contract Documents</i> which the <i>Contractor</i> could not have discovered applying the standard of care described in paragraph 3.14.1;”</p>
SC46.2	9.1.2	<p><u>Delete</u> paragraph 9.1.2 in its entirety and <u>substitute</u> as follows: “9.1.2 Before commencing any <i>Work</i>, the <i>Contractor</i> shall determine the locations of all underground or hidden utilities and structures indicated in or inferable from the <i>Contract Documents</i>, or that are inferable from an inspection of the <i>Place of the Work</i> exercising the degree of care and skill described in paragraph 3.14.1.”</p>
SC46.3	9.1.5	<p><u>Add</u> new paragraph 9.1.5 as follows: “9.1.5 With respect to any damage to which paragraphs 9.1.3 or 9.1.4 apply, the <i>Contractor</i> shall neither undertake to repair or replace any damage whatsoever to the work of other contractors, or to adjoining property, nor acknowledge that the same was caused or occasioned by the <i>Contractor</i>, without first consulting the <i>Owner</i> and receiving written instructions as to the course of action to be followed from either the <i>Owner</i> or the <i>Consultant</i>. Where, however, there is danger to life, the environment, or public safety, the <i>Contractor</i> shall take such emergency action as it deems necessary to remove the danger.”</p>

SC47 GC 9.2 TOXIC AND HAZARDOUS SUBSTANCES

SC47.1	9.2.5 .5	<u>Add</u> a new subparagraph 9.2.5.5 as follows: “.5 in addition to the steps described in subparagraph 9.2.5.3, take any further steps it deems necessary to mitigate or stabilize any conditions resulting from encountering toxic or hazardous substances or materials.”
SC47.2	9.2.6	<u>Add</u> the following to paragraph 9.2.6, after the word “responsible” in the second line: “or whether any toxic or hazardous substances or materials already at the <i>Place of the Work</i> (and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the <i>Contractor</i> or anyone for whom the <i>Contractor</i> is responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment, or material damages to the property of the <i>Owner</i> or others,”.
SC47.3	9.2.8	<u>Add</u> the following to paragraph 9.2.8, after the word “responsible” in the second line: “or whether any toxic or hazardous substances or materials already at the <i>Place of the Work</i> (and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the <i>Contractor</i> or anyone for whom the <i>Contractor</i> is responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment, or material damages to the property of the <i>Owner</i> or others,”.
SC47.4	9.2.1 0	<u>Add</u> new paragraph 9.2.10 as follows: “9.2.10 The <i>Contractor, Subcontractors and Suppliers</i> shall not bring on to the <i>Place of the Work</i> any toxic or hazardous substances and materials except as required in order to perform the <i>Work</i> . If such toxic or hazardous substances or materials are required, storage in quantities sufficient to allow work to proceed to the end of any current work week only shall be permitted. All such toxic and hazardous materials and substances shall be handled and disposed of only in accordance with all laws and regulations that are applicable at the <i>Place of the Work</i> .”

SC48 GC 9.4 CONSTRUCTION SAFETY

SC48.1	9.4.1	<p><u>Delete</u> paragraph 9.4.1 in its entirety and <u>substitute</u> as follows:</p> <p>“9.4.1 The <i>Contractor</i> shall be solely responsible for construction safety at the <i>Place of the Work</i> and for compliance with the rules, regulations, and practices required by the <i>OHSA</i>, including, but not limited to those of the "constructor", and shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the <i>Work</i>. Without limiting the foregoing, the <i>Contractor</i> shall be solely responsible for construction safety in respect of its <i>Consultants</i>, other <i>Consultants</i>, <i>Subcontractors</i> and <i>Suppliers</i>, the <i>Owner's</i> own forces, and other contractors, subcontractors, and suppliers during the course of the <i>Project</i>.”</p>
SC48.2	9.4.2 to 9.4.1 0	<p><u>Add</u> new paragraphs 9.4.2 to 9.4.10 as follows:</p> <p>9.4.2 Prior to the commencement of the <i>Work</i>, the <i>Contractor</i> shall submit to the <i>Owner</i>:</p> <ul style="list-style-type: none"> .1 the evidence of workers' compensation compliance required by GC 10.4.1; .2 copies of the <i>Contractor's</i> insurance policies having application to the <i>Project</i> or certificates of insurance, at the option of the <i>Owner</i>; .3 documentation setting out the <i>Contractor's</i> in-house safety programs; .4 a copy of the "Notice of Project" filed with the Ministry of Labour; .5 copies of any documentation or notices to be filed or delivered to the authorities having jurisdiction for the regulation of occupational health and safety at the <i>Place of the Work</i>. <p>9.4.3 The <i>Contractor</i> shall indemnify and save harmless the <i>Owner</i>, its agents, trustees, officers, directors, employees, consultants, successors, appointees, and assigns from and against the consequences of any and all safety infractions committed by the <i>Contractor</i> under the occupational health and safety legislation in force at the <i>Place of the Work</i> including the</p>

		<p>payment of legal fees and disbursements on a substantial indemnity basis.</p> <p>9.4.4 The <i>Owner</i> undertakes to include in its contracts with other contractors and in its instructions to its own forces the requirement that the other contractor or its own forces, as the case may be, comply with the policies and procedures of and the directions and instructions from the <i>Contractor</i> with respect to occupational health and safety and related matters.</p> <p>9.4.5 If the <i>Owner</i> is of the reasonable opinion that the <i>Contractor</i> has not taken such precautions as are necessary to ensure compliance with the requirements of paragraph 9.4.1, the <i>Owner</i> may take any remedial measures which it deems necessary, including stopping the performance of all or any portion of the <i>Work</i>, and the <i>Owner</i> may use its employees, the <i>Contractor</i>, any <i>Subcontractor</i> or any other contractors to perform such remedial measures.</p> <p>9.4.6 The <i>Contractor</i> shall file any notices or any similar document required pursuant to the <i>Contract</i> or the safety regulations in force at the <i>Place of the Work</i>. This duty of the <i>Contractor</i> will be considered to be included in the <i>Work</i> and no separate payment therefore will be made to the <i>Contractor</i>.</p> <p>9.4.7 Unless otherwise provided in the <i>Contract Documents</i>, the <i>Contractor</i> shall develop, maintain and supervise for the duration of the <i>Work</i> a comprehensive safety program that will effectively incorporate and implement all required safety precautions. The program shall, at a minimum, respond fully to the applicable safety regulations and general construction practices for the safety of persons or property, including, without limitation, any general safety rules and regulations of the <i>Owner</i> and any workers' compensation or occupational health and safety statutes or regulations in force at the <i>Place of the Work</i>.</p> <p>9.4.8 The <i>Contractor</i> shall provide a copy of the safety program described in paragraph 9.4.7 hereof to the <i>Consultant</i> for delivery to the <i>Owner</i> prior to the commencement of the <i>Work</i>, and shall, ensure, as far as it is reasonably practical to do so, that every employer and worker performing work in respect of the <i>Project</i> complies with such program.</p>
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		<p>9.4.9 The <i>Contractor</i> shall arrange regular safety meetings, and shall supply and maintain, at its own expense, at its office or other well-known place at the job site, safety equipment necessary to protect the workers and general public against accident or injury as prescribed by the authorities having jurisdiction at the <i>Place of the Work</i>, including, without limitation, articles necessary for administering first-aid to any person and an emergency procedure for the immediate removal of any injured person to a hospital or a doctor's care.</p> <p>9.4.10 The <i>Contractor</i> shall promptly report in writing to the <i>Owner</i> and the <i>Consultant</i> all accidents of any sort arising out of or in connection with the performance of the <i>Work</i>, whether on or adjacent to the job site, giving full details and statement of witnesses. If death or serious injuries or damages are caused, the accident shall be promptly reported by the <i>Contractor</i> to the <i>Owner</i> and the <i>Consultant</i> by telephone or messenger in addition to any reporting required under the applicable safety regulations."</p>
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SC49 GC 10.1 TAXES AND DUTIES

SC49.1	10.1.2	<p><u>Amend</u> paragraph 10.1.2 by <u>adding</u> the following sentence to the end of the paragraph:</p> <p>"For greater certainty, the <i>Contractor</i> shall not be entitled to any mark-up for overhead or profit on any increase in such taxes and duties and the <i>Owner</i> shall not be entitled to any credit relating to mark-up for overhead or profit on any decrease in such taxes. The <i>Contractor</i> shall provide a detailed breakdown of <u>Additional</u> taxes if requested by the <i>Owner</i> in a form satisfactory to the <i>Owner</i>."</p>
SC49.2	10.1.3	<p><u>Add</u> new paragraph 10.1.3 as follows:</p> <p>"10.1.3 Where the <i>Owner</i> is entitled to an exemption or a recovery of sales taxes, customs duties, excise taxes or <i>Value Added Taxes</i> applicable to the <i>Contract</i>, the <i>Contractor</i> shall, at the request of the <i>Owner</i>, assist with the application for any exemption, recovery or refund of all such taxes and duties and all amounts recovered or exemptions obtained shall be for the sole benefit of the <i>Owner</i>. The <i>Contractor</i> agrees to endorse over to the <i>Owner</i> any cheques received from the federal or provincial governments, or any other taxing authority, as may be required to give effect to this paragraph."</p>

SC50 GC 10.2 LAWS, NOTICES, PERMITS, AND FEES

SC50.1	10.2.5	<p><u>Amend</u> paragraph 10.2.5 by <u>adding</u> the words “Subject to paragraph 3.4” at the beginning of the paragraph.</p> <p>-and-</p> <p><u>Add</u> the following to the end of the second sentence:</p> <p>“...and no further <i>Work</i> on the affected components of the <i>Contract</i> shall proceed until these directives have been obtained by the <i>Contractor</i> from the <i>Consultant</i>.”</p>
SC50.2	10.2.6	<p><u>Amend</u> paragraph 10.2.6 by <u>adding</u> the following sentence to the end of the paragraph:</p> <p>“In the event the <i>Owner</i> suffers loss or damage as a result of the <i>Contractor’s</i> failure to comply with paragraph 10.2.5 and notwithstanding any limitations described in paragraph 12.1.1, the <i>Contractor</i> agrees to indemnify and to hold harmless the <i>Owner</i> and the <i>Consultant</i> from and against any claims, demands, losses, costs, damages, actions suits or proceedings resulting from such failure by the <i>Contractor</i>.”</p>
SC50.3	10.2.7	<p><u>Amend</u> paragraph 10.2.7 by inserting the words “which changes were not, or could not have reasonably been known to the <i>Owner</i> or to the <i>Contractor</i>, as applicable, at the time of bid closing and which changes did not arise as a result of a public emergency or other <i>Force Majeure</i> event” to the second line, after the words “authorities having jurisdiction”.</p>
SC50.4	10.2.8	<p><u>Add</u> new paragraph 10.2.8 as follows:</p> <p>“10.2.8 The <i>Contractor</i> shall furnish all certificates that are required or given by the appropriate governmental authorities as evidence that the <i>Work</i> as installed conforms with the laws and regulations of authorities having jurisdiction, including certificates of compliance for the <i>Owner’s</i> occupancy or partial occupancy. The certificates are to be final certificates giving complete clearance of the <i>Work</i>, in the event that such governmental authorities furnish such certificates.”</p>

SC51 GC 10.4 WORKERS’ COMPENSATION

SC51.1	10.4.1	<p><u>Delete</u> paragraph 10.4.1 and <u>replace</u> with the following:</p>
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		<p>“10.4.1 Prior to commencing the <i>Work</i>, and with each and every application for payment thereafter, including the <i>Contractor’s</i> application for payment of the holdback amount following <i>Substantial Performance of the Work</i> and again with the <i>Contractor’s</i> application for final payment, the <i>Contractor</i> shall provide evidence of compliance with workers’ compensation legislation in force at the <i>Place of the Work</i>, including payments due thereunder.”</p>
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SC52 GC 11.1 INSURANCE

SC52.1	11.1	<p><u>Delete</u> entirety of GC 11.1 and <u>replace</u> with the following:</p> <p>“GC 11.1 INSURANCE</p> <p>11.1.1 Without restricting the generality of GC 12 – INDEMNIFICATION, the <i>Contractor</i> shall provide, maintain, and pay for the insurance coverages specified in GC 11.1 – INSURANCE. Unless otherwise stipulated, the duration of each insurance policy shall be from the date of commencement of the <i>Work</i> until the expiration of the warranty periods set out in the <i>Contract Documents</i>. Prior to commencement of the <i>Work</i> and upon the placement, renewal, <u>amendment</u>, or extension of all or any part of the insurance, the <i>Contractor</i> shall promptly provide the <i>Owner</i> with confirmation of coverage and, if required, a certified true copy of the policies certified by an authorized representative of the insurer together with copies of any <u>amending</u> endorsements.</p> <p>.1 General Liability Insurance</p> <p>General liability insurance shall be in the name of the <i>Contractor</i>, with the <i>Owner</i> and the <i>Consultant</i> named as <u>Additional insureds</u>, with limits of not less than \$2,000,000.00 inclusive per occurrence for bodily injury, death, and damage to property, including loss of use thereof, for itself and each of its employees, <i>Subcontractors</i> and/or agents. The insurance coverage shall not be less than the insurance required by IBC Form 2100, or its equivalent <u>replacement</u>, provided that IBC Form 2100 shall contain the latest edition of the relevant CCDC endorsement form. To achieve the desired limit,</p>
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		<p>umbrella, or excess liability insurance may be used. All liability coverage shall be maintained for completed operations hazards from the date of <i>Substantial Performance of the Work</i>, as set out in the certificate of <i>Substantial Performance of the Work</i>, on an ongoing basis for a period of 6 years following <i>Substantial Performance of the Work</i>. Where the <i>Contractor</i> maintains a single, blanket policy, the <u>Addition</u> of the <i>Owner</i> and the <i>Consultant</i> is limited to liability arising out of the <i>Project</i> and all operations necessary or incidental thereto. The policy shall be endorsed to provide the <i>Owner</i> with not less than 30 days' notice, in writing, in advance of any cancellation and of change or <u>amendment</u> restricting coverage.</p> <p>.2 Automobile Liability Insurance</p> <p>Automobile liability insurance in respect of licensed vehicles shall limits of not less than \$2,000,000.00 inclusive per occurrence for bodily injury, death and damage to property, covering all licensed vehicles <i>owned</i> or leased by the <i>Contractor</i>, and endorsed to provide the <i>Owner</i> with not less than 30 days' notice, in writing, in advance of any cancellation, change or <u>amendment</u> restricting coverage. Where the policy has been issued pursuant to a government-operated automobile insurance system, the <i>Contractor</i> shall provide the <i>Owner</i> with confirmation of automobile insurance coverage for all automobiles registered in the name of the <i>Contractor</i>.</p> <p>.3 Aircraft and Watercraft Liability Insurance</p> <p>Where determined necessary by the <i>Contractor</i>, acting reasonably, aircraft and watercraft liability insurance will be obtained in accordance with the provisions of paragraph 11.1.3. Aircraft and watercraft liability insurance with respect to owned or non-owned aircraft and watercraft if used directly or indirectly in the performance of the <i>Work</i>, including use of <u>Additional</u> premises, shall be subject to limits of not less than \$2,000,000.00 inclusive per occurrence for bodily injury, death and damage to property, including loss of use thereof and limits of not less than \$2,000,000.00 for aircraft passenger hazard. Such insurance shall be in a form acceptable to the <i>Owner</i>. The policies shall be endorsed to provide the <i>Owner</i> with not less than 30 days' notice, in writing, in advance of cancellation, change or <u>amendment</u> restricting coverage.</p> <p>.4 Property and Boiler and Machinery Insurance</p>
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		<p>(1) Builder's Risk property insurance shall be in the name of the <i>Contractor</i> with the <i>Owner</i> and the <i>Consultant</i> named as <u>Additional</u> insureds. The policy shall insure against all risks of direct physical loss or damage to the property insured which shall include all property included in the <i>Work</i>, whether owned by the <i>Contractor</i> or the owner or owned by others, so long as the property forms part of the <i>Work</i>. The property insured also includes all materials and supplies necessary to complete the work, whether installed in the work temporarily or permanently, in storage on the project site, or in transit to the project site, as well as temporary buildings, scaffolding, falsework forms, hoardings, excavation, site preparation and similar work. The insurance shall be for not less than the sum of the amount of the contract price and the full value of products that are specified to be provided by the owner for incorporation into the work, if applicable, with the deductible of \$10,000.00 payable by the contractor. The insurance shall include the foregoing and, otherwise, shall not be less than the insurance required by IBC Form 4042 or its equivalent <u>replacement</u> provided that the IBC Form 4042 shall include the latest <u>Addition</u> of the relevant CCDC endorsement form. The coverage shall be based on a completed value form and shall be maintained continuously until ten (10) days after the date of the final certificate of payment.</p> <p>(2) Boiler and machinery insurance shall be in the name of the <i>Contractor</i>, with the <i>Owner</i> and the <i>Consultant</i> named as <u>Additional</u> insureds, for not less than the <u>replacement</u> value of the boilers, pressure vessels and other insurable objects forming part of the <i>Work</i>. The insurance provided shall not be less than the insurance provided by the "Comprehensive Boiler and Machinery Form" and shall be maintained continuously from commencement of use or operation of the property insured and until 10 days after the date of the final certificate for payment.</p> <p>(3) The policies shall allow for partial or total use or occupancy of the <i>Work</i>.</p> <p>(4) The policies shall provide that, in the case of a loss or damage, payment shall be made to the <i>Owner</i> and the <i>Contractor</i> as their respective interests may appear. The <i>Contractor</i> shall act on behalf of the <i>Owner</i> for the purpose of adjusting the amount of such loss or damage payment with the</p>
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		<p>insurers. When the extent of the loss or damage is determined, the <i>Contractor</i> shall proceed to restore the <i>Work</i>. Loss or damage shall not affect the rights and obligations of either party under the <i>Contract</i> except that the <i>Contractor</i> shall be entitled to such reasonable extension of the <i>Contract Time</i>, relative to the extent of the loss or damage, as determined by the <i>Owner</i>, in its sole discretion.</p> <p>(5) The <i>Contractor</i> shall be entitled to receive from the <i>Owner</i>, in <u>Addition</u> to the amount due under the <i>Contract</i>, the amount at which the <i>Owner's</i> interest in restoration of the <i>Work</i> has been appraised, such amount to be paid as the restoration of the <i>Work</i> proceeds and as provided in GC 5.2 – APPLICATIONS FOR PROGRESS PAYMENT and GC 5.3 – PROGRESS PAYMENT. In <u>Addition</u>, the <i>Contractor</i> shall be entitled to receive from the payments made by the insurer the amount of the <i>Contractor's</i> interest in the restoration of the <i>Work</i>.</p> <p>(6) In the case of loss or damage to the <i>Work</i> arising from the work of other contractors, or the <i>Owner's</i> own forces, the <i>Owner</i>, in accordance with the <i>Owner's</i> obligations under paragraph 3.2.2.4 of GC 3.2 – CONSTRUCTION BY OWNER OR OTHER CONTRACTORS, shall pay the <i>Contractor</i> the cost of restoring the <i>Work</i> as the restoration of the <i>Work</i> proceeds and as provided in GC 5.2 – APPLICATIONS FOR PROGRESS PAYMENT and GC 5.3 – PROGRESS PAYMENT.</p> <p>.5 Contractors' Equipment Insurance</p> <p>"All risks" contractors' equipment insurance covering construction machinery and equipment used by the <i>Contractor</i> for the performance of the <i>Work</i>, excluding boiler insurance, shall be in a form acceptable to the <i>Owner</i> and shall not allow subrogation claims by the insurer against the <i>Owner</i>. The policies shall be endorsed to provide the <i>Owner</i> with not less than 30 days' notice, in writing, in advance of cancellation, change or <u>amendment</u> restricting coverage. Subject to satisfactory proof of financial capability by the <i>Contractor</i> for self-insurance of his equipment, the <i>Owner</i> agrees to waive the equipment insurance requirement.</p> <p>11.1.2 The <i>Contractor</i> shall be responsible for deductible amounts under the policies except where such amounts may</p>
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		<p>be excluded from the <i>Contractor's</i> responsibility by the terms of GC 9.1 - PROTECTION OF WORK AND PROPERTY and GC 9.2 - DAMAGES AND MUTUAL RESPONSIBILITY.</p> <p>11.1.3 Where the full insurable value of the <i>Work</i> is substantially less than the <i>Contract Price</i>, the <i>Owner</i> may reduce the amount of insurance required to waive the course of construction insurance requirement.</p> <p>11.1.4 If the <i>Contractor</i> fails to provide or maintain insurance as required by the <i>Contract Documents</i>, then the <i>Owner</i> shall have the right to provide and maintain such insurance and provide evidence of same to the <i>Contractor</i>. The <i>Contractor</i> shall pay the costs thereof to the <i>Owner</i> on demand, or the <i>Owner</i> may deduct the amount that is due or may become due to the <i>Contractor</i>.</p> <p>11.1.5 All required insurance policies shall be with insurers licensed to underwrite insurance in the jurisdiction of the <i>Place of the Work</i>."</p>
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SC53 GC 11.2 CONTRACT SECURITY

SC53.1	11.2.1	<p><u>Delete</u> paragraph 11.2.1 and <u>replace</u> it with the following:</p> <p>"11.2.1 If required by the <i>Contract Documents</i>, the <i>Contractor</i> shall, prior to the execution of the <i>Contract</i> and within 7 calendar days of receiving <i>Notice in Writing</i> to do so, furnish a performance bond and labour and material payment bond which meets the requirements under paragraph 11.2.2."</p>
SC53.2	11.2.2	<p><u>Delete</u> paragraph 11.2.2 and <u>replace</u> it with the following:</p> <p>"11.2.2 The performance bond and labour and material payment bond, if required, shall:</p> <ol style="list-style-type: none"> .1 be issued by a duly licensed surety company, which has been approved by the <i>Owner</i> and is permitted under the <i>Construction Act</i>, .2 be issued by an insurer licensed under the <i>Insurance Act</i> (Ontario) and authorized to transact a business of suretyship in the Province of Ontario; .3 shall be in the form prescribed by the <i>Act</i>,

		<p>.4 have a coverage limit of at least 50 per cent of the <i>Contract Price</i>, or such other percentage of the <i>Contract Price</i> as stated in the <i>Contract Documents</i>;</p> <p>.5 extends protection to <i>Subcontractors</i>, <i>Suppliers</i>, and any other persons supplying labour or materials to the <i>Project</i>, and</p> <p>.4 shall be maintained in good standing until the fulfillment of the <i>Contract</i>, including all warranty and maintenance periods set out in the <i>Contract Documents</i>.”</p>
SC53.3	11.2.3	<p><u>Add</u> new paragraph 11.2.3 as follows:</p> <p>“11.2.3 It is the intention of the parties that the performance bond shall be applicable to all of the <i>Contractor’s</i> obligations in the <i>Contract Document</i> and, wherever a performance bond is provided with language which conflicts with this intention, it shall be deemed to be amended to comply. The <i>Contractor</i> represents and warrants to the <i>Owner</i> that it has provided its surety with a copy of the <i>Contract Documents</i> prior to the issuance of such bonds.”</p>

SC54 GC 12.1 INDEMNIFICATION

SC54.1	12.1	<p><u>Delete</u> GC 12.1 – INDEMNIFICATION in its entirety and <u>substitute</u> as follows:</p> <p>“12.1.1 The <i>Contractor</i> shall indemnify and hold harmless the <i>Owner</i>, its parent, subsidiaries and affiliates, their respective partners, trustees, officers, directors, agents and employees and the <i>Consultant</i> from and against any and all claims, liabilities, expenses, demands, losses, damages, actions, costs, suits, or proceedings (hereinafter called “claims”), whether in respect of claims suffered by the <i>Owner</i> or in respect of claims by third parties, that directly or indirectly arise out of, or are attributable to, the acts or omissions of the <i>Contractor</i>, its employees, agents, <i>Subcontractors</i>, <i>Suppliers</i> or any other persons for whom it is in law responsible (including, without limitation, claims that directly or indirectly arise out of, or are attributable to, loss of use or damage to the <i>Work</i>, the <i>Owner’s</i> property or equipment, the <i>Contractor’s</i> property or equipment or equipment or property adjacent to the <i>Place of the Work</i> or death or injury to the <i>Contractor’s</i> personnel).</p>
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		12.1.2 The provisions of GC 12.1 - INDEMNIFICATION shall survive the termination of the <i>Contract</i> , howsoever caused and no payment or partial payment, no issuance of a final certificate of payment and no occupancy in whole or in part of the <i>Work</i> shall constitute a waiver or release of any of the provisions of GC 12.1.”
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SC55 GC 12.2 WAIVER OF CLAIMS

SC55.1	12.2.1	In paragraph 12.2.1 in the fourth line after the word “limitation” <u>add</u> the words “claims for delay pursuant to GC 6.5 DELAYS” -and- <u>add</u> the words “(collectively “Claims”)” after “ <i>Substantial Performance of the Work</i> ” in the sixth line.
SC55.2	12.2.1 .1	In subparagraph 12.2.1.1 change the word “claims” to “Claims” and change the word “claim” to “Claim”.
SC55.3	12.2.1 .2	In subparagraph 12.2.1.2 change the word “claims” to “Claims”.
SC55.4	12.2.1 .3	<u>Delete</u> subparagraph 12.2.1.3 in its entirety.
SC55.5	12.2.1 .4	In paragraph 12.2.1.4 change the word “claims” to “Claims”.
SC55.6	12.2.2	In paragraph 12.2.2 <u>delete</u> the words “in paragraphs 12.2.1.2 and 12.2.1.3” and <u>replace</u> them with “in paragraph 12.2.1.2” -and- change the word “claims” to “Claims” in both instances and change the word “claim” to “Claim”.
SC55.7	12.2.3	<u>Delete</u> paragraph 12.2.3 in its entirety.
SC55.8	12.2.4	<u>Delete</u> paragraph 12.2.4 in its entirety.
SC55.9	12.2.5	<u>Delete</u> paragraph 12.2.5 in its entirety.
SC55.10	12.2.6	In paragraph 12.2.6 change the word “claim” to “Claim” in all instances in the paragraph.
SC55.11	12.2.7	In paragraph 12.2.7 change “The party” to “The <i>Contractor</i> ”

	<p>12.3.9 Should any <i>Work</i> be repaired or replaced during the time period for which it is covered by the specified warranty, a new warranty shall be provided under the same conditions and for the same period as specified herein before. The new warranty shall commence at the completion of the repair or replacement.</p> <p>12.3.10 The <i>Contractor</i> shall ensure that its <i>Subcontractors</i> are bound to the requirements of GC 12.3 – WARRANTY for the <i>Subcontractor's</i> portion of the <i>Work</i>.</p> <p>12.3.11 The <i>Contractor</i> shall ensure that all warranties, guarantees or other obligations for <i>Work</i>, services or <i>Products</i> performed or supplied by any <i>Subcontractor</i>, <i>Supplier</i> or other person in connection with the <i>Work</i> are obtained and available for the direct benefit of the <i>Owner</i>. In the alternative, the <i>Contractor</i> shall assign to the <i>Owner</i> all warranties, guarantees or other obligations for <i>Work</i>, services or <i>Products</i> performed or supplied by any <i>Subcontractor</i>, <i>Supplier</i> or other person in connection with the <i>Work</i> and such assignment shall be with the consent of the assigning party, where required by law, or by the terms of that party's contract. Such assignment shall be in addition to, and shall in no way limit, the warranty rights of the <i>Owner</i> under the <i>Contract Documents</i>.</p> <p>12.3.12 The <i>Contractor</i> shall commence or correct any deficiency within 2 <i>Working Days</i> after receiving a <i>Notice in Writing</i> from the <i>Owner</i> or the <i>Consultant</i>, and shall complete the <i>Work</i> as expeditiously as possible, except in the case where the deficiency prevents maintaining security or where basic systems essential to the ongoing business of the <i>Owner</i> and/or its tenants cannot be maintained operational as designed. In those circumstances all necessary corrections and/or installations of temporary replacements shall be carried out immediately as an emergency service. Should the <i>Contractor</i> fail to provide this emergency service within 8 hours of a request being made during the normal business hours of the <i>Contractor</i>, the <i>Owner</i> is authorized, notwithstanding GC 3.1, to carry out all necessary repairs or replacements at the <i>Contractor's</i> expense.”</p>
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***NEW* PART 13 OTHER PROVISIONS**

SC57 GC 13.1 OWNERSHIP OF MATERIALS

SC57.1	13.1	<p><u>Add</u> new GC 13.1 – OWNERSHIP OF MATERIALS as follows:</p> <p>“GC 13.1 OWNERSHIP OF MATERIALS</p> <p>“13.1.1 Unless otherwise specified, all materials existing at the <i>Place of the Work</i> at the time of execution of the <i>Contract</i> shall remain the property of the <i>Owner</i>. All <i>Work</i> and <i>Products</i> delivered to the <i>Place of the Work</i> by the <i>Contractor</i> shall be the property of the <i>Owner</i>. The <i>Contractor</i> shall remove all surplus or rejected materials as its property when notified in writing to do so by the <i>Consultant</i>.”</p>
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SC58 GC 13.2 CONSTRUCTION LIENS

SC58.1	13.2	<p><u>Add</u> new GC 13.2 – CONSTRUCTION LIENS as follows:</p> <p>“GC 13.2 LIENS</p> <p>13.2.1 Notwithstanding any other provision in the <i>Contract</i>, the <i>Consultant</i> shall not be obligated to issue a certificate, and the <i>Owner</i> shall not be obligated to make payment, subject to the <i>Owner’s</i> requirement to issue a <i>Notice of Non-Payment</i> (Form 1.1) to the <i>Contractor</i>, if at the time such certificate or payment was otherwise due:</p> <ul style="list-style-type: none">.1 a claim for lien has been registered against the <i>Project</i> lands by a <i>Subcontractor</i> or a <i>Supplier</i> that has not been vacated or discharged by the <i>Contractor</i> in accordance with the requirements of this <i>Contract</i>, or.2 if the <i>Owner</i> or a mortgagee of the <i>Project</i> lands has received a written notice of a lien that has not been resolved by the <i>Contractor</i> through the posting of security or otherwise. <p>13.2.2 In the event a construction lien arising from the performance of the <i>Work</i> is registered or preserved against the <i>Project</i> lands by a <i>Subcontractor</i> or a <i>Supplier</i>, or a written notice of a lien is given or a construction lien action is commenced</p>
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		<p>against the <i>Owner</i> by a <i>Subcontractor</i> or a <i>Supplier</i>, then the <i>Contractor</i> shall, at its own expense:</p> <ul style="list-style-type: none">.1 within 10 calendar days of registration of the construction lien, vacate or discharge the lien from title to the premises (i.e. the <i>Place of the Work</i>). If the lien is merely vacated, the <i>Contractor</i> shall, if requested, undertake the <i>Owner's</i> defence of any subsequent action commenced in respect of the lien, at the <i>Contractor's</i> sole expense;.2 within 10 calendar days of receiving notice of a written notice of a lien, post security with the Ontario Superior Court of Justice so that the written notice of a lien no longer binds the parties upon whom it was served; and.3 satisfy all judgments and pay all costs arising from such construction liens and actions and fully indemnify the <i>Owner</i> against all costs and expenses arising from same, including legal costs on a full indemnity basis. <p>13.2.3 In the event that the <i>Contractor</i> fails or refuses to comply with its obligations pursuant to paragraph 13.2.2, the <i>Owner</i> shall, at its option, be entitled to take all steps necessary to address any such construction liens including, without limitation and in addition to the <i>Owner's</i> rights under paragraph 13.2.4, the posting of security with the Ontario Superior Court of Justice to vacate the claim for lien from title to the <i>Project</i> lands, and in so doing will be entitled to a full indemnity from the <i>Contractor</i> for all legal fees, security, disbursements and other costs incurred and will be entitled to deduct same from amounts otherwise owing to the <i>Contractor</i>.</p> <p>13.2.4 In the event that any <i>Subcontractor</i> or <i>Supplier</i> registers any claim for lien with respect to all or part of the <i>Place of Work</i>, the <i>Owner</i> shall have the right to withhold, in addition to the statutory holdback, the full amount of said claim for lien plus either: (a) \$250,000 if the claim for lien is in excess of \$1,000,000 or (b) 25% of the value of the claim for lien and to bring a motion to vacate the registration of said claim for lien and any associated certificate of action in respect of that lien, in accordance with Section 44 of the <i>Act</i>, by paying into court as security the amount withheld.</p>
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		13.2.5 Nothing in this GC 13.2 serves to preclude the <i>Contractor</i> from preserving and perfecting its lien in the event of non-payment by the <i>Owner</i> .”
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**APPENDIX 1
to the Supplementary Conditions**

Project-specific requirements for a “*Proper Invoice*”

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

- .1 the written bill or request for payment must be in writing;
- .2 the *Contractor’s* name and current address;
- .3 the *Contractor’s* HST registration number;
- .4 the date the application for payment was prepared by the *Contractor*;
- .5 the period of time in which the services or materials were supplied to the *Owner*;
- .6 the purchase order number provided by the *Owner*;
- .7 reference to the provisions of the *Contract* under which payment is being sought (e.g. GC 5.3 – PROGRESS PAYMENTS for progress payments, GC 5.4 – SUBSTANTIAL PERFORMANCE OF THE WORK, GC 5.7 – FINAL PAYMENT for final payment, etc.);
- .8 a description, including quantities where appropriate, of the services or materials, or a portion thereof, that were supplied and form the basis of the *Contractor’s* request for payment;
- .9 the amount the *Contractor* is requesting to be paid by the *Owner*, set out in a statement based on the schedule of values approved under GC 5.2.5, separating out any statutory or other holdbacks, set-offs and HST;
- .10 a sworn Statutory Declaration in the form CCDC 9A-2018, only for second and subsequent progress payments;
- .11 a current Workplace Safety Insurance Board clearance certificate;
- .12 a pre-approved schedule of values, supplied by the *Contractor*, for Divisions 1 through 14 of the *Specifications* (or equivalent Construction Specifications Institute Masterformat) of the *Work*, aggregating the total amount of the *Contract Price*, including all supporting invoicing;
- .13 a separate pre-approved schedule of values, supplied by each *Subcontractor*, for each of Division 15, 16, and 17 of the *Specifications* (or equivalent Construction

- Specifications Institute Masterformat) of the *Work*, aggregating the total amount of the *Contract Price*, including all supporting invoicing;
- .14 invoices and other supporting documentation for all claims against the cash allowance;
 - .15 a current, acceptable, and up to date *Construction Schedule Update*;
 - .16 if requested by the *Owner*, a current and valid certificate(s) of insurance as required under GC 11.1 – INSURANCE;
 - .17 the name, title, telephone number and mailing address of the person at the place of business of the *Contractor* to whom payment is to be directed;
 - .18 a current, up to date, and approved *Shop Drawing* log;
 - .19 in the case of the *Contractor's* application for final payment, in addition to the foregoing requirements (as applicable):
 - (a) any documents or materials not yet delivered pursuant to paragraph 5.4.5, together with complete and final as-built drawings;
 - (b) the *Contractor's* written request for release of the deficiency holdback, including a statement that no written notices of lien have been received by it;
 - (c) the *Contractor's* written certification that there are no outstanding claims, pending claims or future claims from the *Contractor* or their *Subcontractors* or *Suppliers*; and
 - (d) sufficient evidence of the *Contractor's* compliance with GC 3.13.3.

END OF AMENDMENTS TO CCDC 2 - 2008

SECTION 01 14 00 – WORK RESTRICTIONS

1.0 GENERAL

1.1. SECTION INCLUDES

- .1 Connecting to existing services
- .2 Special scheduling requirements

1.2. RELATED SECTIONS

- .1 Section 01 53 00 - Temporary Construction.
- .2 Section 01 33 00 - Submittal Procedures.
- .3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3. EXISTING SERVICES

- .1 Notify Owner and Consultant and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Consultant and Owner, forty-eight (48) hours of notice for necessary interruption of mechanical or electrical service throughout course of work.
 - .1 Keep duration of interruptions minimum.
 - .2 Perform interruptions after normal working hours of occupants, preferably on weekends.
- .3 Provide for vehicular, pedestrian and personnel traffic.
- .4 Construct barriers in accordance with Section 01 53 00.

1.4. AFTER HOURS WORK

- .1 Schedule Work with school staff through the Board's contact so as to limit disruption to school operations. Include for any overtime, to ensure orderly and continuous progression of Work and operation of school.
- .2 Direct calls from Contractors to Board staff to adjust alarms and to arrange for access will not be accepted. All correspondence must be through the Project Manager.
- .3 Arrange 48 hours in advance with Board to obtain an access card and adjust security alarms for after hours Work.
- .4 Bidders are cautioned that the Board will be compensated by the Contractor for false alarms. Any costs associated with each false alarm will be levied against the Contractor for false fire alarm activation or security alarm activation. These costs may include, but are not limited to:

- .1 Fines or penalties imposed by the local Fire Services,
- .2 Fines or penalties imposed by the local Police Services,
- .3 Overtime costs borne by the Board.
- .5 Contractors are responsible for ensuring doors and windows are secured prior to leaving school.
- .6 Unless specifically stated otherwise school activities take precedence over Contractor's activities.

1.5. SPECIAL REQUIREMENTS

- .1 Schedule and perform work in occupied areas to Board Representative's approval.
- .2 Schedule and perform noise generating work to Board Representative's approval.
- .3 Submit schedule of special requirements or disruptions in accordance with Section 01 33 00.
- .4 All Contractor personnel are restricted to the job site and necessary access routes. No personnel shall visit other areas or buildings without specific authorization.

END OF SECTION

SECTION 01 19 00 – SPECIFICATIONS AND DOCUMENTS

1.0 GENERAL

1.1. RELATED DOCUMENTS

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

1.2. WORDS AND TERMS

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

1.3. COMPLEMENTARY DOCUMENTS

- .1 Generally, drawings indicate graphically, the dimensions and location of components and equipment. Specifications indicate specific components, assemblies, and identify quality.
- .2 Drawings, specifications, diagrams and schedules are complementary, each to the other, and what is required by one, to be binding as if required by all.
- .3 Should any conflict or discrepancy appear between documents, which leaves doubt as to the intent or meaning, apply the Precedence of Documents article below or obtain guidance or direction from Consultant.
- .4 Examine all discipline drawings, specifications, schedules, diagrams and related Work to ensure that Work can be satisfactorily executed.
- .5 All specification sections of the Project Manual and Drawings are affected by requirements of Division 01 sections.

1.4. PRECEDENCE OF DOCUMENTS

- .1 In the event of conflict within and between the Contract Documents, the order of priority within specifications and drawings for this project are - from highest to lowest:
 - .1 the Agreement and Definitions between the Owner and the Construction
 - .2 the Defined Terms, Definitions;
 - .3 Supplementary Conditions;
 - .4 the General Conditions;
 - .5 Sections of Division 01 of the specifications;
 - .6 Technical specifications Sections of Divisions 02 through 49 of the specifications.

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

1.5. SPECIFICATION GRAMMAR

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

END OF SECTION

SECTION 01 21 00 – ALLOWANCES

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 45 00 – Quality Control.
- .2 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. GENERAL

- .1 Allowances included herein are for items of Work which could not be fully quantified prior to Bidding.
- .2 Expend each allowance as directed by the Consultant. Work covered by allowances shall be performed for such amounts and by such persons as directed by Consultant.
- .3 Funds will be expended by means of Cash Allowance allocations and contingency allowance allocations.
- .4 Progress payments for Work and Products authorized under allowances will be made in accordance with the payment terms set out in the Conditions of the Contract.
- .5 The Contractor shall bid the work involved and submit the Bids received to the Consultant and the Board, for approval
- .6 The Contractor shall submit 3 bids unless directed by the Board.

1.3. CASH ALLOWANCES

- .1 Cash allowances, cover the net cost to the Contractor of services, products, construction machinery and equipment, freight, handling, unloading, storage, installation where indicated, and other authorized expenses incurred in performing the Work. Cash allowances shall not be included by a subcontractor in the amount for their subcontract work.
- .2 Supply only allowances shall include:
 - .1 Net cost of Products.
 - .2 Delivery to Site.
 - .3 Applicable taxes and duties, excluding HST.
- .3 Supply and install allowances shall include:
 - .1 Net cost of Products.
 - .2 Delivery to Site.
 - .3 Unloading, storing, handling or products on site.
 - .4 Installation, finishing and commissioning of products.

- .5 Applicable taxes and duties, excluding HST.
- .4 Inspection and testing allowances shall include:
 - .1 Net cost of inspection and testing services.
 - .2 Applicable taxes and duties, excluding HST.
- .5 Other costs related to work covered by cash allowances are not covered by the allowance, but shall be included in the Contract Price.
- .6 Where costs under a cash allowance exceed the amount of the allowance, the Contractor will be compensated for any excess incurred and substantiated plus an allowance for overhead and profit as set out in the Contract Documents.
- .7 Progress payments on accounts of work authorized under cash allowances shall be included in the monthly certificate for payment.
- .8 Submit, before application for final payment, copies of all invoices and statements from suppliers and subcontractors for work which has been paid from cash allowances.

1.4. ALLOWANCES SCHEDULE

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

- .1 Designated Substance Removal. \$ 25,000.00
(ACM Summary report to be provided to contractor)

- .2 Independent Testing & Inspection (soil, concrete, mortar, structural steel, air barrier, painting) \$ 15,500.00
(As directed by the Consultant)

- .3 Finish Hardware \$ 20,000.00
(Installation included in base bid)2500

- .4 Interior Signage \$ 500.00

- .5 Relocate existing IT cabinet/rack \$ 6,000.00

- .6 Data/Voice and PA with in office \$ 8,000.00

- | | | |
|----|---|-------------|
| .7 | Public Address (PA) systems. | \$25,000.00 |
| | 23900Relocating the existing PA terminal and installing a NEW PA system
(Including all cabling and hardware) | |

Total of All Allowances:	\$100,000.00
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SECTION 01 31 00 – PROJECT MANAGING AND COORDINATION

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 32 00 - Construction Progress Documentation.
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 53 00 – Temporary Construction Facilities
- .4 Section 01 61 00 – Product Requirements
- .5 Section 01 78 10 – Closeout Submittals and Requirements
- .6 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. PROJECT COORDINATION

- .1 Perform coordination of progress schedules, submittals, use of site, temporary utilities, construction facilities and construction Work, with progress of Work of other contractors, under instructions of the Consultant.
- .2 The Contractor shall have total control of the Work and shall effectively direct and supervise the Work so as to ensure conformity with the Contract Documents and within the Contract Time.
- .3 The Contractor shall be solely responsible for the construction means, methods, sequences, and procedures and for coordinating parts of the Work under the contract.
- .4 Co-ordinate progress of the Work, progress schedules, submittals, use of site, temporary utilities, construction facilities, safety regulations and fire protection, as per authorities having jurisdiction codes.
- .5 The Consultant has the authority to stop the Work:
 - .1 whenever they observe or are made aware of unsafe conditions.
 - .2 whenever it is deemed necessary to protect the interests of the Board,
 - .3 whenever materials or workmanship are in contravention to the Contract Documents

1.3. SITE SUPERVISOR AND PROJECT MANAGER

- .1 If requested, the Contractor shall provide the Consultant, in writing, the name of the Project Manager and Site Supervisor, and proof of competent experience in similar projects.
- .2 Performance of the Contractors Project Manager and Site Supervisor
 - .1 If the Board and or the Consultant become concerned with any of: Site Safety, Project Schedule, or general compliance with the tender

- documents due to the performance of the Site Supervisor or Project Manager, the Consultant and or the Board will identify the concerns in writing to the Contractor.
- .2 The Contractor shall respond in writing to the Board and Consultant with a corrective action for each item within 24 hours.
 - .3 If it is found that any of the corrections are not immediately implemented, the Consultant and the Board shall meet with the General Contractor to review the credentials including curriculum vitae and comparable experience of a replacement Site Supervisor and or Project Manager proposed by that Contractor.
 - .4 All outstanding concerns initiating the replacement of the personnel will be immediately addressed to the satisfaction of the Consultant and the Board.
- .3 If the Board and or the Consultant become concerned with site safety, project schedule or general compliance with the tender documents due to the performance of the Site Supervisor or the Project Manager, the Consultant or the Board will issue the concerns in writing to the Contractor. The Contractor shall respond in writing within 24 hours to the Consultant and the Board. If any of the corrections are not immediately implemented, the Consultant or the Board will schedule a meeting with the Consultant, General Contractor and the Board. At this meeting the Contractor will introduce the new Project Manager, and or Site Supervisor and present the Curriculum Vitae for each showing proof of comparable experience in similar projects. The Contractor will then address the outstanding concerns to the satisfaction of the Consultant and the Board.
- .4 The Project Manager, and/or Site Supervisor shall not be replaced by the Contractor without prior written approval from the Board and the Consultant.

1.4. PERMITS

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

1.5. CONSTRUCTION DOCUMENTS

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

1.6. PRECONSTRUCTION MEETING

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

1.7. ON-SITE DOCUMENTS

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

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

1.8. SCHEDULES

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

1.9. CONSTRUCTION PROGRESS MEETINGS

- .1 Prior to the commencement of the Work, the Contractor together with the Consultant shall mutually agree to a sequence for holding regular "on site meetings".

- .2 The Contractor will organize site meetings. Ensure persons, whose presence is required, are present and relative information is available to allow meetings to be conducted efficiently.
- .3 Contractor, major subcontractors and consultants involved in Work are to be in attendance.
- .4 Post and forward copies of progress schedules for advice of Subcontractors, Owner and Consultant.
- .5 Notify parties minimum five (5) days prior to meetings.
- .6 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within two (2) days after meeting.
- .7 Agenda to include following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for effect on construction schedule and on completion date.
 - .12 Review site security issues.
 - .13 Other business.
- .8 Schedule additional meetings, to expedite progress, should work require it.
- .9 Keep Owner and Consultant informed of progress, of delays and potential delays during all stages of Work. Do everything possible to meet progress schedule
- .10 Schedule and administer pre-installation meetings when specified in sections and when required to coordinate related or affected Work.

1.10. SUBMITTALS

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

- .4 Submit requests for interpretation of Contract Documents, and obtain instructions through Consultant.
- .5 Process substitutions through Consultant.
- .6 Process change orders through Consultant.
- .7 Deliver closeout submittals for review and preliminary inspections, for transmittal to Consultant.

1.11. RECORD (AS-BUILT) DOCUMENTS AND SAMPLES

- .1 Procedures for record as-built documents and samples as specified in Section 01 78 10.
- .2 Keep as-built documents and samples available for inspection by Consultant.

1.12. CLOSEOUT PROCEDURES

- .1 Take-over procedures, acceptance, and warranties as specified Section 01 78 10
- .2 Notify Consultant and Board when Work is considered ready for Substantial Performance.
- .3 Accompany Consultant and Board on preliminary inspection to determine items listed for completion or correction.
- .4 Comply with Consultant's instructions for correction of items of Work listed in executed certificate of Substantial Performance.
- .5 Notify Consultant of instructions for completion of items of Work determined in Consultant's final inspection.

END OF SECTION

SECTION 01 32 00 – CONSTRUCTION PROGRESS DOCUMENTATION

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. SCHEDULES

- .1 Within seven 7 days following the award of the Contract, submit a detailed cash flow chart broken down on a monthly basis, in a manner acceptable to the Consultant. Cash flow chart shall indicate anticipated Contractor's monthly progress billings from commencement of work until completion.
- .2 Update cash flow chart whenever changes occur to scheduling and in manner and at times satisfactory to Consultant.
- .3 Submit schedule of values at least fourteen (14) days before the first application
- .4 Submit schedules as follows:
 - .1 Submittal Schedule for Shop Drawings and Product Data.
 - .2 Submittal Schedule for Samples.
 - .3 Submittal Schedule for timeliness of Owner-furnished Products.
 - .4 Product Delivery Schedule.
 - .5 Cash Allowance Schedule for acquiring Products and Installation.
 - .6 Shutdown or closure activity.

1.3. CONSTRUCTION PROGRESS SCHEDULING

- .1 Submit initial schedule to the Consultant and the Board in duplicate within seven (7) days after following the award.
- .2 Schedule Format.
 - .1 Prepare schedule in form of a horizontal bar chart.
 - .2 Split horizontally for projected and actual performance.
 - .3 Provide horizontal time scale identifying each Working Day of each week.
- .3 Schedule Submission.
 - .1 Consultant will review schedule and return reviewed copies within five (5) days after receipt.
 - .2 Submit schedules in electronic format, forward to the Consultant and Owner as a pdf. file.

- .3 Resubmit finalized schedule within five (5) days after return of review copy.
- .4 Submit revised progress schedule with each application for payment.
- .5 Distribute copies of revised schedule to:
 - .1 Job site office.
 - .2 Subcontractors.
 - .3 Other concerned parties.
- .6 Instruct Consultant to report to Contractor within ten (10) days, any problems anticipated by timetable shown in schedule.
- .4 Submit revised schedules with Application for Payment, identifying changes since previous version.
- .5 Select either of the following paragraphs to identify the type and format of schedule required.
- .6 Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.
- .7 Indicate estimated percentage of completion for each item of Work at each submission.
- .8 Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner and required by Allowances.
- .9 Include dates for commencement and completion of each major element of construction:
 - .1 Site clearing.
 - .2 Site utilities.
 - .3 Foundation Work.
 - .4 Structural framing.
 - .5 Subcontractor Work.
 - .6 Equipment Installations.
 - .7 Finishes.
- .10 Indicate projected percentage of completion of each item as of first day of month.
- .11 Indicate progress of each activity to date of submission schedule.
- .12 Indicate changes occurring since previous submission of schedule:
 - .1 Major changes in scope.
 - .2 Activities modified since previous submission.
 - .3 Revised projections of progress and completion.
 - .4 Other identifiable changes.
- .13 Provide a written report to define:

- .1 Problem areas, anticipated delays, and impact on schedule.
- .2 Corrective action recommended and its effect.
- .3 Effect of changes on schedules of other subcontractors.

1.4. PROGRESS PHOTOGRAPHS

- .1 Digital Photography:
 - .1 Submit electronic copy of progress photographs of project, Digital format, minimum 300 in megapixel resolution.
 - .2 Identification: Name and number of project and date of exposure indicated.
 - .3 Provide both interior and exterior photographs.
 - .4 Number of Viewpoints: Locations of viewpoints determined by Consultant.
 - .5 Frequency: Monthly with progress statement. Provide the required number of pictures to accurately reflect the submitted progress percentage.

1.5. SHOP DRAWING SUBMITTAL SCHEDULE

- .1 Include schedule for submitting shop drawings, product data, samples
- .2 Indicate dates for submitting, review time, resubmission time, and last date for meeting fabrication schedule.
- .3 Include dates when shop drawings and samples will be required for Owner-furnished products.
- .4 Include dates when reviewed submittals will be required from Consultant.
- .5 Provide final signed off copies of the shop drawings in digital format to the Board.

END OF SECTION

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SECTION 01 33 00 – SUBMITTAL PROCEDURES

2.0 GENERAL

2.1. RELATED SECTIONS

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

2.2. ADMINISTRATIVE

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

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

2.3. SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "Shop Drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 The term "design team" means Consultant and Sub-consultants whether Sub-consultants are employees of Consultant or not, and includes structural, mechanical, electrical, etc.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow fourteen (14) days for Consultant's review of each submission.
- .5 Adjustments made on Shop Drawings by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
- .6 Make changes in Shop Drawings as Consultant may require, consistent with Contract Documents. When resubmitting, notify Consultant in writing of any revisions other than those requested.
- .7 Accompany submissions with transmittal letter, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .8 Submissions shall include:
 - .1 Date and revision dates.

- .2 Project title and number.
- .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to other parts of the Work.
- .9 After Consultant's review, distribute copies.
- .10 Submit Shop Drawings in Pdf. format for each requirement requested in specification Sections and as consultant may reasonably request.
- .11 Submit product data sheets or brochures in Pdf. format for requirements requested in specification sections and as requested by Consultant where Shop Drawings will not be prepared due to standardized manufacture of product.
- .12 Delete information not applicable to project.
- .13 Supplement standard information to provide details applicable to project.
- .14 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, the drawings will be stamped as reviewed or reviewed as modified and will be returned. At this point fabrication and installation of Work may proceed. If Shop Drawings are rejected, noted copy will be returned and re-submission of corrected Shop Drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .15 Signed drawings shall be returned to and retained by Contractor who is then responsible for distribution of copies of corrected shop drawing to

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

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

2.4. SAMPLES

- .1 Submit for review to the Consultant three (3) samples as requested in respective specification Sections.
- .2 Submit samples with identifying labels bearing material or component description, manufacturer's name and brand name, Contractor's name, project name, location in which material or component is to be used, and date.
- .3 Deliver samples prepay any shipping charges involved for delivering samples to destination point and returning to point of origin if required.
- .4 Provide samples of special products, assemblies, or components when so specified.
- .5 No work requiring a sample submission shall commence until submission has received Consultant's final review.
- .6 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .7 Where colour, pattern or texture is criterion, submit full range of samples.
- .8 Adjustments made on samples by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
- .9 Make changes in samples which Consultant may require, consistent with Contract Documents.
- .10 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

2.5. MOCK-UP

- .1 Erect mock-ups to Section 01 45 00.

2.6. CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, and prior to commencing the work submit the performance bond and the labour and materials payment bond as described in the bid documents.
- .2 Submit transcription of certified true copies of insurance immediately after award of Contract.
- .3 A current WSIB clearance certificate
- .4 The bidder's health and safety policy for the project.
- .5 A copy of the notice of project issued by the ministry of labour for the project
- .6 Building materials, components and elements specified without the use of trade or proprietary names shall meet requirements specified. If requested by Consultant, submit evidence of meeting requirements specified. Evidence shall consist of certification based on tests carried out by an independent testing agency. Certification based on previous tests for same materials, components or elements is acceptable. Certification shall be in form of written test reports prepared by testing agency.

END OF SECTION

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SECTION 01 35 17 – FIRE SAFETY PROCEDURES

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 14 00 – Work Restrictions.
- .2 Section 01 31 00 - Project Managing and Coordination.
- .3 Section 01 33 00 - Submittal Procedures.
- .4 Section 01 35 23 – Health and Safety
- .5 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. FIRE SAFETY PLAN

- .1 Contractors and their personnel will be familiar with this section and its requirements.
- .2 The contractor must take all necessary precautions during the carrying out of the work to prevent the possibility of fire occurring.

1.3. FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by the governing codes, regulations and bylaws.
- .2 The contractor will, at all times, when welding, brazing and performing any operation with an open flame, combustible adhesives or flammable solvents keep a portable, operable fire extinguisher within 3 meters of the operation.

1.4. HOT WORK

- .1 Take all precautions to Work safely and to provide the necessary protection to persons and property from Hot Work. This includes, but is not limited to Brazing, Cutting, Grinding, Soldering, Thawing Pipe, Torch Applied Roofing and Welding. With all such activity these steps are to be followed:
 - .1 Whenever possible, complete Hot Work in a welding shop or out of doors at the school.
 - .2 Flammable liquids, dust lint and oily deposits to be removed from within 50-ft (15m) of Work. Remove other combustibles where possible. Otherwise protect with fire-resistive tarpaulins or metal shields.
 - .3 Explosive atmosphere in area eliminated. Floors swept clean. Combustible floors wet down, covered with damp sand or fire-resistive tarpaulins.

- .4 All wall and floor openings covered. Fire-resistive tarpaulins suspended beneath Work.
- .5 For on-site Work (indoor and out of doors), advise the Head Custodian, Principal, Consultant (if assigned) and Project Coordinator prior to Work being performed, and of related dangers.
- .6 Where the Fire Alarm system is required to be set to stand-by to discourage false alarms from smoke detectors provide a firewatch throughout the building or structure being worked on. NEVER put the fire alarm system in stand-by mode when the building is occupied by staff or students.
- .7 In the event of a fire as a result of the Hot Work, notify the fire department immediately. Report incident to the head custodian, the Consultant, if assigned, and Project Coordinator immediately, whether extinguished or not. Provide a fire incident report to the Board.
- .8 Barriers must be set up to protect staff and students (i.e. pylons, shields, and caution tape) from exposure to arc flash and smoke migration.
- .9 Have all necessary doors, windows and/or drapes closed. Confer with the Head Custodian to shut down all fan systems in the area to reduce or eliminate smoke distribution.
- .10 Provide and keep fire extinguishers handy and in good Working condition. Temporarily cover all smoke detectors in area during time of Work.
- .11 Provide a fire watch/spot check for several hours after Work is completed. Uncover smoke detectors.
- .12 On new construction, the requirements of the Hot Wok permit may be waived, until such time as either Substantial Completion or Occupancy is granted, whichever comes first.
- .13 On additions to existing buildings, the requirements for Hot Work permits shall remain in place.

1.5. HOT WORK PERMIT

- .1 **A sample Hot Work Permit is attached to the specifications – refer to Appendix 013517-A**
- .2 Each permit is valid for seven (7) days only and must be renewed prior to its expiration date
- .3 The contractor must obtain Hot Work Permits from the School Board's representative prior to the start of work.

- .4 The contractor must complete the form as required and must keep the form on site.
- .5 Return each completed form to the School Board's representative on date of expiration.
- .6 The most current version of the Permit and its requirements shall be used for the purposes of the Work.

1.6. FIRE PROTECTION SYSTEMS

- .1 Any Modifications to Fire Alarm system and its devices including service, additions and changes in device location must be performed only by a Certified Fire Alarm Technician as per the Ontario Fire Code section 1.1, subsection 1.1.5.
- .2 The Contractor will receive from the Board's contact a contact number for the monitoring service and a school system number.
- .3 Bidders are cautioned that the Board will be reimbursed for the cost of false alarms. Refer to Section 01 14 00 Work Restrictions, Para. 1.4.4.
- .4 An approved inspection firm shall verify all new fire alarm devices, in accordance to CSA regulations. Certificate of Verification is required before occupancy.

1.7. FIRE ALARM SHUT-DOWN PROCEDURE

- .1 Do not shut the system down unless necessary. Plan the operation required to reduce system down time to the least amount possible.
- .2 Wherever possible, shut down only the zone needing Work and schedule this down time in unoccupied school hours. Allow for this in your bid pricing.
- .3 Discuss the possible down time with the head custodian and principal prior to any partial or whole system shut down.
- .4 The school or building administration shall advise all staff of fire alarm system shut down. This will include instructions to call 911 if they see a fire and when system is back on line.
- .5 Prior to alarm system shutdown and upon restoring the fire alarm system individuals supervising the shut down must contact Direct Detect at 519-741-2494 and have on hand the School System Account Number (this number can be found on the decal on the fire alarm panel). The School System Account Number will start with the prefix 209
 - .1 The Contractor shall provide full detail to the monitoring company as requested including building number and name (as identified on the fire alarm monitoring panel), contact name, company name, length of time system is down. Call shall be placed just prior to any shut down.

- .6 A fire patrol will need to be established and will include the following at the Contractor's expense:
 - .1 Patrol all halls and high-risk areas affected.
 - .2 Fire patrol shall have access to a phone and call 911 if they see a fire.
 - .3 Report all other problems they encounter.
 - .4 Remain on patrol until system is back on.
- .7 Contact Direct Detect at 519-741-2494 and inform them when the system is put back on line.
- .8 An activated system must not be reset until authorized by the Fire Department and the cause of the alarm has been investigated.

1.8. FIRE PROTECTION EQUIPMENT IMPAIRMENT

- .1 Fire Protection Equipment referred to in this section includes sprinkler systems, special fire suppression systems, and kitchen hood suppression systems.
- .2 The Contractor will take all precautions including restrict all Hot Work operations and shut down hazardous processes during all Fire protection equipment impairment.
- .3 Do not shut the Fire protection equipment down unless necessary Plan the operation required to reduce system impairment time to the least amount possible.
- .4 Wherever possible, shut down only the Fire protection equipment needing Work and schedule this impairment time for unoccupied school hours. Allow for this in your bid pricing.
- .5 Discuss the possible down time with the head custodian and principal prior to any partial or whole system impairment.
- .6 The school administration shall advise all staff of Fire protection equipment shut down. This will include instructions to call 911 if they see a fire and when system is back on line
- .7 The Contractor will plan to use temporary protection such as extra extinguishers, charged hose lines and temporary sprinkler protection during all Fire protection equipment impairment.
- .8 If the sprinkler system is restorable, either in whole or in part, the Contractor or sub-Contractor shall assign someone to restore the system promptly in the event of a fire.
- .9 A fire patrol may need to be established and will include the following at the Contractor's expense:
 - .1 Patrol all halls and high-risk areas affected.
 - .2 Fire patrol shall have access to a phone and call 911 if they see a fire.

- .3 Report all other problems they encounter.
- .4 Remain on patrol until system is back on.
- .10 The Contractor shall inform all sub trades that the Board has a Red Tag Permit System and it shall be used for all Fire protection equipment impairment.
- .11 For ease of use, a Factory Mutual hanging wall kit has been place at all Board Fire protection equipment locations. Supplies of Red Tag Permits are provided there.

1.9. FIRE ALARM MODIFICATIONS AND MAINTENANCE

- .1 Very important changes to Ontario Building Code as they relate to the Standard for the Verification of Fire Alarm Systems CAN/ULC-S537-M have taken effect December 24, 1999. (Minister's Ruling 99-BC-01)
 - .1 Clause 5.1; "Addition of conventional field device(s), or modification(s), to existing input circuit(s) or output circuit(s) shall require re-verification of all devices served by those input circuit(s) or output circuit(s)." If one device is added to a zone, the entire zone or in the case of a single zone panel the entire system is to be verified.
 - .2 Clause 5.2 "Addition of input circuit(s) or output circuit(s) to an existing fire alarm system shall require verification of the new circuit(s) in accordance with this standard, and shall also require all previously existing circuit(s) to be tested as follows:
 - .3 TEST: One conventional field device on each circuit shall be operated to confirm activation of all output circuits in accordance with the systems design." Even though no other zones have been touched, one device per input zone is to be tested when the Fire Alarm system is modified.
 - .4 Clause 5.5 "Where a transponder is added to an existing system, the transponder shall be verified in accordance with subsections 3.2, Wiring; and subsection 3.3 Control Units; and with CAN/ULC-S536, Standard for the Inspection and Testing of Fire Alarm Systems as well as re-verification of existing field devices and verification of new conventional field devices." If a new addressable device is added to a system, the new device is to be tested; as well a test must be conducted on all addressable devices on the loop.
 - .5 Clause 5.6 "Where an existing fire alarm system control unit is replaced with a new control unit, it shall be verified in accordance with CAN/ULC-S536, Standard for the Inspection and Testing of Fire Alarm Systems.

Replacement of any control panel will require the testing of all existing fire alarm devices.

- .2 The Contractor and sub-Contractors shall include in the bid price for the above ULC Standards requirements referenced in the Ontario Building Code.

1.10. INSTALLATION AND/OR REPAIR OF ROOFING

- .1 The Contractor will review with the Consultant and the Board's representative of the location of any asphalt kettles and the dates the kettles will be in use. The Contractor, in the course of performing roofing work, will ensure all personnel utilize the following precautions:
 - .1 Use only kettles equipped with thermometers or gauges in good working order.
 - .2 Locate kettles in a safe place outside of building.
 - .3 Maintain continuous supervision while kettles are in operation and provide metal covers for the kettles to smother any flames in case of fire.
 - .4 All roofing materials stored in locations no closer than 15 meters to any structures.

1.11. FIRE DEPARTMENT ACCESS

- .1 Designated fire routes must be maintained. Fire Department must be advised of any work that would impede fire apparatus response.

1.12. SMOKING PRECAUTIONS

- .1 Smoking is not permitted anywhere on Board properties. Workers who wish to smoke must leave the property, and not within sight of students. Any worker found to be in contravention of the Ontario Smoke Free Act will be subject to legislated fines.

1.13. FLAMMABLE LIQUIDS

- .1 The handling and storage on site of flammable liquids are to be governed by the current National Fire Code of Canada.
- .2 Flammable liquids such as gasoline, kerosene and naphtha may be kept for ready use in quantities not exceeding 10 imperial gallons provided they are stored in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval.
- .3 Transfer of flammable liquids is prohibited within buildings.

- .4 Transfer of flammable liquids must not be carried out in the vicinity of open flame or any type of heat producing devices.
- .5 Flammable liquids having a flash point below 100° F (37.7°C) such as naphtha or gasoline must not be used as solvents or cleaning agents.
- .6 Flammable waste liquids, for disposal, must be stored in approved containers located in a safe ventilated area. Quantities are to be kept to a minimum.

END OF SECTION

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Contractor Hot Work Permit

1. Take all precautions to Work safely and to provide the necessary protection to persons and property from Hot Work. This includes, but is not limited to Brazing, Cutting, Grinding, Soldering, Thawing Pipe, Torch Applied Roofing and Welding. With all such activity these steps are to be followed:
 - A. Whenever possible, complete Hot Work in a welding shop or out of doors at the school.
 - B. Flammable liquids, dust lint and oily deposits to be removed from within 50-ft (15m) of Work. Remove other combustibles where possible. Otherwise protect with fire-resistive tarpaulins or metal shields.
 - C. Explosive atmosphere in area eliminated. Floors swept clean. Combustible floors wet down, covered with damp sand or fire-resistive tarpaulins.
 - D. All wall and floor openings covered. Fire-resistive tarpaulins suspended beneath Work.
 - E. For Work on walls or ceilings, remove combustibles away on other side.
2. For on-site Work (indoor, out of doors), advise the Head Custodian and Principal prior to Work being performed, and of related dangers.
3. In the event of a fire as a result of the Hot Work, notify the fire department and the head custodian immediately, whether extinguished or not.
4. Barriers must be set up to protect staff and students (i.e. pylons, shields, and caution tape) from exposure to arc flash and smoke migration.
5. Have all necessary doors, windows and/or drapes closed. Request of the head custodian to shut down all fan systems in the area to reduce or eliminate smoke distribution.
6. Provide and keep fire extinguishers handy and in good Working condition. Temporarily cover all smoke detectors in area during time of Work.
7. Provide a fire watch/spot check for several hours after Work is completed. Uncover smoke detectors.



Appendix - 013517-A

Facility Services

CONTRACTOR HOT WORK PERMIT

STOP!

Avoid hot work or seek an alternative method if possible.

This hot work permit is required for any temporary operation involving open flames or producing heat and/or sparks.
This includes but is not limited to: brazing, cutting, grinding, soldering, torch-applied roofing and welding.

A SEPARATE PERMIT IS REQUIRED FOR EACH AREA

Board Supervisor/ Manager/Proj. Coordinator Responsibilities:

- i. Verify precautions taken in Section A
- ii. Complete and retain Part 1
- iii. Complete Section B prior to commencement of Hot Works
- iv. Issue Part 2 to Contractor completing Hot Work & Post
- v. Obtain Part 2 when Fire Monitoring complete
- vi. Return Part 1 and Part 2 to Controller, Facility Services

Contractor Responsibilities:

- i. Verify precautions taken in Section A
- ii. Complete Section C during each day that Hot Works takes place
- iii. Return Part 2 to Board Supervisor/ Manager/Proj. Coordinator

PART 1

Section A	Indicate Precautions Taken
<input type="checkbox"/>	Available sprinklers, hose streams, and extinguishers available and in service
Within 35' or 11m of hot work	
<input type="checkbox"/>	Flammable liquid, dust, lint and oily deposits removed
<input type="checkbox"/>	Explosive atmosphere in area eliminated
<input type="checkbox"/>	Floors swept clean
<input type="checkbox"/>	All wall and floor openings covered
<input type="checkbox"/>	Combustible floors covered with fire resistant sheets
<input type="checkbox"/>	Protect or shut down ducts that might carry sparks/smoke
Hot work on walls, ceiling or roofs	
<input type="checkbox"/>	Construction is noncombustible and without combustible covering or insulation
<input type="checkbox"/>	Combustible materials on other side of walls, ceilings or roofs moved away
<input type="checkbox"/>	Combustible structure wetted down
Hot work on enclosed equipment	
<input type="checkbox"/>	Enclosed equipment cleaned of all combustible material
<input type="checkbox"/>	Containers purged of flammable liquid/vapour
<input type="checkbox"/>	Pressurized vessels, piping & equipment removed from service, isolated & vented
Fire watch/hot work and monitoring	
<input type="checkbox"/>	Fire watch will be provided <u>during</u> and for <u>1 hour</u> after work including break
<input type="checkbox"/>	Fire watch is trained and supplied with suitable extinguishers
<input type="checkbox"/>	Fire watch is trained in the use of sounding fire alarm
<input type="checkbox"/>	Fire watch conducted in adjoining areas, above and below the space where appropriate
<input type="checkbox"/>	Monitor hot work area for an additional <u>2 hours</u> after fire watch
<input type="checkbox"/>	Other precautions taken (please detail):

Section B	Authorization Granted
Board Supervisor/Manager/Proj. Coordinator:	_____
	Print Name _____ Signature _____
Permit Valid from / to: (max. 7 days)	_____
	From This Date _____ To This Date _____
(Maximum 7 days or until end of hot work whichever is sooner)	

Section C				Contractor and Location Affected			
Dates: (max 7 days)	Name of Contractor conducting hot work	Name & signature of individual assigned to fire watch	Name & signature of individual assigned to fire monitoring				
School: _____							
Room/Area: _____							
Nature of Job: _____							
I verify the above location has been examined <u>each day</u> , the precautions listed in Section A have been taken <u>each day</u> , and permission is authorized for this work.							
I further acknowledge that if activity is during <u>school operational hours</u> , that appropriate <u>notification</u> has been given to <u>school</u> administration.							
Hot Works Contractor: _____ Signature _____							
School Administrator notified: _____ Print Name _____							
In Case of Emergency call: 911 - Then call: 519-570-0003 Ext. 4123							

Refer to WRDSB Administration Procedure 4200 Hot Works/Fire Watch (Copies Available on Request)

SECTION 01 35 23 – HEALTH AND SAFETY

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 31 00 - Project Managing and Coordination.
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 35 17 – Fire Safety Requirements
- .4 Section 01 35 43 – Hazardous Materials
- .5 Section 01 41 00 – Regulatory Requirements
- .6 Section 01 53 00 – Temporary Construction Facilities
- .7 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. REFERENCES

- .1 Province of Ontario, including requirements for a "Prime Contractor" as defined by the Act.

1.3. SAFETY PLAN

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to commencing any site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Consultant may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.
- .3 Be governed by pertinent safety requirements of Federal or Provincial Governments and of municipal bodies having authority, particularly the Ontario Construction Safety Act, The Occupational Health and Safety Act for Ontario, and regulations of Ontario Ministry of Labour, and work in conjunction with proper safety associations operating under the authority of Ontario Workers' Compensation Act. Protect Owner, Owner's employees, the public and those employed on the Work from bodily injury and to protect adjacent public and private property and Owner's property from damage. Furnish and maintain protection, such as warning signs, tarpaulins, guard rails, barriers, guard lights, night lights, railings around shafts, pits and stairwells, etc. as required. Remove temporary protective measures when no longer required.

1.4. TEMPORARY WORK

- .1 Temporary work requiring engineering proficiency for the design, erection, operation maintenance and removal shall be designed and bear stamp of the registered professional Engineer or Architect. Detail drawings will be submitted to the Consultant for review prior to commencing any work.
- .2 Before a temporary structure is used, person responsible for design, or their representative, shall inspect structure and certify it has been constructed according to their design.

1.5. RESPONSIBILITY

- .1 The "Prime Contractor" according applicable local jurisdiction, is responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- .3 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, and follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Health and Safety Act having jurisdiction. Advise the Board and the Consultant verbally and in writing.
- .4 The Contractor shall make their own arrangements for emergency treatment of accidents. Any accidents shall be reported immediately to the Board contact.
- .5 The Contractor agrees to hold the Board harmless of any and all liability of every nature and description, which may be suffered through bodily injuries, involving deaths of any persons, by reasons of negligence of the Contractor, his agents, employees, or his sub-Contractors.

1.6. SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00.
- .2 Submit site-specific Health and Safety Plan: Within ten (10) days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation

- .3 Submit one (1) copy of Contractor's authorized representative's work site health and safety inspection reports to Consultant and Owner.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit Material Safety Data Sheets (MSDS) to Consultant.
- .7 Consultant's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .8 Medical Surveillance: Where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Consultant.
- .9 On-site Contingency and Emergency Response Plan: Address standard operating procedures to be implemented during emergency situations.
- .10 File Notice of Project with the Ministry of Labour prior to commencement of Work.

1.7. SAFETY ACTIVITIES

- .1 Perform site specific safety hazard assessment related to project.
- .2 Schedule and administer Health and Safety meeting with Consultant prior to commencement of Work.
- .3 Perform Work in accordance with Section 01 41 00 - Regulatory Requirements and this section.

1.8. HEALTH AND SAFETY COORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Coordinator must:
 - .1 have previous experience as a Health & Safety coordinator,
 - .2 have working knowledge of occupational safety and health regulations,
 - .3 be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work,
 - .4 be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan, and
 - .5 be on site during execution of Work.

1.9. POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Health and Safety Act having jurisdiction, and in consultation with Consultant.

1.10. CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Consultant or by the Board.
- .2 Provide Consultant and/or Board with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Consultant and or the Board may stop Work if non-compliance of health and safety regulations is not corrected.

1.11. PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:
 - .1 Refer to Section 01 35 43 Hazardous Materials

1.12. HAZARDOUS WORK

- .1 Blasting or other use of explosives is not permitted at the place of work.

1.13. WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

1.14. LOCKOUT PROCEDURES

- .1 All Work to be done on electrical systems or machinery, where the unexpected switching on of the system or machinery could result in personal injury to a student, staff, employee, or the Contractor's employee, must be done in accordance with the Contractor's standard lockout procedure.
- .2 The Contractor shall provide his/her own locks for the above procedure.
- .3 The lock shall include contact information for the person(s) locking out such device.

1.15. OVERHEAD LIFTING

- .1 Under no circumstances will a crane or lifting device be used over a occupied space.
- .2 When working adjacent to occupied spaces, ensure a clearance of one (empty) classroom, or a minimum of 10m between any occupied space and the furthest possible reach of the crane.

1.16. WARNING SIGNS AND NOTICES

- .1 Notices shall be posted advising of the hazard but will not be considered a substitute for providing approved protection, separation, and space from the hazard.

1.17. FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by the governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.
- .3 Maintain placed or installed Fire Protection to protect the portions of the Work during construction.

1.18. SCENT-FREE ENVIRONMENT

- .1 The Board requires that, where advised, a building may be deemed scent-free and as such, the wearing of scented products is prohibited.
- .2 Any methods or materials that are found to create negative responses in staff or students shall cease and be removed under advisement of the Consultant and or the Board, until alternate methods can be determined.

END OF SECTION

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SECTION 01 35 43 – HAZARDOUS MATERIALS

2.0 GENERAL

2.1. RELATED SECTIONS

- .1 Section 01 35 23 – Health and Safety Requirements.
- .2 Section 01 41 00 – Regulatory Requirements.
- .3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

2.2. REFERENCES

- .1 Province of Ontario, including requirements for a "Prime Contractor" as defined by the Act.

2.3. ASBESTOS and OTHER REGULATED SUBSTANCES

- .1 An Asbestos Audit, as prepared by MTE Consultants Inc. for this facility, is attached under Appendix 013543 A. A duplicate set is also available in the Facilities Services Departments located in the Education Centre. Unless specifically covered by a Cash Allowance or Contingency Allowance that states otherwise, include in this Contract the required removal of all asbestos containing materials (ACM) to complete the work. No claims for extra costs will be accepted for areas known to contain ACM that are within the scope of this Work.
- .2 Comply with applicable legislation regarding asbestos. Should the Contractor encounter asbestos not noted in the referenced Asbestos Audit that would be disturbed during the course of the Work, they should stop the work in that immediate area and report the same to the Consultant and Board contact.
- .3 In addition, Lead, Mercury, Silica, and Isocyanates are anticipated to be present in existing facilities. New construction, renovations, or alterations require compliance by the Contractor with the applicable legislation.

2.4. PROTOCOL FOR ABATEMENT WORK

- .1 This Protocol establishes the requirements to be followed by all Asbestos Abatement Contractors involved with the Board. It applies to Type 1, Type 2 and Type 3 Operations as stated in the Regulations and applies to emergency and non-emergency work (directly retained or working as a sub-contractor).
- .2 Asbestos Abatement Contractors must maintain appropriate insurance coverage and WISB certification.

- .3 Contractors retained for asbestos abatement work shall use personnel certified by the Ontario College of Trades and must provide the Consultant and Board with proof of asbestos certification (AAS and AAW) for all supervisors / all staff involved.
- .4 School Access
 - .1 During school hours all asbestos contractors are to report to the school office upon arrival. After school hours, ensure card-in / card-out procedures are followed and building security is maintained.
- .5 Communication
 - .1 Establish communication contact list with email and phone numbers that shall include:
 - .1 Principal / Vice Principal
 - .2 Area Facility Manager
 - .3 Head Custodian
 - .4 Environmental Officer
 - .5 Manager of Mechanical, Electrical and Environmental Services
 - .6 Manager of Health Safety & Security
 - .7 Contractor staff
 - .8 Consultant
 - .2 Contact the School Principal / Vice to set up a firm date for the abatement (removal / repair). Schedule to allow at least 72 hours notice ahead of the work.
 - .3 Confirm the date by notifying via email the following:
 - .1 Principal / Vice-principal,
 - .2 Area Facility Manager, and
 - .3 Environmental Officer.
 - .4 Consultant
 - .4 Indicate the date, the start time, the anticipated completion time for the work and the work areas in the school.
 - .5 Identify personnel managing the project and provide current cell numbers for emergency contacts.
 - .6 For emergency work, as requested by Area Supervisors, Facility Managers or Environmental Officer, no notification to the school is required.
 - .7 Additionally, for Type 3 work also contact:
 - .1 Manager of Health, Safety & Security, and
 - .2 Notify the MOL (also for Type 2) where required by regulation.
 - .3 Consultant

- .8 Discussions with other groups, school staff, media and others is discouraged and shall be directed to the Board Communication Officer where warranted.
- .6 Asbestos Operations
 - .1 Emergency work shall be carried out the same day (evening/night) or under exceptional conditions the following day / evening / night. Contractors shall exercise discretion when working in the school to minimize anxiety of staff/school community. Where warranted, contact Area Supervisor, Facility Manager or Environmental Officer to obtain further direction.
 - .2 For non-emergency work, contractor is to assess the work on site and provide a cost estimate to the Environmental Officer, (daniela_budure@wrdsb.on.ca) and Consultant. Some work will require discussion with the Facility Manager or Environmental Officer to assess if additional work should be done as to completely remove all ACM material from the area or similar.
 - .3 Where the MTE report shows ACM requiring repair, remove and re-insulate where required.
 - .4 Before beginning any Type 1, Type 2 or Type 3 Operations, the work area must be secured, doors closed, warning signs added to all entrances, caution tape used in open areas and signs used to restrict access to the work area so as to keep persons not involved in the work from entering in the work area.
 - .5 Provide "Construction" warning signs on solid barriers between the Work and public areas. Install a sufficient number of "asbestos abatement" warning signs behind the barriers, posted to warn of the hazard, and that access to the work area is restricted to persons wearing protective clothing and equipment.
 - .6 The contractor is responsible to disable the mechanical ventilation serving the work area and positively prevent operation using Lock-out / Tag-out devices for each air handling unit /fan. Exercise caution during heating season to ensure areas of the building are maintained above freezing and ensure equipment is turned back on after abatement / air clearance completed.
 - .7 Contractor's employees shall put on / take off PPE within work area marked by construction signs. No employee shall leave the work area wearing PPE.

- .8 All dust and waste is to be cleaned up and removed at frequent / regular intervals as the work proceeds and immediately upon completion. No waste bags or similar are to be left behind.

2.5. SUBMITTALS

- .1 Once the abatement is completed, forward a Letter of Completion to the Environmental Officer, (daniela_budure@wrdsb.on.ca). This letter shall be received no later than 72 hours after completion and shall include any sample results.
- .2 For those projects requiring Air Clearance, ensure this info is sent without delay but in all cases no later than 24 hours after sampling. All Type 3 work must take into account that the initial samples may not pass and the contactor must allow one additional day to re-clean and re-sample before school is to resume operations. For those projects not under the direct supervision of a Environmental Consultant, the contactor is to expedite the air clearance sampling with the lab of their choice and carry these costs.
- .3 Forward Air Clearance results to:
 - .1 Principal / Vice-principal,
 - .2 Facility Manager,
 - .3 Environmental Officer,
 - .4 Manager of Mechanical, Electrical and Environmental Services, and
 - .5 Manager of Health, Safety & Security.
 - .6 Consultant

2.6. ACKNOWLEDGEMENT

- .1 The protocols for asbestos work must be read and understood by Asbestos Contractor.
- .2 Submit a signed copy of the most current copy of PROTOCOL FOR ABATEMENT WORK (ASBESTOS ABATEMENT CONTRACTORS) to the General Contractor, the Consultant, and the Board's Environmental Officer.

END OF SECTION

SECTION 01 42 00 – REFERENCES

1.0 GENERAL

1.1. SECTION INCLUDES

- .1 References and standards.
- .2 Standards producing industry organizations and their addresses.

1.2. RELATED SECTIONS

- .1 Section 01 61 00 – Product Requirements.
- .2 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3. REFERENCES

- .1 For Products or quality specified by association, trade, or other references or consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- .2 Conform to reference standard by Ontario Building Code except where a specific date is established or required by code.
- .3 Obtain copies of standards where required by product specification sections.
- .4 Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Consultant shall be altered from the Contract Documents by mention or inference otherwise, in any reference document.

1.4. STANDARDS

- .1 The following associations and organizations are cited in specification sections. Acronym, name, address, and Internet URL addresses are as follows:
- .2 Canadian Organizations:
 - .1 **ACEC** - Association of Consulting Engineers of Canada, 130 Albert Street, Suite 616, Ottawa, ON K1P 5G4; URL: <http://www.acec.ca>.
 - .2 **AWMAC** - Architectural Woodwork Manufacturers Association of Canada, 516-4 Street West, High River, AB T1V 1B6; URL: <http://www.awmac.com>.
 - .3 **Canada Green Building Council**, 330 - 55 rue Murray Street, Ottawa, ON. K1N5M3; Tel: 613-241-1184, Fax: 613-241-5750; URL: <http://www.cagbc.org>.
 - .4 **CCA** - Canadian Construction Association, 75 Albert St., Suite 400, Ottawa, ON K1P 5E7; URL: <http://www.cca-acc.com>.

- .5 **CCDC** – Canadian Construction Documents Committee, Refer to ACEC, CCA, CSC or RAIC; URL: <http://www.CCDC.org>.
- .6 **CGA** - Canadian Gas Association, 20 Eglinton Avenue West, Suite 1305, Toronto, ON M4R 1K8; URL: <http://www.cga.ca..>
- .7 **CGSB** - Canadian General Standards Board, Place du Portage, Phase III, 6B1, 11 Laurier Street, Hull, QC K1A 0S5; URL: <http://w3.pwgsc.gc.ca/cgsb>.
- .8 **CISC** - Canadian Institute of Steel Construction, 201 Consumers Road, Suite 300, Willowdale, ON M2J 4G8; URL: <http://www.cisc-icca.ca>.
- .9 **CLA** - Canadian Lumbermen's Association, 27 Goulburn Avenue, Ottawa, ON K1N 8C7; URL: <http://www.cla-ca.ca>.
- .10 **CNLA** - Canadian Nursery Landscape Association, RR #4, Stn. Main, 7856 Fifth Street, Milton, ON L9T 2X8; URL: <http://www.canadanursery.com>.
- .11 **CRCA** - Canadian Roofing Contractors Association, 155 Queen Street, Suite 1300, Ottawa, ON K1P 6L1; URL: <http://www.roofingcanada.com>.
- .12 **CSA** - Canadian Standards Association International, 178 Rexdale Blvd., Toronto, ON M9W 1R3; URL: <http://www.csa-international.org>.
- .13 **CSC** - Construction Specifications Canada, 120 Carlton Street, Suite 312, Toronto, ON M5A 4K2; URL: <http://www.csc-dcc.ca>.
- .14 **CSDMA** - Canadian Steel Door Manufacturers Association, One Yonge Street, Suite 1801, Toronto, ON M5E 1W7; URL: <http://www.csdma.org>.
- .15 **CSPI** - Corrugated Steel Pipe Institute, 652 Bishop Street N, Unit 2A, Cambridge, ON N3H 4V6; URL: <http://www.cspi.ca>.
- .16 **CSSBI** - Canadian Sheet Steel Building Institute, 652 Bishop St. N., Unit 2A, Cambridge, ON N3H 4V6; URL: <http://www.cssbi.ca>.
- .17 **CUFCA** - Canadian Urethane Foam Contractor's Association, Box 3214, Winnipeg, MB R3C 4E7; URL: <http://www.cufca.ca>.
- .18 **CWC** - Canadian Wood Council, 1400 Blair Place, Suite 210, Ottawa, ON K1J 9B8; URL: <http://www.cwc.ca>.
- .19 **EC** - Environment Canada, Conservation and Protection, Inquiry Centre, 351 St. Joseph Blvd, Hull, QC KIA 0H3; URL: <http://www.ec.gc.ca>.
- .20 **EFC** - Electro Federation of Canada, 5800 Explorer Drive, Suite 200, Mississauga, ON L4W 5K9; URL: <http://www.electrofed.com>.
- .21 **MPI** - The Master Painters Institute, 4090 Graveley Street, Burnaby, BC V5C 3T6; URL: <http://www.paintinfo.com>.

- .22 **NABA** - National Air Barrier Association, PO Box 2747, Winnipeg, MB R3C 4E7; URL: <http://www.naba.ca>.
- .23 **NLGA** - National Lumber Grades Authority, 406-First Capital Place, 960 Quayside Drive, New Westminster, BC V3M 6G2; URL: <http://www.nlga.org>.
- .24 **NRC** - National Research Council, Building M-58, 1200 Montreal Road, Ottawa, ON K1A 0R6; URL: <http://www.nrc.gc.ca>.
- .25 **QPL** - Qualification Program List, c/o Canadian General Standards Board, Place du Portage, Phase III, 6B1, 11 Laurier Street, Hull, QC K1A 1G6; URL: <http://www.pwgsc.gc.ca/cgsb>.
- .26 **RAIC** - Royal Architectural Institute of Canada, 55 Murray Street, Suite 330, Ottawa, ON K1N 5M3; URL: <http://www.raic.org>.
- .27 **SCC** - Standards Council of Canada, 270 Albert Street, Suite 2000, Ottawa, ON K1P 6N7; URL: <http://www.scc.ca>.
- .28 **TTMAC** - Terrazzo, Tile and Marble Association of Canada, 30 Capston Gate, Unit 5 Concord, ON L4K 3E8; URL: <http://www.ttmac.com>.
- .29 **ULC** - Underwriters' Laboratories of Canada, 7 Crouse Road, Toronto, ON M1R 3A9; URL: <http://www.ulc.ca>.
- .3 USA Organizations:
 - .1 **AA** - Aluminum Association, 900 19th Street N.W., Washington, DC 20006; URL: <http://www.aluminum.org>.
 - .2 **AASHTO** - American Association of State Highway and Transportation Officials, 444 N Capitol Street N.W., Suite 249, Washington, DC 20001; URL: <http://www.aashto.org>.
 - .3 **AHA** - American Hardboard Association, 1210W Northwest Hwy, Palatine, IL 60067; URL: <http://www.hardboard.org>.
 - .4 **AITC** - American Institute of Timber Construction, 7012 S. Revere Parkway, Suite 140, Englewood, CO 80112; URL: <http://www.aitc-glulam.org>.
 - .5 **AMCA** - Air Movement and Control Association Inc., 30 West University Drive, Arlington Heights, IL 60004-1893; URL: <http://www.amca.org>.
 - .6 **ANSI** - American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036; URL: <http://www.ansi.org>.
 - .7 **APA** - The Engineered Wood Association, P.O. Box 11700, Tacoma, WA 98411-0700; URL: <http://www.apawood.org>.
 - .8 **API** - American Petroleum Institute, 1220 L St. Northwest, Washington, DC 20005-4070; URL: <http://www.api.org>.
 - .9 **ARI** - Air Conditioning and Refrigeration Institute, 4100 N Fairfax Drive, Suite 200, Arlington, VA 22203; URL: <http://www.ari.org>.

- .10 **ASHRAE** - American Society of Heating, Refrigeration and Air-Conditioning Engineers, 1791 Tullie Circle NE, Atlanta, GA 30329; URL: <http://www.ashrae.org>.
- .11 **ASME** - American Society of Mechanical Engineers, ASME Headquarters, 3 Park Avenue, New York, NY 10016-5990; URL: <http://www.asme.org>.
- .12 **ASTM International**, 100 Barr Harbor Drive West, Conshohocken, PA 19428-2959; URL: <http://www.astm.org>.
- .13 **AWCI** - Association of the Wall and Ceiling Industries International, 803 West Broad Street, Suite 600 , Falls Church, VA 22046; URL: <http://www.awci.org>.
- .14 **AWPA** - American Wire Producer's Association, 801 N Fairfax Street, Suite 211, Alexandria, VA 22314-1757; URL: <http://www.awpa.org>.
- .15 **AWPA** - American Wood Preservers' Association, P.O. Box 5690, Granbury TX 76049-0690; URL: <http://www.awpa.com>
- .16 **AWS** - American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126; URL: <http://www.amweld.org>.
- .17 **AWWA** - American Water Works Association, 6666 W. Quincy Avenue, Denver, CO 80235; URL: <http://www.awwa.org>.
- .18 **EIMA** - EIFS Industry Manufacturer's Association, 3000 Corporate Center Drive, Suite 270, Morrow, GA 30260; URL: <http://www.eima.com>.
- .19 **ISAP** - International Society for Asphalt Paving, 400 Selby Avenue, Suite 1, St. Paul, MN 55102; URL: <http://www.asphalt.org>.
- .20 **IEEE** - Institute of Electrical and Electronics Engineers, IEE Corporate Office, 3 Park Avenue, 17th Floor, New York, NY 10016-5997; URL: <http://www.ieee.org>
- .21 **MSS** - Manufacturers Standardization Society of the Valve and Fittings Industry, 127 Park Street, N.E., Vienna, VA 22180-4602; URL: <http://www.mss-hq.com>.
- .22 **NAAMM** - National Association of Architectural Metal Manufacturers, 8 South Michigan Avenue, Suite 1000, Chicago, IL 60603; URL: <http://www.naamm.org>.
- .23 **NEMA** - National Electrical Manufacturers Association, 1300 N 17th Street, Suite 1847, Rosslyn, VA 22209; URL: <http://www.nema.org>.
- .24 **NFPA** - National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101 Quincy, MA 02269-9101; URL: <http://www.nfpa.org>.
- .25 **NFSA** - National Fire Sprinkler Association, P.O. Box 1000, Patterson, NY 12563; URL: <http://www.nfsa.org>.

- .26 **NHLA** - National Hardwood Lumber Association, 6830 Raleigh-La Grange Road, Memphis, TN 38184-0518; URL: <http://www.natlhardwood.org>.
- .27 **NSPE** - National Society of Professional Engineers, 1420 King Street, Alexandria, VA 22314-2794; URL: <http://www.nspe.org>.
- .28 **PCI** - Prestressed Concrete Institute, 209 W. Jackson Blvd., Suite 500, Chicago, IL 60606-6938; URL: <http://www.pci.org>.
- .29 **PEI** - Porcelain Enamel Institute, PO Box 920220, Norcross, GA 30010; URL: <http://www.porecelainenamel.com>.
- .30 **SSPC** - The Society for Protective Coatings, 40 24th Street, 6th Floor, Pittsburgh, PA 15222-4656; URL: <http://www.sspc.org>.
- .31 **TPI** - Truss Plate Institute, 583 D'Onofrio Drive, Suite 200, Madison, WI 53719; URL: <http://www.tpinst.org>.
- .32 **UL** - Underwriters' Laboratories, 333 Pfingsten Road, Northbrook, IL 60062-2096; URL: <http://www.ul.com>.

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SECTION 01 45 00 – QUALITY CONTROL

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 21 00 - Allowances.
- .2 Section 01 78 10 – Closeout Submittals and Requirements
- .3 Section 01 79 00 – Demonstration and Training
- .4 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. REFERENCES

- .1 **ISO/IEC 17025-2005** - General Requirements for the Competence of Testing and Calibration Laboratories.
- .2 **SCC** (Standards Council of Canada).

1.3. INSPECTION BY AUTHORITY

- .1 Allow Authorities Having Jurisdiction access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection whenever portions of the Work are designated for special tests, inspections or approvals, either when described in the Contract Documents or when required by law in the Place of the Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

1.4. REVIEW BY CONSULTANT

- .1 Consultant may order any part of the Work to be reviewed or inspected if Work is suspected to be not in accordance with Contract Documents.
- .2 If, upon review such work is found not in accordance with Contract Documents, correct such Work and pay cost of additional review and correction.
- .3 If such Work is found in accordance with Contract Documents, The owner will pay cost of review and replacement.

1.5. INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection and Testing Agencies will be engaged by Contractor for purpose of inspecting and testing portions of Work.
- .2 The Board may, at their discretion, request that the Consultant direct the Contractor to engage independent inspecting and or testing agencies to review or test the Work.
- .3 Allocate Costs for inspections and testing to Section 01 21 00.
- .4 Provide equipment required for executing inspection and testing by appointed agencies.
- .5 Employment of inspection and testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .6 If defects are revealed during inspection and/or testing, the appointed agency will request additional inspection and testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant at no cost to Owner. Contractor shall pay costs directly to the inspection agency for retesting and re-inspection.

1.6. ACCESS TO WORK

- .1 Allow inspection and testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Cooperate to provide reasonable access and facilities for such access.

1.7. CONTRACTOR RESPONSIBILITIES

- .1 Notify appropriate agency minimum 48 hours in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.8. DUTIES & AUTHORITY OF TESTING AGENCY

- .1 Testing agency is expected to do the following:
 - .1 Act in a professional and unprejudiced basis and carry out inspection and testing functions to establish compliance with requirements of Contract Documents.
 - .2 Check work as it progresses and prepare reports stating results of tests and conditions of work and state in each report whether specimens

tested conform to requirements of Contract Documents, specifically noting deviations.

- .3 Distribute reports as follows
 - .1 Consultant
 - .2 Owner
 - .3 Contractor
- .2 Testing agency is not authorized to amend or release any requirements of Contract Documents, nor to approve or accept any portion of work.

1.9. REJECTED WORK

- .1 The Contractor shall remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If, it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the Owner may choose to accept the condition. The difference in value between Work performed and that called for by Contract Documents shall be deducted from the Contract value via Change Order. The amount of this change shall be determined by Consultant. The Contractor shall warrant the work performed for the time period specified as if it were performed in accordance with the Contract Documents.

1.10. TESTING OF EXCAVATION & BACK FILL

- .1 The Consultant must approve all Sample and fill tests prior to purchase.
- .2 In coordination with the Consultant and Contractor, inspect and test backfill and fill to ensure the degree of compaction specified has been obtained.
- .3 Inspect excavation at required levels in regard to bearing values for footings, foundations and floor slabs.
- .4 Authorization and calculation of extra excavation work, if required, due to unsatisfactory bearing shall be adjusted by Unit Price.

1.11. CONCRETE STRENGTH TESTS

- .1 Review the proposed concrete mix design and check test if considered necessary.
- .2 Obtain representative samples of fresh concrete for each mix design of concrete placed in any one day as directed by the Consultant.

- .3 Make standard slump tests.
- .4 Mould three (3) standard 150mm diameter cylindrical test specimens from each sampling of fresh concrete. Store specimens as per best practice while they are on the site. Cure all cylinders in the laboratory under standard moisture and temperature conditions. Compression test one of the cylinders at 7 days and the remaining two at 28 days after sampling. Each concrete cylinder test report shall contain the specific location of concrete represented by sample, design strength, aggregate size, admixtures used, date, hour and temperature at time of sampling, percentage air content, unit weight and test strength of cylinder.
- .5 When concrete is placed under the conditions of "Cold Weather Requirements" make one additional cylinder; store it in a heated enclosure for 24 hours and then store it on the job site in a place protected from disturbance and off the ground. Compressive test this cylinder 7 days after sampling.
- .6 Determine the air content of air entrained standard weight concrete.
- .7 Determine the air content and unit weight of light weight concrete by the volumetric method.
- .8 Additional testing required because of changes in materials or proportions of the mix requested by the Contractor as well as any extra testing of concrete or materials occasioned by their failure to meet specification requirements or testing of the structure or performance of the structure, including load testing, shall be carried out at the Contractor's expense.

1.12. INSPECTION OF STRUCTURAL STEEL

- .1 Ensure all steel has mill test reports that comply with the Specification prior to purchase.
- .2 Inspect fabrication of steel in plant.
- .3 Inspect erection work at site including fit-up, placing, plumbing, levelling, temporary bracing, field cutting and alterations.
- .4 Shop and field inspect welded and bolted connections and painting.
- .5 High strength bolts - the installation and testing of bolts shall conform to the requirements of CSA S16-1969. Check one representative connection in ten by torque testing every bolt, and check each bolt in every connection with a tap of hammer for soundness. Enforce requirements of connection type.
- .6 Examine visually all welded joints for inclusions, porosity, lack of fusion penetration or even contour, undercuts and cracks. Root passes shall be checked for penetration and cracks from the back of the joint. Any suspect welds shall be checked ultrasonically.

1.13. INSPECTION OF METAL DECK

- .1 Check deck for gauge, type and protective coating thickness to ensure compliance with Specification.
- .2 Inspect erection work at the site including anchorage.

1.14. INSPECTION AND TESTING OF PAVING

- .1 Testing shall be carried out in three stages as described below by means of sufficient site visits to ensure satisfactory results but in no case less three site visits.
- .2 Test within 16 hours from time called to do so by Contractor, since paving is a critical item at the end of the project.
- .3 Stage One:
 - .1 Visual inspection and compaction tests of subsoil.
- .4 Stage Two:
 - .1 Inspection of granular sub-base (after each layer is placed or after the last layer is placed and compacted).
 - .2 On site density tests.
 - .3 Verify thickness of various levels. (Minimum of 4 checks shall be done on thickness in a paved area of 250m² or less, and 1 additional check for each additional 250m² or part thereof).
 - .4 Laboratory tests: moisture content and grading of materials.
- .5 Stage Three:
 - .1 Inspection of asphalt installation.
 - .2 Checking of thickness and density of material and checking suitability of equipment used.
- .6 Standard Proctor Test shall be carried out for all projects.
- .7 Further, grain size analysis and Marshall test shall be carried out if visual inspection is not satisfactory or, if there is reason to suspect materials supplied are not acceptable.
- .8 All laboratory tests shall be performed according to A.S.T.M. methods, latest revisions
- .9 Paving Contractor shall obtain from their supplier grading tables of materials used and submit them to the testing laboratory for approval. The paving contractor shall ensure material delivered complies with grading tables.
- .10 Be responsible for all approvals given to Paving Contractor. At completion of paving project, inform Consultant all tests were performed according to the Specifications and the Contractor's performance has been approved.

- .11 The Consultant will not entertain any credits for work either not performed or incorrectly performed by the contractor. If thicknesses or consistencies of sub-base are not as specified, or if asphaltic material is not as specified, then the Contractor shall remove same at their expense and provide proper specified materials.

1.15. BUILDING THERMOGRAPHIC SCAN

- .1 Upon completion of the Work, the Consultant and/or Owner may arrange for an independent agency to carry out a thermographic scan of the building to determine acceptability of thermal performance of the building envelope.
- .2 Consultant, prior to start of construction work, will designate a sample area of the building to include a portion of exterior wall and roof.
- .3 Consultant will implement a special inspection program for this sample area to be carried out as construction progresses. Contractor shall not cover any completed work until notifying Consultant and receiving acceptance of completed work. Contractor shall remove and replace any work which is installed in contravention of this requirement.
- .4 Results of thermographic scan of entire building will be evaluated and compared to those of the sample area to determine acceptance or rejection of any part of the building envelope.
- .5 Contractor shall carry out remedial work as required to bring quality of any rejected portion of the building envelope to that of the sample area. Contractor shall pay for costs of any follow-up thermographic scans required to determine acceptability of remedial work. This procedure shall be repeated until all parts of the building envelope have been accepted.

1.16. TESTS AND MIX DESIGNS

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

1.17. MOCK-UP

- .1 Prepare mock-up for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.
- .2 Prepare mock-ups for Consultants review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.

- .3 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .4 If requested, Consultant will assist in preparing a schedule fixing dates for preparation.
- .5 Remove mock-up at conclusion of Work or when acceptable to Consultant. Repair any damage and clean-up at place of mock-up.
- .6 Approved mock-up may remain as part of Work.

1.18. EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical and electrical systems to the consultant.
- .2 Refer to Sections 01.78.10 and 01.79.00 for definitive requirements.

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SECTION 01 51 00 – TEMPORARY UTILITIES

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 52 00 - Construction Facilities.
- .2 Section 01 53 00 - Temporary Construction.
- .3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. INSTALLATION AND REMOVAL

- .1 Provide temporary utilities controls in order to execute work expeditiously.
- .2 Location of temporary facilities shall be subject to Consultant's approval.
- .3 Salvage and assist in recycling products for potential reuse wherever possible.
- .4 Remove temporary facilities from site when directed by consultant.

1.3. DEWATERING

- .1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water. Provide necessary pumps (including spare pumps) and temporary drainage for keeping the Work free of water throughout construction period. Locate sumps away from foundation elements. Control grading around excavation to prevent surface water from draining into excavation and from damaging adjoining property.

1.4. WATER SUPPLY

- .1 Provide continuous supply of potable water for construction use until such time as permanent municipal water supply is available.
- .2 Hose extensions to be provided by subcontractors requiring them.
- .3 For New Builds arrange for connection with appropriate utility company and pay all costs for installation, maintenance, removal and usage costs until occupancy has been achieved.
- .4 For Additions and renovations the contractor can use existing Board service unless noted otherwise.

1.5. TEMPORARY HEATING AND VENTILATION

- .1 Provide temporary heating required during construction period, including unit rental costs, maintenance.

- .2 Provide temporary heating fuel, if not already available on site, until such time as a permanent natural gas line is installed, and thereafter fuel costs shall be borne by the Board. The Contractor shall provide all connections and piping between the permanent fuel source and the heating appliance(s).
- .3 Provide temporary heat and ventilation in enclosed areas as required to:
 - .1 Facilitate progress of Work.
 - .2 Protect Work and products against dampness and cold.
 - .3 Prevent moisture condensation on surfaces.
 - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
 - .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .4 Maintain temperatures of minimum:
 - .1 10 degrees C in areas where construction is in progress, until takeover by Board. Contractor to ensure temporary enclosures remain sealed and penetrations are repaired or closed in a timely fashion.
 - .2 16 degrees C in areas where finishes are in progress.
 - .3 16 degrees C in building once it is enclosed.
 - .4 Refer to other Sections for intermittent heating requirements up to 21 degrees C. Provide insulated tarp enclosures for openings as required to enclose the building after completion of main building shell components and roof.
 - .5 If the Contractor fails to ensure the temporary enclosures remained sealed (including temp doors when not in use) the Consultant and or the Board shall require the contractor to pay 40% of that months usage charge
- .5 Use forced hot air heaters. Open-flame type heaters or salamanders are not permitted. Ventilate direct fired heating units to the outside.
- .6 Uniformly distribute heat to avoid hot and cold areas and to prevent excessive drying.
- .7 Early heating of the building shell will be required to expedite interior finishing to meet the project schedule.
- .8 Ventilating:
 - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.

- .4 Ventilate storage spaces containing hazardous or volatile materials.
- .5 Ventilate temporary sanitary facilities.
- .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .7 Provide minimum 1 air change per hour for enclosed areas receiving architectural finishes.
- .8 Do not allow excessive build-up of moisture inside building.
- .9 The permanent mechanical systems for the new building, when installed in safe operating conditions, may be used for temporary heating or cooling if approved in writing by the Consultant, without penalty to the warranty.
- .10 Follow the requirements of "Temporary Use of New Permanent Services and Equipment" if the permanent heating system installed under the contract is intended to be used for temporary heating during the construction.
- .11 Provide competent persons to operate and maintain permanent systems for duration of temporary use period.
- .12 Perform required repairs and maintenance immediately after each inspection. Pay for operating costs. Upon termination of temporary use period, services and equipment shall be inspected, tested, adjusted, fitters replaced, balanced, cleaned and lubricated.
- .13 Permanent services and equipment shall be turned over to Owner in new and perfect operating condition.
- .14 Use of permanent systems and equipment as temporary facilities shall not affect the guarantee conditions and guarantee period for such systems and equipment. Make due allowance to ensure Owner will receive full benefits of equipment manufacturer's warranty from the date of Substantial Performance.
- .15 Ensure date of Substantial Performance of the Work and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Consultant.
- .16 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform with applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
 - .5 Vent direct-fired combustion units to outside.
- .17 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.6. TEMPORARY POWER AND LIGHT

- .1 Provide temporary electrical service and system including lighting and power system for use by all Sections.
- .2 Contractor will provide a source for, and pay the costs of temporary power during construction for temporary lighting and operating of power tools until such time as permanent source is available.
- .3 Contractor to ensure that the use of power from a source provided by the Board shall not exceed the capacity of the current use required for the operation of any existing facility.
- .4 Install and maintain temporary electrical service and systems in accordance with Construction Safety Association's "Temporary Wiring Standards on Construction Sites", the Ontario Electrical Code and other authorities having jurisdiction.
- .5 Provide at least one temporary panel on each floor with service capacity suitable for construction requirements and to authorities and utilities approval.
- .6 Provide temporary wiring with lighting to all areas of each floor to provide adequate lighting.
 - .1 Lighting levels must be maintained at a minimum of 10 foot candles, or to suit the particular location or operation, whichever is greater.
 - .2 Do not use materials of the temporary service in permanent installation.
 - .3 Increase lighting levels equivalent to the final requirements when finishing operations are underway.
- .7 Extension cords, lights, etc., required by various subcontractors and run from above outlet positions will be supplied and maintained by the party or parties requiring same.
- .8 Follow requirements of "Temporary Use of New Permanent Services and Equipment" if electrical power and lighting systems installed under the contract are intended to be used for temporary electricity and lighting during the construction.
- .9 Electrical power and lighting systems installed under this contract can be used for construction provided damages are made good and all lamps that have been used for more than two months are replaced with new lamps.
- .10 For New Builds arrange for connection with appropriate utility company and pay all costs for installation, maintenance, removal and usage costs until occupancy has been achieved.
- .11 For Additions and renovations the contractor can use existing Board service unless noted otherwise.
- .12 Provide and pay for temporary power for electric cranes and other equipment requiring temporary power in excess of above noted requirements.

1.7. TEMPORARY COMMUNICATION FACILITIES

- .1 Contractor to provide and pay for temporary Phone, e-mail and printer hook up, for the duration of contract until completion for use by the contractor.
- .2 The site superintendent is to have e-mail access and a printer on site.

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SECTION 01 53 00 – TEMPORARY CONSTRUCTION FACILITIES

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 51 00 - Temporary Utilities.
- .2 Section 01 35 23 – Health and Safety
- .3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. INSTALLATION AND REMOVAL

- .1 Provide temporary construction facilities in order to execute work expeditiously.
- .2 Remove temporary facilities from site when directed by Consultant.

1.3. PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

1.4. PROTECTION OF SURROUNDING WORK

- .1 Provide protection for finished and partially finished Work from damage.
- .2 Provide necessary cover and protection.
- .3 Be responsible for damage incurred due to lack of or improper or inappropriate protection.

1.5. ROOF AND STRUCTURE PROTECTION

- .1 Ensure no part of Work or existing structures are subjected to a load, which will endanger its safety or will cause permanent deformation.
- .2 The Contractor when indicated by the Board Contact or Consultant shall provide roof protection. Ensure all precautions are taken to avoid liability for roof damage.
- .3 Typical roof protection shall consist of a layer of 1inch rigid foam insulation set directly on the roof surface and a layer of 19 mm (3/4 inch) plywood in all places under scaffold legs, ladder legs and in areas of foot traffic or falling debris.

1.6. WORK SITE ENCLOSURE & SAFETY BARRIERS

- .1 Erect and maintain for the duration of the work:

- .1 a minimum 1800 mm high chain link fence or self-supporting, heavy duty, interconnected fence panels (commonly referred to as Insta-fence) for a temporary site enclosure (hoarding) completely around perimeter of work site,
- .2 any temporary posts shall be completely removed by the contractor prior to occupancy,
- .3 under no circumstance shall t-bar posts be used on board property
- .4 any additional safety devices including full hoarding as required and noted on the drawings, to protect the students, staff, public and private property from injury and damage,
- .5 any additional requirements as regulated by authorities having jurisdiction, local by-laws and zoning.
- .2 The Contractor is to assume full responsibility for any injury or damage caused due to failure to comply with Paragraph 1 above.
- .3 Any hazardous conditions identified outside of the main fenced area will be barricaded with a fence complying to the above.
- .4 Provide lockable truck entrance gate/gates and at least one (1) pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys with restricted availability, in the project office.
- .5 Erect and maintain pedestrian walkways including roof and side covers, complete with signs and electrical lighting as required by law.
- .6 Provide barriers around trees and plants designated to remain.
- .7 Protect from damage by equipment and construction procedures.

1.7. TREE PROTECTION

- .1 Protect all existing trees to remain from damage during construction period. Make good, at Contractor's expense, trees damaged during construction.
- .2 Confine movement of heavy equipment, storage of same, and storage of materials to a predetermined area. Do not store materials or place equipment over root systems of any existing trees to remain.
- .3 Install fencing or approved equal at limits of drip line of existing trees to remain unless directed otherwise. Where this case is not practical, and only if approved by the Consultant, the trunks shall be protected with an approved tree guard.
- .4 No rigging cables shall be wrapped around or installed in trees. Do not flush concrete trucks or cement mixing machines over root systems or near trees. Flush concrete trucks or cement mixing machines in areas approved by Consultant.

- .5 Areas where root systems of trees are exposed directly adjacent to a structure will be backfilled with good loam only.
- .6 Whenever excavating is required within branch spread of trees that are to remain, the contractor shall contact the consultant for direction prior to the start of work.
- .7 If any existing tree to remain is injured and does not survive the following year, it will, as determined by the Board, be removed in its entirety and be replaced with a tree of similar size and value, as directed by the Consultant.
- .8 Should the destroyed tree be of such a size or shape that it cannot be feasibly replaced, the Contractor shall compensate the Owner for the minimum sum of five thousand dollars (\$5,000.00) per destroyed tree.

1.8. GUARD RAILS AND BARRIERS

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.
- .2 Erect and maintain for the duration of the Work, safety devices and barricades including hoarding, as required, to protect the staff, students, public and private property, from injury and damage.
- .3 The Contractor is to ensure that all requirements from authorities having jurisdiction and all requirements from the Owner are met.
- .4 The Contractor is to assume full responsibility for any damage caused due to his failure to comply with paragraph 2 above.
- .5 Hazardous conditions on the exterior shall be fenced.

1.9. WEATHER ENCLOSURES

- .1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
- .2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.
- .3 Design enclosures to withstand wind pressure.

1.10. DUST TIGHT BARRIERS

- .1 Provide dust tight barriers and screens or partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.
- .2 Maintain and relocate protection until such work is complete.
- .3 Where required adjust air handling units to eliminate migration of dust.

1.11. SCAFFOLDING

- .1 Erect scaffolding independent of walls and use in such a manner limiting interference with other work. When not in use, move scaffolding as necessary to permit installation of other work. Construct and maintain scaffolding in a rigid, secure and safe manner. Remove it promptly when no longer required. Protect surface on which scaffolding is bearing.

1.12. SHORING, BRACING, PILING

- .1 Provide shoring, bracing, piling, sheeting and sheet piling and underpinning required to support soil banks, existing work and property in accordance with Construction Safety Act and other applicable regulations. Maintain shoring until building is strong enough and sufficiently braced to withstand pressure of backfilling. Make construction aids free of permanent work so they may be removed entirely when no longer required, without damaging the Work. Locate construction aids so adequate room is left for damp-proofing foundation walls, laying substructure drainage and other work.
- .2 Shoring and false work over one tier in height shall be designed and shall bear the stamp of a registered professional engineer, having experience in this field.

1.13. HOISTING

- .1 Provide, operate and maintain services required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
- .2 Machinery shall be operated by qualified operator.

1.14. OVERHEAD LIFTING

- .1 Any condition requiring the use of a crane or lifting device over a Board structure must follow the requirements of Health and Safety Section 01 35 23, Paragraph 1.15 Overhead Lifting.

1.15. ELEVATORS/LIFTS

- .1 When elevators/lifts are to be used by construction personnel, provide protective coverings for finish surfaces of elevator cabs and entrances.
- .2 Co-ordinate use of elevator cabs with Consultant and the Board.

1.16. USE OF THE WORK

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with Products.

- .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.17. CONSTRUCTION PARKING

- .1 Construction personnel vehicle parking, to be confined to the work site enclosure, or.
- .2 Parking will be permitted on site only where and if it does not disrupt the employees of the place of work as directed by the Board
- .3 Permission to park vehicles on site does not imply any liability or responsibility for safe keeping of vehicles and contents thereof by the School Board.

1.18. ACCESS TO SITE

- .1 Provide and maintain adequate access to project site.
- .2 Build and maintain temporary roads where necessary and provide snow removal within the area of work, and access to the work, during period of Work. The area shall be restored to the satisfaction of the Board at the completion of the project.
- .3 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.
- .4 Clean roadways and taxi areas where used by Contractor's equipment.

1.19. SECURITY

- .1 The Contractor shall ensure the security of the work site, contents, and built structures for the duration of the project.
- .2 The Contractor shall be responsible to provide and pay for security personnel to guard site and contents of site after working hours and during holidays as required.
- .3 Notify the Board of the use of security guards or systems.
- .4 The Board shall not be responsible for the loss, theft, or vandalism.

1.20. OFFICES

- .1 Provide and maintain, until completion of Contract, for Contractor's use, a temporary office, large enough to accommodate site administrative activities and site meetings, complete with light, heat, air conditioning, ventilation, table and chairs. Do not store materials in office area; keep clean and tidy.
- .2 Provide a clearly marked and fully stocked first-aid case in a readily available location.

- .3 Subcontractors may provide their own offices as necessary. Direct location of these offices.

1.21. EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds and platforms for storage of tools, equipment and materials.
- .2 Review storage areas on site with the Consultant. Store materials and equipment to ensure preservation of quality of product and fitness for the Work. Store materials and equipment on wooden platforms or other hard, clean surfaces, raised above the ground or in water tight storage sheds of sufficient size for storage of materials and equipment which might be damaged by storage in open. Locate stored materials and equipment to facilitate prompt inspection.
- .3 Store packaged materials and equipment undamaged, in their original wrappings or containers, with manufacture's labels and seals intact.
- .4 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.
- .5 Storage sheds required by subcontractors shall be provided by them.

1.22. SANITARY FACILITIES

- .1 Provide weatherproof temporary toilet/sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Service temporary toilet/sanitary facilities as required by authorities but not less than weekly.
- .3 Post notices and take such precautions as required by local health authorities.
- .4 The use of existing washroom facilities is not allowed unless specifically approved by the Board. The Contractor will be required to clean and maintain the existing washrooms to Board standards.
- .5 Except where connected to municipal sewer system, periodically remove wastes from Site.
- .6 Keep toilet/sanitary facilities clean and sanitary and protect from freezing.
- .7 Keep sanitary facilities clean and fully stocked with the necessary supplies at all times.

END OF SECTION

SECTION 01 61 00 – PRODUCT REQUIREMENTS

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 This section describes requirements applicable to all Sections within Divisions 02 to 49.
- .2 Section 01 31 00 – Project Managing and Coordination

1.2. TERMINOLOGY

- .1 New: Produced from new materials.
- .2 Renewed: Produced or rejuvenated from an existing material to like-new condition to serve a new or existing service.
- .3 Defective: A condition determined exclusively by the Consultant.

1.3. PRODUCT QUALITY

- .1 The term 'new' in the following paragraph does not exclude re-manufactured products that have some or all of the materials recycled from other sources. Preference in recycling is for post-consumer recycled materials.
- .2 Products, materials, equipment, parts or assemblies (referred to as Products) incorporated in Work:
- .3 New Product, not damaged or defective, of best quality (compatible with specification requirements) for purpose intended. If requested, provide evidence as to type, source and quality of Products provided.
- .4 Defective Products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective Products at own expense and be responsible for delays and expenses caused by rejection.
- .5 Should any dispute arise as to quality or fitness of Products, decision rests strictly with Consultant.
- .6 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

1.4. AVAILABILITY

- .1 Immediately upon receipt of Boards Purchase Order, review Product delivery requirements and anticipate foreseeable supply delays for any items.
- .2 Immediately upon receipt of Boards Purchase Order the Contractor shall issue Purchase Orders and or Contracts to all Sub-trades. Provide proof to

the Consultant and the Board within 3 days. The Sub-Contractors shall identify in writing any delivery issues within 14 days of receiving the Contractors purchase order or contract. The Schedule noted in 01-31 00 1.7.1 shall incorporate all deliveries and installation.

- .3 If delays in supply of Products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .4 In event of failure to notify Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant reserves right to substitute more readily available Products of similar character, at no increase in Contract Price or Contract Time.

1.5. STORAGE AND PROTECTION

- .1 Store and protect Products in accordance with manufacturers' written instructions.
- .2 Store with seals and labels intact and legible.
- .3 Store sensitive Products in weather tight, climate controlled, enclosures in an environment favourable to Product.
- .4 For exterior storage of fabricated Products, place on sloped supports above ground.
- .5 Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of Products.
- .6 Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- .7 Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.
- .8 Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

1.6. TRANSPORTATION AND HANDLING

- .1 Transport and handle Products in accordance with manufacturer's written instructions.
- .2 Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.
- .3 Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.
- .4 Suitably pack, crate and protect products during transportation to site to preserve their quality and fitness for the purpose intended.

- .5 Store products in original, undamaged condition with manufacturer's labels and seals intact until they are being incorporated into completed work.
- .6 Protect materials from damage by extreme temperatures or exposure to the weather.

1.7. EXISTING UTILITIES

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

1.8. MANUFACTURER'S WRITTEN INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect Products to manufacturer's written instructions. Do not rely on labels or enclosures provided with Products. Obtain written instructions directly from manufacturers.
- .2 Notify Consultant in writing, of conflicts between specifications and manufacturer's instructions, so that Consultant may establish course of action.
- .3 Improper installation or erection of Products, due to failure in complying with these requirements, authorizes Consultant to require removal and re-installation at no increase in Contract Price or Contract Time.

1.9. QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Consultant if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Consultant and or Board reserves right to require dismissal from site any workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Consultant, whose decision is final.
- .4 Products, materials, systems and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the applicable manufacturer's printed directions.

- .5 Where specified requirements are in conflict with manufacturer's written directions, follow manufacturer's directions. Where specified requirements are more stringent than manufacturer's directions, comply with specified requirements.

1.10. COORDINATION

- .1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.
- .3 Contractor is responsible to ensure suppliers or distributors of materials specified or alternatives accepted, which he intends to use, have materials with original schedule, and similarly it shall be the responsibility of all subcontractors and suppliers to so inform the Contractor.
- .4 Contractor shall contact Consultant immediately upon receipt of information indicating materials or items, will not be available on time, in accordance with the latest approved schedule, and similarly it shall be the responsibility of all subcontractors and suppliers to so inform the Contractor.
- .5 The above, in no way releases the Contractor, or their subcontractors and suppliers of their responsibility for ensuring timely ordering of materials and items required, including the necessary expediting, to complete the Work as scheduled in accordance with the Contract Documents including temp accommodations and or materials to ensure occupancy date is achieved.

1.11. CONCEALMENT

- .1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation, inform Consultant if there is interference. Install as directed by Consultant at no additional cost to the Board.

1.12. REMEDIAL WORK

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.13. LOCATION OF FIXTURES

- .1 Inform Consultant of conflicting installation. Install as directed.

1.14. FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use Type 304 or 316 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.15. PROTECTION OF WORK IN PROGRESS

- .1 Prevent overloading of any part of the Project.
- .2 Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated, without written approval of Consultant.

END OF SECTION

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SECTION 01 70 00 – EXAMINATION AND PREPARATION

1.0 GENERAL

1.1. RELATED SECTIONS

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

1.2. REFERENCES

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

1.3. SUBMITTALS

- .1 Submit name and address of Surveyor to Consultant.
- .2 On request of Consultant, submit documentation to verify accuracy of field engineering work.
- .3 Submit certificate signed by surveyor certifying that elevations and locations of completed Work conforms with Contract Documents.

1.4. QUALIFICATIONS OF SURVEYOR

- .1 Qualified registered land surveyor, licensed to practise in the Place of the Work.

1.5. SURVEY REFERENCE POINTS

- .1 Existing base horizontal and vertical control points are designated on Drawings.
- .2 Locate, confirm and protect control points prior to starting site Work. Preserve permanent reference points during construction.
- .3 Make no changes or relocations without prior written notice to Consultant.
- .4 Report to Consultant when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .5 Require surveyor to replace control points in accordance with original survey control.

1.6. SURVEY REQUIREMENTS

- .1 Establish existing and new permanent bench marks on site, referenced to established bench marks by survey control points.
- .2 Record locations, with horizontal and vertical data in Project Record Documents.
- .3 Establish lines and levels, locate and lay out, by instrumentation.

- .4 Establish pipe invert elevations.
- .5 Stake batter boards
- .6 Establish foundation and floor elevations.
- .7 Establish lines and levels for mechanical and electrical work.

1.7. SUBSURFACE CONDITIONS

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

1.8. EXAMINATION

- .1 The Contractor is expected to be totally familiar with site conditions and shall assume full responsibility for the cost involved in repairing any damage to the building, site and services, city property, adjacent buildings, etc., during general construction, regardless of the extent of the damage.
- .2 Inspect existing conditions, including elements or adjacent Work subject to irregularities, damage, movement, including Work during cutting and patching.
- .3 The Contractor shall provide all equipment necessary to make a full and detailed site evaluation. This shall include but not be limited to ladders, flashlights and hand tools.
- .4 The Contractor expressly agrees that conditions above existing suspended acoustic ceilings, but below fixed structure, unless obscured by an additional ceiling above, shall be considered exposed conditions for the purposes of making findings under the provisions of the Contract. There shall be no claims for extra costs for extra Work in these areas.
- .5 After uncovering, inspect conditions affecting performance of the Work.
- .6 Beginning of cutting or patching means acceptance of existing conditions.

1.9. PREPARATION

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

1.10. EXISTING SERVICES

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Consultant of findings.
- .2 Remove abandoned service lines running through within existing and new structures. Cap or seal lines at cut-off points as directed by Consultant.

1.11. LOCATION OF EQUIPMENT AND FIXTURES

- .1 Inform Consultant of conflicting installations, install as directed.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Consultant of impending installation and obtain approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Consultant.

1.12. SURVEY RECORD

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.
- .3 Record locations of maintained, re-routed and abandoned service lines.

END OF SECTION

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SECTION 01 73 30 – EXECUTION AND CUTTING AND PATCHING

2.0 GENERAL

2.1. RELATED SECTIONS

- .1 Section 01 32 00 - Construction Progress Documentation: Submittals and scheduling.
- .2 Section 01 61 00 - Product Requirements.
- .3 Section 01 70 00 – Examination and Preparation
- .4 Individual Product Specification Sections:
 - .1 Cutting and patching incidental to work of the section.
 - .2 Advance notification to other sections of openings required in Work of those sections.

2.2. 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 element.
 - .3 Efficiency, maintenance, or safety of any operational element.
 - .4 Visual qualities of sight exposed elements.
 - .5 Work of Owner or separate contractor.
- .2 Include in request:
 - .1 Identification of Project.
 - .2 Location and description of affected Work.
 - .3 Necessity for cutting or alteration.
 - .4 Description of proposed Work and Products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on work of Owner or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

2.3. TOLERANCES

- .1 Monitor fabrication and installation tolerance control of Products to produce acceptable Work.
- .2 Do not permit tolerances to accumulate beyond effective or practical limits.
- .3 Comply with manufacturers' tolerances. In case of conflict between manufacturers' tolerances and Contract Documents, request clarification from Consultant before proceeding.

- .4 Adjust Products to appropriate dimensions; position and confirm tolerance acceptability, before permanently securing Products in place.

3.0 PRODUCTS

3.1. MATERIALS

- .1 Primary Products: Those required for original installation.
- .2 Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 33 00.

4.0 EXECUTION

4.1. EXAMINATION

- .1 Examine existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering existing Work, assess conditions affecting performance of work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.

4.2. PREPARATION

- .1 Provide temporary supports to ensure structural integrity of the Work. Provide 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.
- .3 Maintain excavations free of water.

4.3. CUTTING

- .1 Execute cutting and fitting as needed to complete the Work. Prior to any cutting and or coring of concrete floors the contractor shall confirm the area is free of services or rebar. Notify the Consultant of any interferences.
- .2 Uncover work to install improperly sequenced work.
- .3 Remove and replace defective or non-conforming work.
- .4 Remove samples of installed work for testing for Hazardous materials.
- .5 Provide openings in the Work for penetration of mechanical and electrical work.
- .6 Employ experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- .7 Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

- .8 Do all cutting, patching and making good, to leave a finished condition and to make the several parts of the work come together properly. Coordinate work to keep cutting and patching to a minimum.
- .9 Make cuts with clean, true, smooth edges. Fit unit to tolerance established by test standard practice for applicable work. Make patches invisible in final assembly.
- .10 Cutting shall be done in a manner to keep patching to minimum. Obtain Consultant's approval of method to be used to conceal new mechanical and electrical services before beginning cutting. Chasing of concrete surfaces is not permitted.
- .11 Cutting or coring of any structural concrete is to be reviewed and approved by the Consultant.
- .12 Do not endanger any work by cutting, digging or otherwise altering, and do not cut nor alter any load bearing element without written authorization by Consultant. Provide bracing, shoring and temporary supports as required to keep construction safely supported at all times
- .13 Any cost caused by omission or ill-timed work shall be borne by party responsible therefore.
- .14 Regardless of which Section of work is responsible for any portion of cutting and patching, in each case tradesmen qualified in work being cut and patched shall be employed to ensure it is correctly done.

4.4. PATCHING

- .1 Execute patching to complement adjacent Work.
- .2 Fit Products together to integrate with other Work.
- .3 Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.
- .4 Employ original installer to perform patching for weather exposed and moisture resistant elements, and sight-exposed surfaces.
- .5 Restore work with new Products in accordance with requirements of Contract Documents.
- .6 Fit work with adequate support to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .7 At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with firestop material.
- .8 Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
- .9 Complete and tightly fit all construction to pipes, ducts and conduits which pass through construction to completely prevent the passage of air.

- .10 Patching and making good shall be done by trade specialists in material to be treated, and shall be made undetectable in finished work when viewed from distance of 1.5m under normal lighting.

END OF SECTION

SECTION 01 74 00 – CLEANING AND WASTE MANAGEMENT

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Common Work by All Trades
- .2 This section describes requirements applicable to all Sections within Divisions 02 to 49.
- .3 Conduct cleaning and disposal operations to comply with local ordinances and environmental protection legislation.
- .4 Store volatile wastes in covered metal containers, and remove from premises at end of each working day.
- .5 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

2.0 PRODUCTS

2.1. CLEANING PRODUCTS

- .1 Cleaning Agents and Materials: Low VOC content wherever possible. The Consultant and the Board shall be notified prior to use of any exception.

3.0 EXECUTION

3.1. CLEANING DURING CONSTRUCTION

- .1 Maintain the Work in tidy condition, free from accumulation of waste products and debris, other than that caused by the Owner or other Contractors.
- .2 Remove waste material and debris from the work areas and deposit in waste container at the end of each working day.
- .3 Vacuum clean interior areas prior to start of finishing work. Maintain areas free of dust and other contaminants during finishing operations.
- .4 Individual Subcontractors are responsible for the daily clean-up and removal of debris related to, or generated by, their own work. The overall responsibility for project cleanliness rests with the Contractor.
- .5 The Contractor shall be responsible for snow removal within the construction area.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Wherever possible recycle materials
- .8 Containers:

- .1 Provide adequate number and sizes of on-site garbage and recycling containers within designated work site as required for collection of waste materials and debris on a daily basis.
- .2 Provide additional waste containers when extent of work warrants.
- .3 Provide and use clearly marked, separate bins for recycling.
- .9 Dispose of waste materials and debris at registered waste disposal and recycling facility.
- .10 Remove oily rags, waste and other hazardous substances from premises at close of each day, or more often when required.
- .11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

3.2. WASTE MANAGEMENT

- .1 Audit, separate and dispose of construction waste generated by new construction or by demolition of existing structures in whole or in part, in accordance with Ontario Regulations 102/94 and 103/94 made under the Environmental Protection Act.
- .2 Containers:
 - .1 Provide adequate number and sizes of on-site garbage and recycling containers within designated work site as required for collection of waste materials and debris on a daily basis.
 - .2 Provide additional waste containers when extent of work warrants.
 - .3 Provide and use clearly marked, separate bins for recycling.
- .3 Fires, and burning of rubbish or waste on site is strictly prohibited.
- .4 Burying of rubbish or waste materials on site is strictly prohibited.
- .5 Disposal of waste or volatile materials such as mineral spirits, oil, gasoline or paint thinner into ground, waterways, or sewer systems is prohibited.
- .6 Empty waste containers on a regular basis to prevent contamination of site and adjacent properties by wind-blown dust or debris

3.3. PREPARATION FOR FINAL CLEANING

- .1 Prior to final cleaning the General Contractor shall:
 - .1 remove all surplus products, tools, construction machinery and equipment not required for the performance of remaining work, and thereafter remove any remaining materials, equipment, waste and debris,
 - .2 replace all filters installed on any equipment in operation in the area of work,

- .3 remove all paint spots or overspray from all affected surfaces, and

3.4. FINAL CLEANING PRIOR TO ACCEPTANCE: INTERIOR

- .1 Prior to applying for Substantial Performance of the Work, or, prior to Owner occupancy of the building or portion of the building affected by the Work, whichever comes first, conduct full and complete final cleaning operations for the areas to be occupied.
- .2 Final cleaning operations shall be performed by an experienced professional cleaning company, possessing equipment and personnel sufficient to perform full building cleaning operations. Contractors "broom cleaning" is not acceptable as a "Final Clean". The cleaning contractor shall:
 - .1 clean interiors of all millwork and surfaces of any furniture and equipment present,
 - .2 use only cleaning materials recommended by the manufacturer of the surface to be cleaned,
 - .3 remove all stains, spots, scuff marks, dirt, dust, remaining labels, adhesives or other surface imperfections,
 - .4 clean and polish all glass and mirrors and remove remaining manufacturer's and safety "X" labels,
 - .5 clean and polish all finished metal surfaces such as enamelled or stainless steel, chrome, aluminum, brass, and bronze,
 - .6 clean and polish all vitreous surfaces such as plumbing fixtures, ceramic tile, porcelain enamel, or other such materials,
 - .7 clean all ceramic tile surfaces in accordance with the manufacturer's instructions,
 - .8 vacuum, clean and dust behind grilles, louvres and screens,
 - .9 steam clean all unprotected carpets immediately prior occupancy by Owner, and
 - .10 clean all equipment and fixtures to a sanitary condition.
- .3 For any areas to be occupied after the owner's initial occupancy, provide full cleaning operations as outlined above prior to turning over to owner,
- .4 The Board's supplies and equipment must not be used for any cleaning operations including, but not limited to: garbage cans, mops, brooms, rags, ladders, chemicals etc.

3.5. FINAL CLEANING PRIOR TO ACCEPTANCE: EXTERIOR

- .1 For areas effected by construction final exterior cleaning operations shall be performed by the General Contractor or competent sub-contractor. Contractor's "broom cleaning" only is not acceptable.

- .2 Final exterior cleaning shall include:
 - .1 broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds,
 - .2 remove dirt and other disfiguration from exterior surfaces,
 - .3 sweep and wash clean paved areas,
 - .4 replace filters of mechanical equipment for all equipment that was in use during construction,
 - .5 clean all roofs, gutters, downspouts, areaways, drywells, and drainage systems,
 - .6 remove debris and surplus materials from crawl areas and other accessible concealed spaces.
 - .7 remove overspray

END OF SECTION

SECTION 01 78 10 – CLOSEOUT SUBMITTALS AND REQUIREMENTS

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 78 10 – Appendix 1 and 2 – WRDSB Warranty Card

1.2. TAKE-OVER PROCEDURES

- .1 Take over procedures will be in strict accordance with the requirements as set out in this Section.

1.3. SUBSTANTIAL PERFORMANCE

- .1 Prior to requesting a Substantial Performance deficiency inspection submit 2 hard copies, 1 digital copy of the Operating and Maintenance Manuals for Consultants approval.
- .2 Application for Substantial Performance must include.
 - .1 One (1) electronic copy of inspection and acceptance certificates required from regulatory agencies, including but not limited to.
 - .1 Certificates of Approval of the Work by the local Building Department.
 - .2 Electrical Inspection Certificate of Inspection.
 - .3 Fire Alarm Verification Certificate.
 - .3 Advise Consultant in writing, when project has been substantially completed. If Consultant agrees this stage has been reached, the Consultant shall prepare a complete list of deficiencies and submit copies of this list to Contractor and the Board.

1.4. COMMENCEMENT OF LIEN PERIODS

- .1 The date of publication of the Certificate of Substantial Performance of the Work, provided to the contractor by the Consultant, shall be the date for commencement of the lien period.

1.5. TOTAL PERFORMANCE

- .1 Prior to requesting a final inspection submit written certificate that the following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents and is ready for final inspection
 - .2 Defects have been corrected and deficiencies have been completed.

- .3 Equipment and systems have been tested and are fully operational.
Submit two copies of the balancing reports
- .4 Certificates required by the contractor have been submitted.
- .5 Operation of systems have been demonstrated to Owner's personnel.
- .6 Submit Record drawings.
- .7 Submit maintenance materials.
- .8 Provide certified site survey
- .2 When items noted above are completed, request final inspection of Work by consultant, and building inspector. If Work is deemed incomplete by Consultant, complete outstanding items and request re-inspection.

1.6. PAYMENT OF SUBSTANTIAL PERFORMANCE HOLDBACK

- .1 Prior to the release of lien holdback provide one copy of the following by the Contractor and each subcontractor:
 - .1 Statutory Declaration or Declaration of Last supply
 - .2 Workplace Safety and Insurance Board "Certificate of Clearance".
- .2 The Contractor shall submit an application for payment of the holdback amount.
- .3 After the receipt of an application for payment which will include a Statutory Declaration and WSIB Clearance from the, the Consultant will issue a certificate for payment of the holdback amount.

1.7. FINAL PAYMENT

- .1 When the Contractor considers final deficiencies and defects have been corrected and it appears requirements of Contract have been completed, make application for final payment.
- .2 When the Consultant finds the Contractor's application for final payment valid, the Consultant will issue a final certificate of payment
- .3 The Board reserves the right to charge the Contractor for school access card(s) that have not been returned.
- .4 The cost to reprogram or replace the card(s) access system is estimated at \$50.00 (fifty dollars) for each card issued, \$30.00 (thirty dollars) for each keybox key, plus \$35.00 (thirty five dollars) administration fee.

1.8. CLOSEOUT SUBMITTALS

- .1 Prepare instructions and data using personnel experienced in maintenance and operation of described products and submit to Consultant for review.
- .2 Copy will be returned to contractor with Consultant's comments.
- .3 Revise content of documents as required prior to final submittal.

- .4 Two (2) weeks prior to Substantial Performance of the Work, submit to the Consultant, the final copies of operating and maintenance manuals.
- .5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.
- .6 If requested, furnish evidence as to type, source and quality of products provided.
- .7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .8 Pay costs of transportation.

1.9. OPERATION AND MAINTENANCE MANUAL FORMAT

- .1 Provide two copies of operating and maintenance data, prepared on 215 X 280mm sheets in printed or typewritten form, contained in 3-ring binders with soft vinyl covers for materials and equipment which require special maintenance or operating procedures.
- .2 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder at the front of each volume.
- .3 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .4 Arrange content by the divisions of the specifications under Section numbers and sequence of Table of Contents.
- .5 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .6 Include the following in each manual:
 - .1 Complete list of subcontractors and suppliers, their addresses and telephone numbers. Provide 24 hour emergency telephone number for such subcontractors as Plumbing, Electrical, Sprinklers, Fire System, Heating, etc.
 - .2 Specified warranties for contractor, each subcontractor and supplier.
 - .3 WRDSB Warranty Card
 - .4 Copy of finish hardware list, complete with all amendments and revisions and lock manufacturer's descriptive and service literature.
 - .5 Schedule of paints and coatings. Include sufficient explanation to fully identify each surface with the applicable paint or coating used. Enclose copy of colour schedule.
 - .6 Maintenance instructions for finished surfaces.
 - .7 Brochures, cuts of equipment and fixtures.
 - .8 Operating and maintenance instructions for equipment.

- .9 Submit copies of letters from manufacturers of equipment and systems indicating their technical representatives have inspected and tested systems and are satisfied with methods of installation, connection and operations. These letters shall state names of persons present at testing, methods used and list of functions performed.
- .10 Submit one complete set of reviewed shop drawings of architectural, structural, mechanical and electrical items, folded to 215 x 280mm size, contained in heavy duty manila envelopes, numbered and labelled. Follow specification format with no more than one Section per envelope, hard copy and PDF.
- .11 Relevant certificates issued by authorities having jurisdiction
- .12 Computer disc or flash drive with all the above documentation in PDF format

1.10. RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of black line opaque drawings, and within the Project Manual.
- .2 Annotate with coloured felt tip marking pens, maintaining separate colours for each major system, for recording changed information.
- .3 Record information concurrently with construction progress. Do not conceal Work of the Project until required information is accurately recorded.
- .4 Contract drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 References to related shop drawings and modifications.
- .5 Specifications: legibly mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: Maintain warranties, test reports and samples required by individual specifications sections.

1.11. RECORD (AS-BUILT) DOCUMENTS AND SAMPLES

- .1 Store AS-BUILT documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .2 Label AS-BUILT documents and file in accordance with section number listings in List of Contents of the Project Manual. Label each document AS-BUILT DOCUMENTS in neat, large, printed letters.
- .3 Maintain AS-BUILT documents in clean, dry and legible condition. Do not use as-built documents for construction purposes.
- .4 Keep as-built documents and samples available for inspection by Consultant.

1.12. RECORD DRAWINGS

- .1 Prior to Substantial Performance of the Work, update the marked up information from the AS-BUILT documents to a master set of drawing.
- .2 Submit one set of completed AS-BUILT documents to the Consultant for review.
- .3 Documents will be returned to contractor with Consultant's comments.
- .4 Revise content of documents as required prior to final submittal.
- .5 After the review is completed resubmit to the Consultant for Consultant to produce electronic record drawings for the owner to use.

1.13. SPARE PARTS

- .1 Provide spare parts, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.
- .4 Obtain receipt for delivered products and submit prior to final payment.

1.14. REPLACEMENT (MAINTENANCE) MATERIALS

- .1 Deliver to site, unload and store where directed, replacement (maintenance) materials as required elsewhere in these Specifications. Obtain signed receipt from Owner's Representative for delivered materials and include copy of receipt in Operation and Maintenance manuals.
- .2 Package materials so they are protected from damage and loss of essential properties.
- .3 Label packaged materials for proper identification of contents.

1.15. SPECIAL TOOLS

- .1 Provide special tools, in quantities specified in individual specification section.

- .2 Provide items with tags identifying their associated function and equipment.
- .3 Receive and catalogue all items. Submit inventory listing to Consultant.
Include approved listings in Maintenance Manual

1.16. FINAL SITE SURVEY

- .1 Submit final site survey certificate in accordance with Section 01 70 00, certifying that elevations and locations of completed Work are in conformance Contract Documents.

1.17. WARRANTIES AND BONDS

- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined. The date of Substantial Performance of the Work shall be the date for commencement of the warranty period.
- .4 Verify that documents are in proper form, contain full information, and are notarized.
- .5 Co-execute submittals when required.
- .6 Retain warranties and bonds until time specified for submittals.

END OF SECTION

SECTION 01 78 40 – MAINTENANCE REQUIREMENTS

1.0 GENERAL

1.1. SECTION INCLUDES

- .1 Equipment and systems.
- .2 Materials and finishes.
- .3 Spare parts
- .4 Maintenance manuals.
- .5 Special tools.
- .6 Storage, handling and protection.
- .7 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.2. RELATED SECTIONS

- .1 Section 01 45 00 - Quality Control.
- .2 Section 01 78 40 – Maintenance Requirements.
- .3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3. EQUIPMENT AND SYSTEMS

- .1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.

- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide coordination Drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports as specified in Section 01 45 00.
- .15 Additional requirements: As specified in individual specification sections.

2.0 PRODUCTS

2.1. MATERIALS AND FINISH

- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Building Envelope: include copies of drawings of building envelope components, illustrating the interface with similar or dissimilar items to provide an effective air, vapour and thermal barrier between indoor and outdoor environments. Include an outline of requirements for regular inspections and for regular maintenance to ensure that on-going performance of the building envelope will meet the initial building envelope criteria.
- .5 Additional Requirements: as specified in individual specifications sections.

2.2. SPARE PARTS

- .1 Provide spare parts, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.
- .4 Obtain receipt for delivered products and submit prior to final payment.

2.3. MAINTENANCE MATERIALS

- .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.
- .4 Obtain receipt for delivered products and submit prior to final payment.

2.4. SPECIAL TOOLS

- .1 Provide special tools, in quantities specified in individual specification section.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

3.0 EXECUTION

3.1. DELIVERY TO SITE

- .1 Deliver to place of work and store.
- .2 General Contractor to receive and acknowledge delivery from contractors and sub-contractors of all parts and materials assembled for maintenance requirements. Provide a summary inventory list to the Consultant and/or the Board after all materials are gathered and verification of location. Signatures of receipt will not be accepted from anyone except the General Contractor's representative.

3.2. STORAGE, HANDLING AND PROTECTION

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

END OF SECTION

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SECTION 01 79 00 – DEMONSTRATION AND TRAINING

1.0 GENERAL

1.1. SECTION INCLUDES

- .1 Procedures for demonstration and instruction of Products, equipment and systems to Owner's personnel.
- .2 Seminars and demonstrations.

1.2. RELATED SECTIONS

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

1.3. DESCRIPTION

- .1 At Substantial Performance, at a time acceptable to Owner and Consultant, but not before operations and maintenance manual have been reviewed and accepted by the consultant; contractor shall give a complete demonstration in the presence of consultant; Sub-consultants, Owner and Owner's personnel of operation and maintenance of systems and equipment once they are 100% complete.
- .2 Owner will provide list of personnel to receive instructions and will coordinate their attendance at agreed-upon times.

1.4. COMPONENT DEMONSTRATION

- .1 Manufacturer to provide authorized representative to demonstrate operation of equipment and systems.
- .2 Instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.

1.5. SUBMITTALS

- .1 Submit schedule of time and date for demonstration of each item of equipment and each system one (1) week prior to designated dates, for Consultant's approval.
- .2 Submit reports within forty eight (48) after completion of demonstration, that demonstration and instructions have been satisfactorily completed.
- .3 Give time and date of each demonstration, with list of persons present.

1.6. CONDITIONS FOR DEMONSTRATIONS

- .1 Equipment has been inspected and put into operation in accordance with manufacturer's instructions and contract requirements.
- .2 Testing, adjusting, and balancing have been performed in accordance with manufacturer's instructions and contract requirements, and equipment and systems are fully operational.
- .3 Provide information packages as required for use in demonstrations and instructions.

2.0 PRODUCTS

2.1. NOT USED

- .1 Not used.

3.0 EXECUTION

3.1. PREPARATION

- .1 Verify that suitable conditions for demonstration and instructions are available.
- .2 Verify that designated personnel are present.
- .3 Prepare agendas and outlines.
- .4 Establish seminar organization.
- .5 Explain component design and operational philosophy and strategy.
- .6 Develop equipment presentations.
- .7 Present system demonstrations.
- .8 Accept and respond to seminar and demonstration questions with appropriate answers.

3.2. PREPARATION OF AGENDAS AND OUTLINES

- .1 Prepare agendas and outlines including the following:
 - .1 Equipment and systems to be included in seminar presentations.
 - .2 Name of companies and representatives presenting at seminars.
 - .3 Outline of each seminar's content.
 - .4 Time and date allocated to each system and item of equipment.
 - .5 Provide separate agenda for each system.

3.3. SEMINAR ORGANIZATION

- .1 Coordinate content and presentations for seminars.
- .2 Coordinate individual presentations and ensure representatives scheduled to present at seminars are in attendance.

- .3 Arrange for presentation leaders familiar with the design, operation, maintenance and troubleshooting of the equipment and systems. Where a single person is not familiar with all aspects of the equipment or system, arrange for specialists familiar with each aspect.
- .4 Coordinate proposed dates for seminars with Owner and select mutually agreeable dates.

3.4. EXPLANATION OF DESIGN STRATEGY

- .1 Explain design philosophy of each system. Include following information:
 - .1 An overview of how system is intended to operate.
 - .2 Description of design parameters, constraints and operational requirements.
 - .3 Description of system operation strategies.
 - .4 Information to help in identifying and troubleshooting system problems.

3.5. DEMONSTRATION AND INSTRUCTIONS

- .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment.
- .2 Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.
- .3 Instruct personnel on control and maintenance of sensory equipment and operational equipment associated with maintaining energy efficiency and longevity of service.
- .4 Review contents of manual in detail to explain all aspects of operation and maintenance.
- .5 Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instructions.

END OF SECTION

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PROJECT NAME

Board Tender Number: #7201-RW-22
Hespeler Public School – Office Renovation
300 Winston Blvd, Cambridge, ON N3C 3J6

PROJECT OWNER

WATERLOO REGION DISTRICT SCHOOL BOARD
51 Ardelt Ave
Kitchener, ON N2C 2R5

CONSULTANTS

ARCHITECT
HOSSACK & ASSOCIATES ARCHITECTS INC.
2150 Dunwin Drive, Unit 4
Mississauga, ON L5L 5M8

STRUCTURAL ENGINEERING CONSULTANTS
MTE Consultants Inc.
123 St. George St.,
London, ON N6A 3A1

MECHANICAL & ELECTRICAL ENGINEER
DEI Consulting Engineers
55 Northland Rd.,
Waterloo, ON N2V 1Y8

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 This Section outlines the mandatory minimum Health and Safety protocols for all renovation, addition and new school board construction Projects where all or a portion of the existing school building remains occupied and in use.
- .2 These Health and Safety protocols are mandatory minimum requirements, procedures and standards that the School Board insists are fully complied with by all parties involved with renovation projects.

1.2 RELATED SECTIONS

- .1 These specifications apply to all Divisions of this Project specification. It is the responsibility of the Contractor to apply these provisions wherever practical within specification limits to all products and services used on this Project.
- .2 The requirements of this Section supersede those of all other specification Sections and Drawings. Where conflicts exist in procedures, methods or materials, they shall immediately be brought to the attention of the Consultant and Board Project Manager. Where clarification is not immediately available, the Contractor shall assume the specifications contained in this Section are a minimum standard and the more stringent specification shall apply.
- .3 The Contractor must receive approval from Board Project Manager for any deviations from this specification Section.
- .4 The General Contractor shall recognize that it is *he* who is the Constructor of the Project. The General Contractor shall also recognize that he is solely responsible for site safety at the Place of the Work and compliance with the requirements of this Section does not limit or remove his total responsibility for site safety as Constructor of the Project.

1.3 REFERENCES

- .1 Applicable related regulations, standards and laws related to safety include but are not limited to:
 - .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
 - .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
 - .3 Province of Ontario
 1. Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. 1990 June 2002.

1.4 COMPLIANCE SPECIFICATION

- .1 Notwithstanding the requirements of this Section, the Contractor must comply with all applicable health, safety and environmental regulations and statutes.

1.5 BEYOND COMPLIANCE SPECIFICATION

- .1 These specifications apply in addition to all applicable health, safety and environmental compliance regulations. They are incorporated here to reflect the Board's intention to develop a specification which provides the safest practical procedures and policies for construction project sites that are occupied and in use by staff, students and visitors during the execution of the Construction Contract.
- .2 Beyond compliance specifications recognize that performance well beyond the minimum regulatory standard is often desirable, possible and affordable, often with no cost or low cost options. It also recognizes that application methods or protocols may be as important as the material specified. Therefore, these specifications cover both material and methods.
- .3 These provisions apply to both indoor and outdoor applications equally.

Part 2 Products

2.1 NOT USED

Part 3 Execution and Compliance Requirements

3.1 APPLICATION OF COMPLIANCE REQUIREMENTS

- .1 The articles set out herein are to be applied together as a set of related policies and procedures to achieve a comprehensive Health and Safety working protocol.
- .2 The Contractor shall execute all of the procedures and meet all of the requirements set out herein and apply these protocols from the outset of the Construction Phase.
- .3 These procedures or requirements are to be maintained for the duration of the Construction Phase. The Contractor shall not discontinue any of the individual procedures or requirements without the prior approval of the Board Project Manager.

3.2 SITE SUPERVISOR (SITE SUPERINTENDENT)

- .1 A full-time Site Supervisor (Site Superintendent) is required on site, regardless of the number of active workers on site.
- .2 Site Superintendent shall have as a minimum:
 - .1 Recent, previous experience with renovation or addition projects involving occupied buildings including (but not limited to) school construction, sites with students, tenants, employees, retail customers, pedestrian and vehicular traffic.

- .2 Successful completion of a multi-session Supervisor's training course conducted by a recognised Construction Association in Ontario.
- .3 Site Superintendent must carry a cell phone at all times during construction with the ability to be reached directly during all work hours and the ability to have voicemail recorded and accessed during all non-work hours including weekends and holidays.
- .4 Site Superintendent must have means of live phone or walkie-talkie communication with the site Flagman during all work hours.
- .5 Site Superintendent shall not be changed throughout project unless confirmed and approved by the Board Project Manager.

3.3 ONTARIO OCCUPATIONAL HEALTH & SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS

- .1 General Contractor to comply with the Ontario Occupational Health & Safety Act and Regulations for Construction Projects, latest edition– including all amendments.
- .2 Beyond compliance in item .1 above, regardless of the number of labourers active on the Project, the General Contractor shall form a contractors' Health & Safety Committee at the outset of construction. This Committee shall then follow the standard requirements for such a Committee as set out in the *Occupational Health & Safety Act and Regulations for Construction Projects*.

3.4 ON-SITE COMMUNICATIONS

- .1 At the outset of the project the General Contractor shall provide to the Board Project Manager all relevant contact information for the Site Superintendent, GC Project Manager and key sub-contractors including names and cell phone numbers.
- .2 The General Contractor shall provide at least one "emergency contact" telephone number at which the Contractor's representative can be reached directly during all work hours and have the ability to have voicemail recorded during all non-work hours including weekends and holidays. As outlined below, this may be designated to the Site Superintendent's cell phone number.
- .3 Regardless of compliance method for the emergency contact telephone number stated above, the Site Superintendent must carry a cell phone at all times during construction with the ability to be reached directly during all work hours and the ability to have voicemail recorded during all non-work hours including weekends and holidays.
- .4 Site Superintendent must have means of live phone or walkie-talkie communication with the site Flagman during all work hours.
- .5 The Contractor is to ensure that the Board Project Manager is immediately apprised of any safety issues as each arises and the related request and/or resolution. The Board Project Manager is responsible for any decisions that have an effect on the contract execution.

- .6 Notwithstanding the reporting to the Project Manager noted above the Site Superintendent shall liaise with school principal or designate on all safety related matters as required on a daily basis.
- .7 In the event of a safety issue requiring contractual clarification or action (i.e. Change Notice, etc.), the contractor shall ensure that, where applicable, the action is followed up with appropriate documentation.

3.5 FULL-TIME ON-SITE FLAGMEN

- .1 A full-time, designated Flagman is required at all vehicular construction entrances. Refer to drawings for the scope and locations.
- .2 In the event there is more than one entrance to the hoarded/fenced construction area, there must be a separate Flagman for each entrance.
- .3 Flagman may not be same person as Site Superintendent or other construction worker.
- .4 Flagman shall not be changed throughout the Project unless confirmed and approved by the Board Project Manager.
- .5 Flagman must have means of phone communication with Site Superintendent (phone or walkie-talkie).
- .6 The Flagman shall not be designated for any other duties than to act as a Flagman for safety purposes as described herein.
- .7 The Flagman shall meet and escort any construction traffic from the site **entrance** into and out of the hoarded/fenced construction area (including through open site areas until entrances to hoarding).
- .8 The Flagman shall only open hoarded areas when construction traffic moves through and immediately re-close gates.
- .9 The Flagman shall control construction parking at the school site (including vehicles parking or traveling in unauthorized areas).
- .10 The location of the Flagman shall be set to ensure the safe guarding of staff, student, and pedestrian traffic.
- .11 If not designated on the Contract Documents, the location of the Flagman shall be confirmed with the Board Project Manager and Consultant at the outset of the project and before the placement of hoarding and fencing.
- .12 Where the Contractor deems it necessary, in order for the Flagman to carry out the required full-time duties, the cost of a temporary shelter shall be included in the Tender Price.

- .13 The Flagman shall be properly attired to carry out his duties, including the use of safety equipment (e.g. wear reflective vest, have appropriate traffic hand-held "Stop" sign and have a visible identification tag).

3.6 SITE SAFETY SIGNAGE

- .1 Standardised Safety Signage is required at all construction entrances.
- .2 If not designated on the Contract Documents, the location of the Safety Signage shall be confirmed with the Board Project Manager and Consultant at the outset of the Project and before the placement of hoarding and fencing.
- .3 Safety Signage is to be posted at all street entrances to school site and at each entrance to hoarded/fenced construction area.
- .4 Total surface area of signage is to avoid exceeding municipal standards that would require a separate signage permit.
- .5 Access signage text shall include cell phone contact number for Site Superintendent.
- .6 Signage posted at gates shall state restrictions on hours of entry and egress as described in the Contract Documents and under no circumstances shall construction traffic be allowed within 30 minutes prior to school start, during recess, lunch break, and 30 minutes after dismissal periods.

3.7 ACCESS/EGRESS CONTROLS

- .1 At the outset of the Contract, the General Contractor shall advise all suppliers and subcontractors of the protocols listed herein and of the requirement to contact the Site Superintendent by Cell phone prior to entering the site.
- .2 The drivers of all construction vehicles entering the site, including delivery vehicle drivers, are to contact site Superintendent by cell phone prior to entering site; the Site Superintendent shall, in turn, give notice to the Flagman to be aware of the traffic and authorize the Flagman to allow entry of that vehicle.
- .3 Vehicular Gates are only for entry and exit of for construction purposes such as construction personnel, Authorities performing inspections, Board representative, delivery personnel, and disposal pickup and ONLY under escort by the Flagman. As such vehicular gates must remain closed and locked at all times and only opened for access/egress under escort by the Flagman, then closed and locked again.
- .4 Gates are to be lockable swing gates for vehicles and man gates at all access points to the hoarded/fenced construction area.

3.8 CONTRACTOR PARKING

- .1 Contractor parking shall be restricted to hoarded areas or designated parking areas only where pre-approved by Board Project Manager and Principal.
- .2 Contractor parking is restricted from all off-site street areas that interfere with site specific parent drop-off and parking areas.

3.9 REQUIRED PRE-CONSTRUCTION MEETINGS

- .1 Meeting 1: Contractor shall receive approval from the Architect and the Board Project Manager for parking, vehicular movement, access/egress strategies at a Pre-construction meeting taking place in advance of mobilizing on site.
- .2 Meeting 2: Once hoarding and fencing is erected BEFORE site construction is fully active and vehicles or equipment is mobilized on site, an initial site meeting shall take place at which time the layout of trailers and staging, deliveries, storage of materials, parking areas and vehicular movement to be reviewed and approved by the Board Project Manager.
- .3 See article 3.12- 'Site Meetings' following.

3.10 CONSTRUCTION FENCING AND HOARDING

- .1 Construction hoarding requirements shall be a site based decision to be determined by the Architect and the Board Project Manager at the design stage and shown on Contract Documents.
- .2 No fencing or hoarding shall be less than a continuous 1800 mm high.
- .3 In portions of the site where chain link is approved, it shall be continuous 1800 mm high chain link fencing, wire-tied to staked iron 'tees' at 1800 mm on centre - OR - leased, modular 'quick fencing' if staked down and wire tied together.
- .4 All fenced and hoarded areas to be gated with lockable vehicular and man gates-minimum construction to be steel rail and chain link construction.
- .5 Plastic snow fencing is NOT permitted.
- .6 All hoarding and fencing shall be maintained in a stable condition, for duration of construction period as part of the base contract price and to include Superintendent's inspection at the beginning and end of each work day.
- .7 All Fire Routes to be outside all fenced and hoarded areas and maintained clear at all times.
- .8 'Covered way' protection shall be provided when accesses or pathways are in proximity to construction, in accordance with Ministry of Labour *Occupational Health & Safety Act* Regulations.

3.11 HEALTH, WELLNESS & SAFETY DEPARTMENT REPRESENTATIVE

- .1 A representative of the Board's Health, Wellness & Safety Dept. ('Environment, Health and Safety Officer') may visit site at any anytime throughout the duration of the Contract to review the site, as it relates to the safety of the occupied areas of the site. Such site review shall neither constitute an inspection or approval for the Contractor.
- .2 Concerns or issues identified by the representative from the Board's Health, Wellness & Safety Dept. shall be communicated through the Board Project Manager and the school Principal for corrective action.
- .3 Contractor shall ensure full access to all site areas, at all times, for the Board's Health, Wellness & Safety Department Representative.

3.12 SITE MEETINGS

- .1 Coordinate the requirements of this Section with *Section 01 22 00 – 'Meetings and Progress Reports'*.
- .2 Initial site meeting to take place after erecting fencing and hoarding but prior to the mobilisation of any vehicles, equipment or start of Work.
- .3 Contractor shall ensure that the Board Project Manager, School Principal and a representative of the Board's Health, Wellness & Safety Department and the School Principal attend the initial site meeting.
- .4 The initial meeting shall review and approve a standardised agenda for all site meetings and a thorough review of the Site Safety Protocol.
- .5 The standardised agenda shall include a Checklist and Report of Health and Safety items at the beginning of the agenda. This Checklist shall be included and each item reviewed at all site meetings for the duration of the project.
- .6 The Checklist of Site Safety items shall include but not be limited to:
 - .1 Contractor's report of site safety record and report of recent site activities, precautions or actions.
 - .2 Review any visits to the site and actions required by Ministry of Labour or Board Health, Wellness & Safety representatives or other Authorities Having Jurisdiction.
 - .3 Contractor's Health & Safety policy manual posted in site trailer.
 - .4 Copy of Ministry of Labour *Occupational Health & Safety Act and Regulations for Construction Projects* in site trailer.
 - .5 Name of General Contractor H&S representative.
 - .6 Continuing compliance with Safety Signage.
 - .7 Hoarding & fencing layout and condition.
 - .8 Access and egress measures and any breaches of requirements.
 - .9 Confirmation of communications link between Site Superintendent & Flagman.

- .10 Work that may produce any noxious odours and the containment measures, (*i.e.*: schedule, type, approvals required therefore).
- .11 Copies of Material Safety Data sheets in site trailer.
- .12 Complete meeting minutes including details of Safety Checklist shall be copied to Architect, Board Project Manager and Principal.
- .7 Contractor to produce record of written Memorandum to all subtrades and suppliers detailing but not limited to: hours of delivery; site access procedures and restrictions; use of existing facilities.
- .8 Contractor to prepare detailed and accurate written record of all meetings to be kept and issued to all parties.

3.13 CONTRACTOR'S HEALTH AND SAFETY COMMITTEE MEETINGS

- .1 As required in item 3.1.2, the Contractor shall form a Health and Safety Committee, hold meetings and record minutes of meetings for the duration of the Contract.
- .2 Contractor to maintain a copy of Health & Safety Committee minutes on site for review by Ministry of Labour or Board representative(s).

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

These photographs are provided for convenience only. Bidders are strongly encouraged to attend the non-mandatory Site Meeting during tender.

Bidders remain responsible to inspect the site and assume existing site conditions.

The following photos were taken November 2021 & January 2022.

Exterior photos



General Office



Staff Room



Staff Washrooms



Guidance/ Meeting



Principal Office



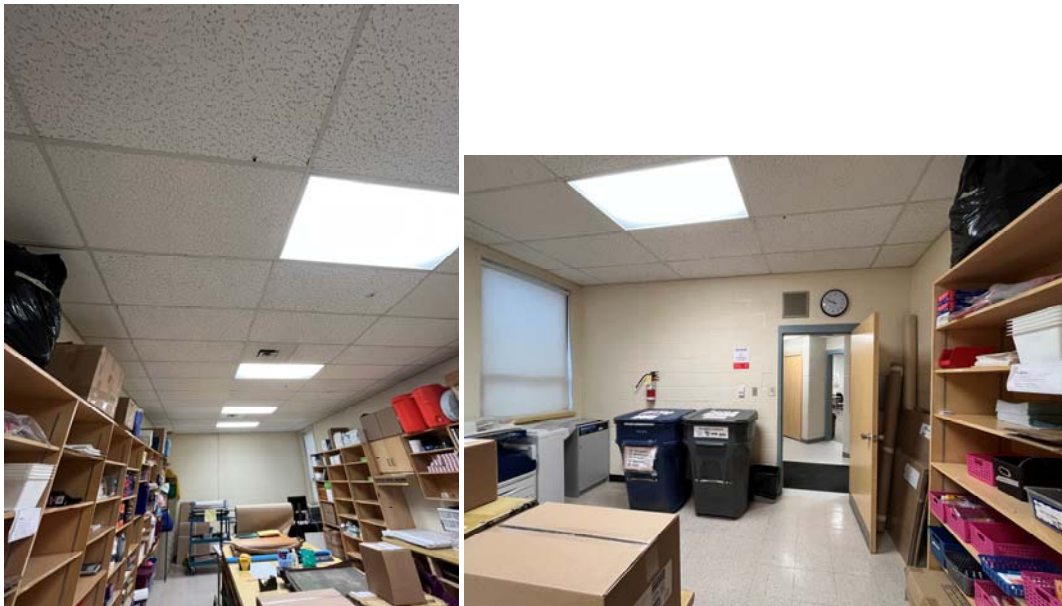
V.P. Office



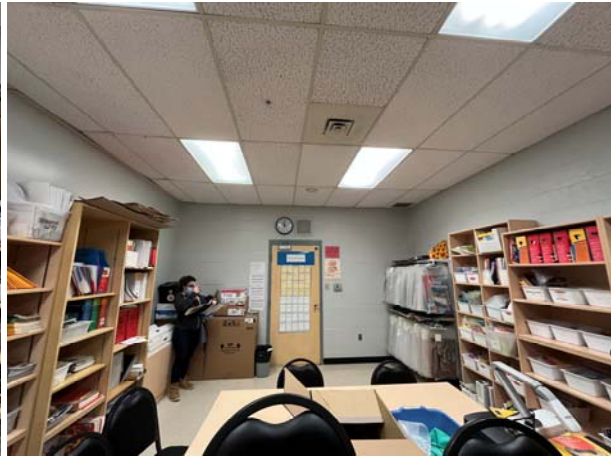
Health/ Storage



Staff Workroom



Literacy Room



Corridor A



Foyer



PART 1 GENERAL

1.1 Related Sections

1. Section 01 11 00 - Summary of Work
2. Section 01 56 00 – Temporary Barriers and Enclosures
3. Section 01 73 03 – Execution Requirements (Cutting and Patching)
4. Section 04 21 13- Brick and Block Masonry
5. Section 01 33 00 - Submittal Procedures
6. Section 08 11 14- Metal Doors and Frames
7. Section 08 71 15 – Finish Hardware
8. Section 09 91 22- Painting
9. Section 09 21 16- Gypsum Board Assemblies
10. Section 09 51 13- Acoustic Panel Ceilings
11. Section 10 11 25- Manufactured Specialties
12. Mechanical and Electrical Sections

1.2 Scope

1. Scope includes but is not limited to:
 - .1 Demolition or alteration of all structural, architectural, mechanical, electrical or site components, equipment, fitments and finishes as required to execute the work.
 - .2 The removal, repair and reinstallation as required to make good of existing acoustic unit ceilings gypsum board bulkheads, windows, doors, hollow metal screens and partition walls where required to be removed for routing new services, general alterations or revising demising walls.
 - .3 Removal and reinstallation as indicated of any existing fixed in place millwork, chalkboards or tackboards or similar fitments or devices identified to remain and be reinstalled.
 - .4 Grinding and patching of walls where chalkboards or fitments have been removed and surface adhesives or similar surface deficiencies remain.
 - .5 Cutting and removal of slabs on grade to remove or replace existing drains, clean outs, oil interceptors, trenches and sub slab services contained within them, not previously removed by Abatement work.
 - .6 Making good of all walls and floors remaining where sections of walls or floors have been removed and surfaces require repair.
 - .7 Making good of all finishes to remain as result of selective demolition.

1.3 Existing Conditions

1. Existing Ground Floor structure contains in-floor heating system materials that are no longer in use but may remain abandoned in place. These may be encountered during construction.
2. Take over structures to be demolished or altered based on their condition on date that tender is accepted, at time of examination prior to tendering.
2. Contractor may confirm the prior removal of all asbestos containing materials in documentation left on site following prior abatement work contract. Should areas of

asbestos be found which are not documented as removed or included in the scope of this work for removal, it shall be reported to the Consultant and Owner's representative for review and instructions for removal.

3. Prior to beginning alteration or demolition, confirm with Owner that no items to be salvaged or turned over to the owner remain in the work areas.

1.4 Protection

- .1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades parts of existing building to remain. Provide bracing, shoring and underpinning required. Make good damage and be liable for injury caused by demolition.
- .2 Take precautions to support structures and, if safety of building being demolished or adjacent structures or services appears to be endangered, cease operations and notify Consultant.
- .3 Refer to structural drawings for Shoring Designs and Method Statements.
- .4 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.

Part 2 Products NOT USED

Part 3 Execution

3.1 Work

- .1 Dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction. Confirm in Divisions 15 and 16 for removal and re-use of mechanical and electrical materials and equipment.
- .2 Refer to drawings for furniture, materials or equipment to be removed and turned over to the owner. Carefully remove such items and store in location designated by Owner.
3. For a scope of work refer to all Drawings and also coordinate items to be altered, re-built, cleaned or otherwise "made good" as a result of the cutting and patching scope of work described in Section 01 73 03 Execution Requirements or other Sections.

3.2 Preparation

- .1 Disconnect electrical, telephone/PA and data service lines in work areas without disrupting main service to building and in accordance with regulations of authorities having jurisdiction. Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of demolition.
- .2 Disconnect and cap designated mechanical services in accordance with requirements of local authority having jurisdiction.
 - .1 Natural gas supply lines, if applicable to be removed by gas company by qualified tradesman in accordance with gas company instructions.
 - .2 Remove, cap or dispose of other underground services as indicated in drawings.
 - .3 Do not disrupt active or energized utilities traversing premises designated to remain undisturbed.

- .3 Floor scans to locate hidden or buried services in the work area have NOT previously been done. Prior to cutting, demolition or removal of any slabs on grade or areas where services may be concealed, engage a **private locate firm to provide magnetic and X-ray scans** of all areas involved. This is the responsibility of the General Contract and costs for such scans are to be included in the base contract price.

3.3 Disconnection and Removal of Materials and Equipment

- .1 Contractor shall cooperate with the Owner to determine which materials are to be removed and retained by Owner. The Owner will decide which items or equipment they wish to retain as their property and all other materials shall be removed from the premises by this Contractor. The equipment which is to be retained by the Owner shall be stored on site where directed by the Owner.
- .2 Refer to mechanical and electrical drawings and for disconnection and removal and/or relocated existing electrical, ductwork, piping and/or equipment.

3.4 Temporary Removals and Replacement

- .1 All items to be removed and installed shall be completed so that replaced materials are left in a clean undamaged state. If required to be replaced due to damage, the contractor shall include in his price for the component to be replaced and installed at no additional cost to the Contract.

3.5 Oil Tank Investigation and Possible Removal

- .1 A Subsurface Investigation report by MTE Engineers dated Dec. 7, 2018, has been provided in the specifications for sampling taken in the location of a possible oil tank within the work area. No concerns were reported with regards to contaminated soil. Should the tank be encountered during construction, the Contractor is to remove the underground abandoned oil tank and infill the area with compacted subbase and reinforced concrete slab as per proposed drawings. Refer to mechanical drawings. Oil Tank Removal, environmental engineering fees and associated testing is to be expended from the Cash Allowance. Licensed Petroleum Mechanic is required to remove the existing oil tank (with the fill pipe). The oil & gas interceptor is to be removed as part of the base bid (by the General Contractor).

3.6 Selective Demolition

- .1 Follow best trade practices for all demolition and alteration work. This includes but is not limited to the following items.
 - .1 The school will be mostly vacant during the construction, with the exception of some spaces being utilized intermittently. Despite this, ensure demolition work does not disrupt any ongoing aspect of the operation of the building.
 - .2 Confirm all demolition work (including potential noise, vibration, tools or equipment noise, etc.) in advance with the principal of the school on a daily basis. Similarly, notify all building occupants in advance at each possible interruption in services or utilities.
 - .3 Protect all areas from damage and intrusion by means of locking rooms under construction when not in use, use of dust tight screens and temporary partitions and

- hoarding. Demolish to minimize dusting. Refer to drawings for locations and other Specification Sections for requirements.
- .4 Signage to be posted at all times. Take precautions to demolish only areas as necessary to complete the work, and avoid damage to adjacent areas. Make good all areas affected by demolition or renovation activities, whether specifically included in the contract documents or not.
 - .5 The Contractor shall be responsible for damage to all areas affected by renovation or alteration activities.
 - .6 Prior to demolition, the Contractor shall carefully examine the drawings in relation to the site conditions, to ensure that all intended work can be carried out without ambiguity. Incorrect demolition of any work by the Contractor, will be back-charged to him. Any discrepancies between the drawings and the site conditions, must be reported to the Consultants immediately.
 - .7 Demolish or remove interior and exterior elements as indicated.
 - .8 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.
 - .9 At end of each day's work, leave work in safe condition so that no part is in danger of toppling or falling. Protect interiors of parts not to be demolished from exterior elements at all times.
 - .10 Demolish masonry and concrete walls in small sections. **Salvage existing imperial block units in coordination with Section 04 21 13 to re-use as patching in existing imperial unit masonry.**
 - .11 Carefully remove and lower structural framing and other heavy or large objects as required. Where partial walls of exposed concrete block masonry is to remain, grind all exposed edges to a bullnose and patch as required suitable for final painting.
 - .12 Do not sell or burn materials on site.
 - .13 Remove contaminated or dangerous materials from site and dispose of in safe manner to minimize danger at site or during disposal, in accordance with all governing legislation.
 - .14 Where applicable, saw cut existing terrazzo floor and base as required and remove to nearest metal 'panel' joint to enable replacement at a full panel. **Replace with terrazzo flooring to match existing as closely as possible. Provide sample to consultant for approval.**
 - .15 Following demolition and removals of floor trenches, walls and fitments, coordinate with Section 01 73 03. As part of the work of this section, scarify or otherwise grind existing or new slabs in preparation for slab in-fills and a self leveler skim slab by Section 01 73 03. That Section is responsible for the provision of a backfill, slab on grade patching and self leveling skim coat where required in advance of new VCT finishes by Section 09 65 19.
 - .16 Patch and make good existing wall, ceiling and floor finish with identical original materials if affected by temporary protection or by previous Abatement contract.

3.7 Repair to all Finishes and Colours

- .1 Repaint all walls in rooms or areas modified as indicated in the Finish Schedule, or as directed by the Consultant.

- .2 Repair and make good all fixtures, finishes, trims and surfaces to all floor, wall and ceiling areas in rooms or areas whether or not they have been modified or affected by the work or by previous Abatement Contract.
- .3 Existing paint colours are to be matched exactly using computer colour matching.

END OF SECTION

Part 1 General

1.1 HAZARDOUS BUILDING MATERIALS REPORT & ABATEMENT SPECIFICATIONS REFERENCE

- .1 Asbestos Abatement forms part of this contract. The **Asbestos Audit Report** prepared for this project is bound within this document. These reports outline the areas of hazardous materials discovered at this site.
- .2 It is the responsibility of the contractor to engage a qualified abatement contractor for required removal.
- .3 Removal and air quality testing is to be performed outside of operating school hours and done in a manner to not interfere with operating school hours.
- .4 The referenced asbestos reports were not prepared by or under the supervision of the Architect. The Architect claims no responsibility or liability for the accuracy of the information contained in the report.
- .6 Refer also to Division 1 and Section 01 35 30 and coordinate with this Section.

Part 2 Products

2.1

1. Refer to documents noted above.

Part 3 Execution

3.1

- .1 Inspection and Testing will be paid for under Cash Allowances.

END OF SECTION

Part 1 General

- .1 ASBESTOS AUDIT UPDATE Report will be provided to the awarded Contractor, prior to construction start.
- .2 As outlined in specification section 01 11 00 'Additional Instructions', a Cash Allowance is to be included in the contract price. Any required designated substance abatement will be paid for from the Cash Allowance.

Part 2 Products

1. Refer to above.

Part 3 Execution

- .1 Inspection and Testing will also be paid for under Cash Allowances.

END OF SECTION

Part 1 **General**

1.1 RELATED SECTIONS

- .1 This Section specifies work which shall be performed by:
Section 04 22 00: Concrete Unit Masonry

1.2 QUALITY ASSURANCE

- .1 Requirements of Regulatory Agencies:
Modify requirements of the Specifications only as jurisdictional authorities may direct.

1.3 REFERENCES

- .1 ASTM C270-89: Standard Specification for Mortar for Unit Masonry.
- .2 CSA A179-04 (R2009): Mortar and Grout for Unit Masonry.
- .3 CSA A371-04 (R2009): Masonry Construction for Buildings.
- .4 CSA S304.1-04: Masonry Design for Buildings (Limit States Design).

1.4 SUBMITTALS

- .1 Affidavits:
Submit to Consultants affidavits of an inspection company that mortar and grout materials conform to requirements of the Specifications, if requested.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Handle and store cementitious materials protected against moisture.
- .2 Handle and store all mortar materials to prevent contamination by foreign materials, and damage by freezing or excessively high temperatures.

1.6 SITE CONDITIONS

- .1 Environmental Requirements:
When air temperature is less than 5° C, mix mortar as specified in CSA A371.

Part 2 **Products**

2.1 MATERIALS

- .1 Use materials only as specified in CSA Standard A179 referenced from CSA A371 and CSA S304.1 as applicable. Ensure that water and aggregate used in mortar, other than in walls buried in earth, will cause no efflorescence.
- .2 Incorporate only materials from same source in mortar exposed to view.
- .3 Water: Verify that water used contains no salts to cause efflorescence.
- .4 Portland Cement: to CAN/CSA-A3001, Type GU; grey colour, unless indicated elsewhere.

-
- .5 Masonry Cement: to CAN/CSA-A3002, Type S.
 - .6 Hydrated Lime: to ASTM C207, Type S-Special.
 - .7 Mortar Aggregate: natural sand, to CSA A179, standard masonry type; clean, dry, protected against dampness, freezing and foreign matter.
 - .8 Grout Coarse Aggregate: to CSA A179, maximum 10 mm size, 27 percent by volume.
 - .9 Grout Fine Aggregate: to CSA A179, clean well graded sharp sand; 54 percent by volume.
 - .10 Water: potable, clean and free of deleterious amounts of acids, alkalies or organic materials.

2.2 ADMIXTURES

- .1 Plasticizer: water reducing type, reducing porosity and absorption to increase bond strength.
- .2 Water Repellent: mixture of calcium carbonate and hydrous magnesium aluminum silicate powders.
- .3 Colour: liquid manufactured or natural oxide pigment, colour and loading as selected by Consultant.

2.3 MIXES

- .1 Mortar for Concrete Masonry Units: to CSA A179, Type S using the Proportion Specification Method c/w water repellent addition.
- .2 Mortar for Calcium Silicate Masonry Units: to CSA 179, Proportion Specification Method, consisting of 1-1-6 mix of Portland cement, hydrated lime and aggregate, c/w integral colour.
- .3 General: Ensure that water and aggregates used are all from same source and will meet required strengths. Batch mortar and grouts are acceptable provided source is approved prior to commencement of work.
- .4 Mix mortars as specified in CSA A179. Use only dry aggregate. Test for bulking to determine accurate proportioning.
- .5 Do not incorporate calcium chloride in mortar mix. In cold weather non-chloride accelerating admixtures may be utilised such as Accelguard 80 by Euclid Chemical Canada Inc., or equivalent meeting specified requirements of ASTM Specification C270.
- .6 Dirt resistant additives: aluminum tristearate, calcium stearate or ammonium stearate.
- .7 Use aggregate passing 1.18 mm sieve where 6 mm thick joints are indicated.
- .8 Colouring Additive: A mineral-oxide pigment, harmless to mortar set and strength, shall be provided. Colour shall be one (1) colour per masonry unit type, as selected by the Consultant.

2.4 GROUT

- .1 Grout in Reinforced Masonry Cores, Bond Beams and Lintels:
 - : 20 MPa strength at 28 days
 - : 175 – 200 mm slump, mixed to CSA – A179, fine grout.

Part 3 Execution

3.1 MIXING

- .1 Mix mortar to consistency required for working.
- .2 Mix grout to semi-fluid consistency.
- .3 Incorporate colour and admixtures into mixes in accordance with manufacturer's instructions. Use clean mixer for coloured mortar.
- .4 Prehydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball. Allow to stand for not less than 1 hour nor more than 2 hour then remix with sufficient water to produce mortar of proper consistency for pointing.

3.2 INSTALLATION

- .1 Grout fully all pockets in concrete foundation walls where structural components installed, under bearing plates at piers and elsewhere as noted on drawings.
- .2 Grout solid all reinforcing installed in concrete block walls.
- .3 Protect all mortar and grout installed from freezing or from excessive heat which will prevent bonding or decrease the required compressive strength.

3.3 PREPARATION

- .1 Protection:
 - Provide waterproof protection over construction surfaces at mixing areas to prevent deposit on them of mortar and mortar materials.

3.4 MORTAR TYPES

- .1 For laying concrete and brick unit masonry, use mortar type:
 - “S” in masonry walls in contact with earth.
 - “S” in masonry walls for all structural walls.
 - “N” in non-structural applications.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 This section to be read in conjunction with Section 04 21 13 for Execution Requirements.
- .2 Work performed by other Sections and which is related to this Section is specified in:
Section 03 10 00: Concrete Formwork: for dovetail anchor slots in concrete, concrete lintels.
- .3 Supply of work which shall be installed by this Section is specified in:

Section 05 12 23: Structural Steel for Buildings: to furnish bearing plates, steel lintels

Section 05 31 00: Steel Decking: to furnish weld plates. Miscellaneous inserts and attachment devices to support the installations of other Sections, frames and miscellaneous metal work
- .4 This Section shall include performance of work which is specified in:
Section 04 05 12: Mortar and Grout

1.2 SYSTEM DESCRIPTION

- .1 Tolerances:
Lay masonry to tolerances specified in CSA A371 and:
 - .1 Level within 6 mm in any bay or 6 m maximum distance, and 13 mm in 12 m or more.
 - .2 Opening sizes within 6 mm of designated dimension.
 - .3 With joints to dimensions indicated, but in no case greater than 13 mm.

1.3 QUALITY ASSURANCE

- .1 Requirements of Regulatory Agencies:
 - .1 Construct masonry as required by jurisdictional authorities.
 - .2 Before commencing masonry work, verify that site conditions will allow construction of masonry within required limitations for wall heights, wall thickness, openings, bond, anchorage, lateral support, and compressive strengths of masonry units and mortars.
 - .3 Construct masonry fire rated assemblies, which are validated by UDI, ULC, or NRC fire tests, in complete accordance with the test design specification. Fire rated assemblies constructed otherwise will be acceptable only on presentation of authorization by jurisdictional authorities.

1.4 REFERENCES

- .1 CAN/CSA-A165 SERIES-04 (R2009): Concrete Block Masonry Units
CAN/CSA-A370-04 (R2009): Connectors for Masonry
CAN/CSA-A371-04 (R2009): Masonry Construction for Buildings
CSA S304.1-04: Design of Masonry Structures (Limit States Design)

- .2 Reference standards quoted in Contract Documents refer to: ASTM A924/A924M-95, Specification for General Requirements for Steel Sheet Metallic Coated by the Hot-Dip Process.
CAN/CGSB-37.2-M88, Emulsified, Asphalt, Mineral Colloid Type, Unfilled, for Dampproofing and Waterproofing, and for Roof Coatings.

1.5 SUBMITTALS

- .1 Samples:
Submit samples of unit masonry for review.
- .2 Affidavits:
Submit affidavits by an approved independent testing laboratory stating that materials supplied are in accordance with the Specifications, if requested.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Isolate masonry units from contact with ground and other materials until laid, to prevent staining.
- .2 Ensure that moisture content of concrete masonry units is maintained within specified limits from time of shipment from plant, to time of installation.
- .3 Cover masonry unit stockpiles while stored to prevent exposure to weather. Keep water out of all holes and reglets in units during freezing weather.
- .4 Handle and store masonry units to prevent soiling and chipping.
- .5 Deliver products to the place on site as directed, and to meet installation schedule.

Part 2 Products

2.1 MATERIALS

- .1 Meet specified requirements of CSA A370 and CSA A371 for materials unless specified otherwise.
- .2 Asphalt Emulsion:
To meet specified requirements of CAN/CGSB-37.2.
- .3 Joint Packing at Walls:
.1 Fire Separation Packing: at tops of fire rated walls and partitions: Thermafiber 200 degree glass fibre insulation by Canadian Gypsum Company, Limited, or Firebarrier fibre firestopping by AD Distributors Ltd.
.2 Expansion Joint Packing: Glass fibre insulation, rigid board, density of 48 kg/cu.m.; or Rodofoam by Sternson Limited, or closed cell neoprene DA2015 by Dur-O-Wal Ltd.

- .4 Joint Reinforcement:
- .1 Provide joint reinforcement in width to ensure that longitudinal rods at faces of wall have minimum mortar cover of 16 mm and that they are centred on shells of hollow core units.
 - .2 Horizontal joint reinforcing shall include longitudinal and cross rods, welded steel rod, Truss type extra heavy duty Blok-Lok BL-30 or 120 Truss-Mesh by Hohmann & Barnard Inc. Galvanizing as per Section 2.1.9.
 - .3 For Exterior single-wythe block wall horizontal joint reinforcement shall include cross ties hot dipped galvanized Truss type (Extra Heavy Duty). Spacing to be minimum every 3rd course, U.N.O.
 - .4 For Interior Single Wythe Load-bearing Walls shall include 4.8mm cross ties mill galvanized Truss type (Extra Heavy Duty). Spacing to be as per drawings.
 - .5 For Interior Single Wythe Non-Load-bearing Walls provide 3.76 mm dia. longitudinal and cross rods, welded steel rod, galvanized, ladder design (Standard). Spacing shall be every second block course.
 - .6 All joint reinforcing to be galvanized as per 2.19 of this Section.
- .5 Masonry Veneer Wall Tie (Steel Stud Back-up):
Adjustable, dual component slotted design; e.g. Blok-Lok or Fero Slotted Stud Tie (Type 1), comprised of:
- .1 Slotted Stud Plate: 1.61 mm thick hot dipped galvanized steel plate to ASTM A153; length to suit air space dimension and stud width.
 - .2 V-Tie: 4.76 mm diameter hot dipped galvanized steel wire to ASTM A153; length to provide placement of tie legs at centerline of veneer.
 - .3 Fasteners: self-tapping sheet metal screws, hex washer head, suitable length to penetrate stud no less than 13 mm; minimum 2 screws per tie.
 - .4 Insulation Retaining Clip: purpose-made plastic, as recommended by tie manufacturer.
- .6 Masonry Veneer Wall Tie (CMU Back-up):
Adjustable, dual component slotted design; e.g. Blok-Lok or Fero Slotted Block Tie (Type 1), comprised of:
- .1 Slotted Block Plate: 1.61 mm thick hot dipped galvanized steel plate, to ASTM A153; length to suit air space and CMU width dimension, less 6 mm.
 - .2 V-Tie: 4.76 mm diameter hot dipped galvanized steel wire, to ASTM A153;; length to provide placement of tie legs at centerline of veneer.
 - .3 Insulation Retaining Clip: purpose-made plastic, as recommended by tie manufacturer.
- .7 Wall Tie (Structural Steel Back-up):
Adjustable, dual component design; suitable for welded attachment; e.g. Blok Lok Flex o-lok ties BLT-9, hot dipped galvanized c/w V-Tie, 4.8 mm size; hot dipped galvanized, suitable length to provide placement of tie legs at central line of veneer.
- .8 Strap Anchors: 6.35 mm thick steel plate, hot dipped galvanized; U-shaped and Z-shaped to suit application; e.g. BLT 11Z BY Blok-Lok.
- .9 Galvanizing:
- .1 For Joint Reinforcement, Bond Ties, Anchors, and Accessories in Exterior Walls: To meet specified requirements of ASTM Specification A153 , Class B, hot dip.
 - .2 For Joint Reinforcement, Anchors, and Accessories in Interior Walls: above

- grade Manufacturer's standard mill galvanising.
- .3 For Joint Reinforcement, Bond Ties, Anchors, and Accessories in interior walls below grade: To meet specified requirements of ASTM Specification A153, Class B, Hot Dip Gavanized.
- .10 Reinforcing Steel:
For reinforced block lintels: to meet specified requirement of CSA Standard G30.18.
- .11 Dovetail Anchor:
25 mm x 2mm formed sheet steel dovetail brick anchor galvanised, with end bent to form hook, to suit dovetail anchor slot specified for installation by formwork constructor.
- .12 Weep Holes:
Plastic tube, 10mm OD x 100 mm long, or 10 mm x 38 mm x 90 mm long rectangular; or DA1069 Cell Vent by Dur-O-Wall Limited.
- .13 Concrete Masonry Units:
- .1 To meet specified requirements of CAN3-A165 Series – 04.
- .2 Include all special shapes, such as end, bond, sash groove and lintel units, required for complete masonry installation indicated on Drawings. Use bullnose corner block at all door jambs, vertical external corners and where otherwise indicated on Drawings.
- .3 Modular size units.
- .4 Provide 100% solid units where required by jurisdictional authorities.
- .5 Moisture controlled ("M") units acceptable to Consultant.
- .6
- .1 Normal Weight Units: For use in walls below ground floor elevation:
Hollow Units: H/15/A/O.
75% Solid Units: S/15/A/M.
Solid Units: Sc/15/A/O:
- .2 Light Weight Units: For use in walls above ground floor elevation:
Hollow Units: H/15/C/M
75% Sold Units S/15/C/M
Solid Units: Sc/15/C/M
- .7 Supply lintel blocks for fabrication of lintels by Section 03 30 00.
- .14 Acoustical concrete blocks (Gym): CSA A165 Series, 'Acoustade' by Richvale York Block Inc. Type and size as shown on drawings, and approved by Consultant.
- .15 Colour glazed structural concrete blocks (adjacent some Corridor Doors and wall in Library): Refer to Section 04 21 13 Masonry Veneer for details on coloured glazed structural concrete block units to supplied and installed. Type and size as shown on drawings, and approved by Consultant.

Part 3 Execution

3.1 PROTECTION

- .1 Cover exposed tops of masonry walls when laying is not in progress and until protected by completed construction. Cover with non-staining waterproof material to overhang top

edges of wall by 600 mm minimum and secured to prevent dislodgement.

- .2 Protect exposed external corners of masonry with materials which will not damage or soil finished surfaces.
- .3 Protect all finished surfaces from mortar droppings.
- .4 Take particular care to protect faces of concrete unit masonry from mortar droppings and smears as laying proceeds.
- .5 Turn over or cover scaffolds and mortar boards at completion of each day's work to avoid staining of finished surfaces by splashed rain.

3.2 LAYING MASONRY

- .1 Lay masonry to meet specified requirements of CSA A370 and CSA A371, unless otherwise specified.
- .2 Lay masonry to course as shown on Drawings and to minimise cutting of units.
- .3 Coordinate coursing of dissimilar sized units only as approved by Consultant.
- .4 Use only dry and unfrozen materials.
- .5 Remove sections of masonry which have been frozen before laying of masonry continues.
- .6 Lay masonry in running bond with vertical joints of alternate courses in line.
- .7 Lay concrete unit masonry with thick ends of webs on top.
- .8 Joints:
 - .1 Make joints of uniform thickness with vertical joints from course to course maintained plumb.
 - .2 Provide full bed and head joints for shear walls.
 - .3 When laying is resumed on walls previously laid with mortar either partially or totally set, remove loose units and mortar from top and adjoining surfaces. Remove mortar completely when masonry is removed and replaced with new.
 - .4 Form tooled concave joints wherever exposed to view, whether behind cabinets, fitments, and wall accessories, or not. When mortar has become "thumb-print" hard, tool joints and clean off burrs with trowel or burlap. Use a tool with a bearing surface of 550 mm minimum length on horizontal joints to avoid uneven depressions.
 - .5 Rake out joints to masonry exposed to view to provide for caulking
 - : at junction of interior and exterior walls with columns.
 - : at junction of interior with exterior walls.
 - : intersections of walls and partitions where joint reinforcement is installed.
 - : at caulked joints where indicated typically.
- .9 Stop off horizontal runs of walls by racking back a half unit in each horizontal course: do not touch.

-
- .10 Do not wet concrete units.
- .11 Distribute masonry units of varying colours and textures to avoid spotty appearance over wall surfaces exposed to view. Do not use units which contrast too greatly with overall range.
- .12 Use chipped and blemished units only where concealed. Do not use defective or broken units. Do not lay concrete units with markedly smooth face that will appear slick where exposed to view, whether painted or not.
- .13 Maintain bracing of walls and piers continuously during construction until structure provides support.
- .14 Lintels:
- .1 Build in Lintels supplied by Section 03 30 00 and 05 50 00. Set and level lintels on a bed of mortar.
 - .2 Build in precast concrete block lintels fabricated under work of Section 03 30 00.
 - .3 Provide means to prevent damage due to differential movement resulting from expansion or contraction and from deflection of lintel.
 - .4 Bridge openings not exceeding 450 mm in width with 6 mm mild steel plate lintels bearing 100 mm on each side of opening. Width of plate shall be wall thickness less 25 mm. Joint at lintel to be dry packed. Provide weep joints in mortar at 800 mm above lintels.
- .15 Built-In Items:
- .1 Verify that built-in items specified in other Sections are available for building in before laying of masonry commences. Co-operate in the setting and aligning of built-in items and provide for later installation of items which are installed by other Sections, to avoid cutting, fitting, and patching.
 - .2 Build masonry around pressed steel door frames supplied and set as specified in other sections. Ensure that anchors are well secured and that frames are true and plumb. Completely fill frames with mortar as each course is laid. Maintain protective frame covering and ensure that no mortar is left on frame faces.
- .16 Cope, cut and split concrete masonry units with power-driven abrasive discs. Cut units wherever electrical outlets, grilles, and pipes occur. Allow 3.2 mm clearance around items which are incorporated in walls.
- .17 Do not expose open cells, cores or frogs of masonry units to view.
- .18 Coat faces of concrete covered with less than 200 mm of masonry veneer at exterior walls and parapets with prime coat and one dampproof coat of asphalt emulsion.
- .19 Locate bearings and piers as indicated on Drawings; provide solid masonry units at bearings.
- .20 Extend walls and partitions at top to deck, slab or structural members, as applicable, except where otherwise noted on Drawings. Incorporate both lateral support and deflection space at termination of walls as required by this Section. Where walls terminate at bottoms of steel joists, close space at joists to deck or slab with metal lath

and plaster on one side of joist or with 16 mm thick fire rated, Type X. gypsum board secured to each side of joists, if infilling with masonry is impractical; and to meet specified requirements of Section 09 21 16. Ensure that construction at joists completely closes and seals space.

.21 Masonry Solid Wall Anchorage:

- .1 Use dovetail anchors for slots at concrete construction.
- .2 Keep masonry a minimum of 12.7 mm clear of faces of structural members or as indicated on Drawings, and fill space with glass fibre board, leaving space for caulking at joints exposed to view or the weather.
- .3 Bed anchors solidly in mortar joints.
- .4 Fill cores of hollow units solidly with mortar where anchors are embedded.
- .5 Co-ordinate with Section 031 0 00 to ensure that dovetail anchor slots in concrete are located correctly. Assist in their installation if requested.
- .6 Coordinate with Section 11 52 00 locations of all wall mounted Gymnasium equipment and fill blocks solid above, below, and within mounting locations.

.22 Joint Reinforcement:

1. Install joint reinforcement in single wythe masonry walls and partitions. Place reinforcement continuously in horizontal joints spaced as noted on structural drawings, beginning with course 400 mm above bearing, unless otherwise specified or indicated.
2. Place reinforcement additionally in courses 200 mm, 400 mm and 800 mm above and below openings, and extending 600 mm beyond jambs of openings.
3. Where changes in wall thickness occur, extend reinforcement of lesser width 450 mm beyond changes of width.
4. Lap reinforcement a minimum of 150 mm at splices.
5. Do not run reinforcement through control joints.
6. Wherever walls and partitions intersect one another, or each other, continue reinforcement through. Do not carry reinforcement through intersections where lateral support anchors are installed or at intersections of walls and partitions with solid piers.
7. Bond cavity walls together with cavity-wall ties staggered in alternate course and spaced not to exceed 800 mm horizontally and 600 mm vertically. Provide additional ties spaced not more than 400 mm apart within 200 mm of openings and on each side of control and expansion joints, except where wythes are bonded together with masonry returns or otherwise.
8. Install vertical reinforcing to size and spacing as shown on Drawings. Fill voids with minimum 10 MPa grout.
9. Properly position vertical bar reinforcement in concrete masonry pilasters, columns, and walls and secure against displacement.
10. Provide two 15M size reinforcing bars grouted vertically into masonry unit cores on both sides of masonry openings. One bar per cell.
11. Solidly fill block cores containing vertical reinforcement or anchor bolts with grout.
12. Lap splices 30-bar diameters minimum. Clear distance between vertical bars and masonry units shall be 15 mm.
13. Provide 20M size reinforcing bars full height, each cell, complete with 25MPa concrete as shown on drawings.

- .23 Deflection Space:
- .1 Incorporate a deflection space between tops of non-load-bearing walls and partitions and structure to prevent transference of structural loads to masonry.
 - .2 Fill deflection space with glass fibre board compressed to 50% of original thickness to completely seal space.
 - .3 Co-ordinate laying of masonry with installation of lateral support specified in this Section and as provided by Section 05 50 00.
- .24 Penetrations of Masonry:
- .1 Fill voids of masonry to within 19 mm of structural members, pipes, ducts and conduit that penetrate masonry walls and partitions, unless otherwise indicated.
 - .2 Keep masonry units similarly clear of such penetrations.
 - .3 Finish mortar smooth at face of masonry.
 - .4 Pack remainder of annular void surrounding penetrating item with fire separation packing to within 12.7 mm of face of masonry to allow for sealant.
- .25 Shrinkage Control Joints:
- .1 Incorporate vertical shrinkage control joints in walls of which concrete masonry units are a part.
 - .2 Install control joints at junctions of walls and columns, at intersections of unit concrete masonry load-bearing walls, and wherever indicated on Drawings, and otherwise in wall with no openings, at a maximum spacing of 6000 mm o/c. Carry joints full height of walls.
 - .3 Ensure complete vertical separation through walls incorporating control joints. Make control joints 9.5 mm wide, rake back 19 mm at junctures with concrete, and leave joints free and clear for caulking, as specified in Section 07 92 10.
 - .4 Construct control joints of standard block and fill void between block with 20 MPa concrete grout to form a continuous key full height of joint by installation of continuous building paper between concrete key and block on one side of joint.
- .26 Expansion Joints:
- .1 Incorporate expansion joints in walls where indicated on Drawings.
 - .2 Maintain expansion joints free of mortar with temporary filler when laying masonry. Pack joints full height with glass fibre board compressed to 50% of original thickness.
 - .3 Leave clean space in joints for caulking as specified in Section 07 92 10.
- .27 Fire Separations:
- .1 Construct fire separation walls tightly to construction at perimeter, and without openings or voids.
 - .2 Do not reduce the thickness of masonry fire separations to less than the thickness indicated for the required fire separation rating.
 - .3 All load bearing and non-load bearing partitions shall carry to the underside of structure above.
 - .4 All openings in partitions, even above ceilings shall be patched to maintain sound and fire separation.

- .5 In partitions and walls not required to be fire separations, fill space between partitions and structural elements with rock wool compressible filler to maintain complete sound separation.
 - .6 In fire separations, spaces to be firestopped in accordance with Section 07 84 00 – Firestopping.
 - .7 Use U.L.C. labeled mortar for all patching in fire separations.
- .28 Lateral Support Anchors:
- .1 Vertical:
 - .1 At intersecting and abutting load bearing walls, use prefabricated corners and tees to match horizontal reinforcing.
 - .2 At intersection of non-load bearing walls with load bearing or non-load bearing walls, use corrugated galvanized ties.
 - .3 At wood parapet and similar conditions, use model BL404 with BLT9 ties, all by BlokLok. Ensure ties extend a minimum of 50 mm into the brick or block outer wythe.
- .29 Bonding
- .1 Walls of two or more widths: bond using metal ties in accordance with subsection 5.6 of CAN3-A371.
 - .2 Submit procedure and obtain approval by Architect.
 - .3 In cavity walls, keep all cavity spaces free of mortar and debris by placing a wood strip on the ties. Retain strip on a wire line and pull up level and clean off droppings prior to placing next course of ties. Install mortar control device at 300 mm o.c. horizontally, in a staggered pattern so as to overlap each other on each side. Install in every 2nd course above foundation and shelf angles.
- .30 Thru-wall flashing and Thru-wall Building Paper at Control Joints
- .1 Install thru-wall flashing at ground floor elevation in all walls on foundations.
 - .2 Leave 2” (50 mm) of thru-wall flashing or building paper hanging, projecting off all lintels and all required locations. Architect will review prior to cutting.
 - .3 Cutting protruding flashing: This procedure is to ensure that thru-wall flashing is installed where intended.
- .31 Base Course Detail
- .1 Provide square base block in areas of porcelain tile installation for porcelain cove base and fitted corners. Contractor to grind upper 50mm of block corner to match upper courses of bullnose block walls Refer to Details
- .32 Cold Weather Protection
- .1 Refer to the Ontario Masonry Contractor's Association's provision and publications. Include for tarped heated enclosures, heated mortar mixing pans - no non-freeze additives such as calcium will be tolerated on this project.

3.3 ADJUSTMENT AND CLEANING

- .1 Patch damaged masonry in walls which have been rejected as unacceptable.
- .2 Point all holes in mortar joints except weepholes.

- .3 Point all voids in concrete unit masonry faces.
- .4 Cut out defective mortar joints to a minimum depth of 13 mm and repoint.
- .5 Clean concrete masonry units with dry brushes and as otherwise recommended by the supplier to remove mortar and stains.
- .6 Do not use wire brushes for cleaning.
- .7 Should specified cleaning methods be insufficient, proceed with other methods only with approval.
- .8 Protect adjacent materials, construction and finished surfaces from damage while cleaning.
- .9 Ensure that all efflorescence and mortar deposits are removed from surfaces to receive coating.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 09 91 22 – Painting

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A53/A53M-[02], Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A269-[02], Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .3 ASTM A307-[02], Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.40-[97], Anti-corrosive Structural Steel Alkyd Primer.
 - .2 CAN/CGSB-1.181-[92], Ready-Mixed, Organic Zinc-Rich Coating.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-G40.20/G40.21-[98], General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 CAN/CSA-G164-[M92(R1998)], Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CAN/CSA-S16.1-[01], Limit States Design of Steel Structures.
 - .4 CSA W48-[01], Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .5 CSA W59-[1989(R2001)], Welded Steel Construction (Metal Arc Welding) (Imperial Version).
- .4 The Environmental Choice Program
 - .1 CCD-047a-[98], Paints, Surface Coatings.
 - .2 CCD-048-[98], Surface Coatings - Recycled Water-borne.

1.3 SUBMITTALS

- .1 Shop Drawings
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
 - .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Storage and Protection:
 - .1 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
 - .2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

- 1.5 WASTE MANAGEMENT AND DISPOSAL**
- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .2 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- Part 2 Products**
- 2.1 MATERIALS**
- .1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 50 for tubes and Grade 44W for Plates and Flat Shapes.
 - .2 Welding materials: to CSA W59.
 - .3 Bolts and anchor bolts: to ASTM A307.
 - .4 Stainless steel tubing: to ASTM A269, Type 302 or 304 alloy, Seamless welded with AISI No. 4 finish.
 - .5 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.
- 2.2 PRIMERS, COATINGS AND SHOP PAINTING**
- .1 Interior Steel in Dry Areas: Quick drying oil alkyd conforming to CISC/CPMA 2.75.
 - .2 Exterior Steel, Interior Steel in Unheated Areas, Steel Embedded in Concrete: Hot dip galvanized conforming to CSA G164, minimum Z275 coating. Galvanizing of structural steel components and loose lintels: refer to Section 5120.
 - .3 Galvanized Coating Touch-Up: W.R. Meadows “Galvafroid” or Kerry Industries “Z.R.C.” zinc rich coating or similar manufacturer containing minimum 90% zinc by weight.
 - .4 Apply one shop coat(s) of primer or coating as indicated above and according to manufacturer’s recommendations. Do not prime aluminum, stainless steel or those components to be galvanized or encased in concrete.
 - .5 Use primer unadulterated, as provided by manufacturer. Paint on dry surfaces free from rust scale and grease. Do not paint when temperature is lower than 10 deg. Celsius and rising.
 - .6 Clean surfaces to be field welded; do not paint.
- 2.3 FASTENINGS**
- .1 Use nuts and bolts conforming to ASTM A307, A325, and A563 as applicable.
 - .1 For interior work, use cadmium-plated fastenings where other protection is not specified.
 - .2 For exterior work, use Type 300 or 400 stainless steel.
- 2.4 ANCHORS AND SHIMS**
- .1 For exposed anchorage of aluminum, if applicable, use stainless steel and otherwise to match metal anchored. For non-exposed work, anchors and shims may be galvanized steel.
- 2.5 PIPE**
- .1 To ASTM A53, extra strong steel pipe for bollards.

- 2.6 BITUMINOUS PAINT**
- .1 Alkali-resisting to meet specified requirements of CAN/CGSB-1.108, Type 2. Use to insulate contact between dissimilar metals.

- 2.7 FABRICATION**
- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
 - .2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.
 - .3 Where possible, fit and shop assemble work, ready for erection.
 - .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
 - .5 Weld all connections where possible, and bolt where not possible unless indicated otherwise on drawings.
 - .6 Weld all stainless steel by the Argon Arc Process. Grind smooth and polish joints, crevice-free, and flush without seams.

- 2.8 LIST OF MISCELLANEOUS METAL FABRICATIONS**
- .1 This Section includes, but is not limited to the following list as may be drawn or noted in the drawings or specified elsewhere. Note : Galvanize all exterior items and other items noted. Prime paint all interior items.
 - .1 Anchors, Bolts, Inserts, Sleeves for work in this Section.
 - .2 Bench Supports and Shelf Brackets (see ADs).
 - .3 Hangers and Supports (for work in this Section).
 - .4 Lintels (if not by Structural Steel).
 - .5 other items identified on large format and AD drawings.

Part 3 Execution

- 3.1 GENERAL**
- .1 Supply and install all miscellaneous metal work indicated on the Drawings and not indicated in work of other Sections in addition to items listed below.

- 3.2 ERECTION**
- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
 - .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
 - .3 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
 - .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
 - .5 Provide components for building by other sections in accordance with shop drawings and schedule.
 - .6 Make field connections with bolts to CAN/CSA-S16.1, or weld.
 - .7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
 - .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.

- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding. Spray or brush apply a minimum of three (3) coats of zinc-rich paint to achieve a dry film thickness of 8 mils. Apply a finish coat of aluminum paint to provide a colour blend with

3.3 GALVANIZED STEEL

- .1 Galvanize steel members, fabrications, and assemblies after fabrication by the hot dip process in accordance with CSA G164, minimum Z275 coating.
- .2 Galvanize bolts, nuts and washers and iron and steel hardware components in accordance with CSA G164.
- .3 Safeguard products against steel embrittlement in conformance with ASTM A143.
- .4 Design features which may lead to difficulties during galvanizing shall be pointed out prior to dipping.
- .5 The composition of metal in the galvanizing bath shall be not less than 98.0% zinc.

3.4 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.5 DISSIMILAR MATERIALS

- .1 Where dissimilar metals are in contact, adequate drainage should be provided to avoid standing water which can act as an electrolyte and promote galvanic corrosion. Insulate materials from one another with bitumastic, paint or other inert coating. Stainless steel can be used in contact with, or inbedded in masonry, concrete and plaster, without danger of corrosive attack.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 03 10 00 – Concrete Forms and Accessories.
- .2 Section 08 11 14- Steel Doors and Frames.
- .3 Section 07 52 16 – SBS Modified Bituminous Membrane Roofing

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA B111-[1974(R1998)], Wire Nails, Spikes and Staples.
 - .2 CAN/CSA-G164-[M92(R1998)], Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA O121-[M1978(R1998)], Douglas Fir Plywood.
 - .4 CAN/CSA-O141-[91(R1999)], Softwood Lumber.
 - .5 CSA O151-[M1978(R1998)], Canadian Softwood Plywood.
 - .6 CAN/CSA-O325.0-[92(R1998)], Construction Sheathing.
 - .7 CAN/CSA-086M-01(R2006), Engineering Design in Wood.
- .2 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber [2000].

1.3 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.
- .3 Plywood, OSB and wood based composite panel construction sheathing identification: by grademark in accordance with applicable CSA standards.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Divert unused wood materials from landfill to recycling, reuse, composting facility approved by Consultant.
- .3 Do not dispose of preservative treated wood through incineration.
- .4 Do not dispose of preservative treated wood with materials destined for recycling or reuse.
- .5 Dispose of treated wood, end pieces, wood scraps and sawdust at sanitary landfill approved by Consultant.

- .6 Dispose of unused wood preservative material at official hazardous material collections site approved by Consultant.
- .7 Do not dispose of unused preservative material into sewer system, into streams, lakes, onto ground or in other locations where they will pose health or environmental hazard.

Part 2 Products

2.1 LUMBER MATERIAL

- .1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:
 - .1 CAN/CSA-O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .2 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:
 - .1 Douglas fir Graded 122-C, construction or No. 2 Pine, pressure treated in accordance with CSA 080M.
 - .2 Board sizes: "Standard" or better grade.
 - .3 Dimension sizes: "Standard" light framing or better grade.
 - .4 Post and timbers sizes: "Standard" or better grade.
 - .5 Fasteners: Proprietary fasteners toggle bolts, expansion shields and lag bolts, crews and lead or inorganic fire plugs, explosive actuated fastening devices, recommended for purpose by manufacture. Use stainless steel or galvanized to CSA G164-M1981 fasteners for all exterior fastening and for any damp or moist areas.
 - .6 Wood Preservatives: Surface-applied wood preservative: clear copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.
 - .7 Material shall be straight, sawn square, true, dressed four sides properly sized, shaped to correct dimensions from nominal sizes noted on Drawings.
- .3 Framing Lumber:
 - .1 Western Red Cedar species, well seasoned, processed and stamped at the same mill with appropriate grade markings. Conform to requirements of standard grading rule for Canadian Lumber of National Lumber Grades Authority (NLGA) with latest supplement, approved by Canadian Lumber Standard Administrative Board, as follows:
 - .1 Posts: 'Structural No.2 or Better' grade, with dressed smooth surfaces.
 - .2 Fence Boards and Framing: 'No.2 Clear or Better' grade with dressed smooth surfaces.

2.2 PANEL MATERIALS

- .1 Douglas fir plywood (DFP): to CSA O121, standard construction, good one side with waterproof adhesive.

2.3 ACCESSORIES

- .1 Nails, spikes, staples, screws, bolts anchors lag screws, special fastening devices and supports required for erection of all carpentry components: to CSA B111. Use galvanized components where exposed to exterior atmosphere.
- .2 Rough Hardware (cedar): Provide rough hardware such as nails, spikes, staples, bolts, nuts, washers, screws, clips, strap iron and including hardware for temporary enclosures. Nails shall be spiral type. All nails, spikes and staples shall conform to CSA B111. All rough hardware shall be galvanized unless otherwise noted.
- .3 Surface applied wood preservative: Green coloured copper naphthenate or 5% pentachlorophenol solution, water repellent preservative or same copper based preservative as used for shop impregnation, in accordance with CAN/CSA O80.
- .4 Fire retardant treatment of lumber and plywood: 'Dricon' fire retardant treatment by J. A. Biewer or approved equivalent, conforming to CAN/CSA-O80.20 and CAN/CSA-O80.27 respectively, to provide a flame spread rating of 25 or less in accordance with CAN/ULC-S102.
- .5 Tube Forms: Spirally wound, adhesive laminated fibre paper tube forms having bursting pressure of 965 kPa, coated with hot wax, diameters as required, 'Handiform', or 'Permaform' by Perma Tubes Ltd., or 'Sonotube' by Sonoco Limited.
- .6 Concrete: Minimum 20.684 MPa (3,000 psi) concrete conforming to CAN/CSA-A23.1/A23.2.

2.4 FINISHES

- .1 Galvanizing: to CAN/CSA-G164, use galvanized fasteners for exterior work and interior highly humid areas.

Part 3 Execution

3.1 GENERAL

- .1 Supply and install all other carpentry shown on drawings or as required for completion of work. Co-operate with other trades in installing items supplied by other sections, cut openings in woodwork when so required and make good disturbed surfaces.

3.2 PREPARATION

- .1 Do all wood framing in accordance with the Ontario Building Code and CAN3 - 086M - 01 - (2006).
- .2 Machine dressed work shall be slow fed using sharp cutters and finished members shall be free from drag, feathers, slivers or roughness of any kind.
- .3 Frame materials with tight joints rigidly held in place.
- .4 Design construction methods for expansion and contraction of the materials.

- .5 Erect work plumb, level, square and to required lines.
- .6 Be responsible for methods of construction for ensuring that materials are rigidly and securely attached and will not be loosened by the work of other trades.

3.3 FURRING AND BLOCKING

- .1 Supply and install furring and blocking, required.
- .2 Align and plumb faces of furring and blocking to tolerance of 1:600.

3.4 ROUGH BUCKS AND NAILERS

- .1 Install wood bucks and nailers, as indicated, including wood bucks and linings around frames for doors and windows.
- .2 Except where indicated, otherwise, use material at least 38 mm thick secured with 9 mm bolts located within 300 mm from ends of members and uniformly spaced at 1200 mm between.
- .3 Countersink bolts where necessary to provide clearance for other work.

3.5 ROOF FASCIAS, CANTS, NAILERS CURBS

- .1 Install wood cants, fascia backing, nailers, curbs and other wood supports for roofing, sheet metal fork, roof mounted equipment.
- .2 Secure with galvanized 9 mm bolts, where indicated, galvanized nails elsewhere. Locate fastenings within 300 mm from ends and uniformly spaced between. Space bolts at 1200 mm and nails at 600 mm centres, except where indicated otherwise.
- .3 Staple vapour retardant sheet strip to underside of nailers before installation. Apply strip continuous with 200 mm overlap at joints, free of wrinkles and tears, with at least 200 mm exposed for overlap on roof deck.
- .4 Install wood nailers for roof hoppers, dressed, tapered and recessed slightly below top surface of roof insulation.

3.6 SUPPORTS FOR MECHANICAL UNITS

- .1 Performed by Section 07 51 12. Refer to Details and Mechanical and Architectural Drawings and specifications.

3.7 PRESSURE TREATED WOOD

- .1 Use wood pressure treated in accordance with CSA 080M for all wood members in contact with exterior walls and roofs.
- .2 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

3.8 INSTALLATION OF HOLLOW METAL FRAMES

- .1 Set frames plumb and square in their exact location and at correct elevation. Firmly block and brace to prevent shifting. Shim up where required to ensure proper alignment dimensions from finished floor to head of frame. Install temporary wood spreaders at mid-height.
- .2 Where pressed steel frames are installed in concrete walls, secure frames to concrete using lead expansion shields and anchor bolts through pipe sleeves. Perform drilling of concrete as required. Fill recessed bolt heads flush to frame face with approved metal filler and sand smooth.
- .3 Install fire rated door frames in accordance with requirements of National Fire Code Volume 4, produced by The National Fire Protection Association (NFPA 80).

3.9 GENERAL

- .1 Supply and install all other carpentry shown on drawings or as required for completion of work. Co-operate with other trades in installing items supplied by other sections, cut openings in woodwork when so required and make good disturbed surfaces.

3.10 ERECTION

- .1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .2 Countersink bolts where necessary to provide clearance for other work.

3.11 INSTALLATION

- .1 Lay out work carefully and to accommodate work of others. Cut and fit accurately. Erect in position indicated by drawings. Align, level, square, plumb, and secure work permanently in place. Brace work temporarily as required. Join work only over solid bracing.
- .2 Bore holes true to line and to same size as bolts. Drive bolts into place for snug fit, and use plates or washers for bolthead and nut bearings. Turn up bolts and lag screws tightly when installed, and again just before concealed by other work or at completion of work.
- .3 Co-operate with work of other Sections to ensure that unity of actions will ensure orderly progress to meet construction schedule.
- .4 Provide anchors, bolts and inserts, required for attachment of the work of this Section, to those performing the work of other Sections and who are responsible for their installation.
- .5 Work shall include rough hardware such as nails, bolts, nuts, washers, screws, clips, hangers, connectors, and strap iron required for installation of work and all operating hardware required on work of this Section for temporary use.
- .6 Do not attach work by wood plugs or blocking in concrete or masonry. Use lead shields, expansion shields, concrete nails, or similar methods only as approved by the Architect.
- .7 Do not regard grounds, blocking, furring, and such other fastening provisions as shown on Drawings as exact or complete. Provide required provisions for fastening, located and secured to suit site conditions, and adequate for intended support.

- .8 Cut fastening work into lengths as long as practicable and with square ends. Erect work plumb, in true planes, and fastened rigidly in place.
- .9 Grounds around openings in cavity wall systems, under sills and thresholds to provide continuous support shall be 50mm (2") minimum thickness, preservative treated.
- .10 Install supports and furring members as required to receive components of cabinetwork.
- .11 Install blocking at roofs, as indicated on Drawings, secured permanently to structure, trimmed and levelled to accommodate roofing components, and to receive flashings.
- .12 All members shall be accurately cut to length, angle and be true to line to assure tight joints.
- .13 Correct alignment and plumb must be maintained until specified lateral bracing is installed. Cutting and altering of trusses is not permitted except by approval by the Engineer. Heavy concentrated loads must not be placed on top of trusses until permanent bracing and decking have been installed. In any event, these temporary loads must not exceed the truss design loads.

3.12 SCHEDULES

- .1 Provide electrical equipment backboards for mounting electrical equipment as indicated. Use 19mm thick plywood on 19 x 38 mm furring around spacing, perimeter and at maximum 300 mm intermediate

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 06 10 11 – Rough Carpentry.
- .3 Section 09 91 22 - Painting.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI A208.1-[99], Particleboard.
 - .2 ANSI A208.2-[94], Medium Density Fiberboard (MDF).
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM E1333-[96], Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates From Wood Products Using a Large Chamber.
 - .2 ASTM D2832-[92(R1999)], Standard Guide for Determining Volatile and Non-volatile Content of Paint and Related Coatings.
 - .3 ASTM D5116-[97], Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products.
- .3 Architectural Woodwork Manufacturers Association of Canada (AWMAC)
 - .1 AWMAC Quality Standards for Architectural Woodwork [, 1994].
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-71.20-[M88], Adhesive, Contact, Brushable.
- .5 Canadian Standards Association (CSA)
 - .1 CSA B111-[74(R1998)], Wire Nails, Spikes and Staples.
 - .2 CSA O112.4-[M1977(R1999)], Standards for Wood Adhesives.
 - .3 CSA O112.5-Series-M-[1977(R1999)], Urea Resin Adhesives for Wood (Room- and High-Temperature Curing).
 - .4 CSA O112.7-Series M-[1977(R1999)], Resorcinol and Phenol-Resorcinol Resin Adhesives for Wood (Room- and Intermediate-Temperature Curing).
 - .5 CSA O115-[M1982(R2001)], Hardwood and Decorative Plywood.
 - .6 CSA O121-[M89(R1998)], Douglas Fir Plywood.
 - .7 CAN/CSA O141-[91R1999], Softwood Lumber.
 - .8 CSA O151-[M1978(R1998)], Softwood Plywood.
 - .9 CSA O153-[M1980(R1998)], Poplar Plywood.
 - .10 CSA Z760-[94], Life Cycle Assessment.
- .6 Environmental Choice Program (EPC)

- .1 ECP-44-[92], Adhesives.
- .2 ECP-45-[92], Sealants and Caulking Compounds.
- .3 ECP-76-[98], Surface Coatings.
- .7 International Organization for Standardization (ISO)
 - .1 ISO 14040-[97], Environmental Management-Life Cycle Assessment - Principles and Framework.
 - .2 ISO 14041-[98], Environmental Management-Life Cycle Assessment - Goal and Scope Definition and Inventory Analysis.
- .8 National Electrical Manufacturers Association (NEMA)
 - .1 NEMA LD-3-[95].
- .9 National Hardwood Lumber Association (NHLA)
 - .1 Rules for the Measurement and Inspection of Hardwood and Cypress [, January 1996].
- .10 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber [, 2000].

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate details of construction, profiles, jointing, fastening and other related details.
 - .1 Scales: profiles full size, details 1/2 full size.
- .3 Indicate materials, thicknesses, finishes and hardware.

1.4 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate samples: sample size 300 x 300 mm samples of each type of paneling laminate, melamine and each type of solid wood or plywood to receive stain or natural finish.
- .3 Submit a typical prototype unit representative of the work of this section.

1.5 GUARANTEE

- .1 This architectural woodworker shall furnish the Owner with a two (2) year Guarantee Certificate to the full value of the architectural woodwork sub-contract, certifying that the architectural woodwork has been manufactured and/or installed in accordance with the standards incorporated in the AWMAC Quality Standards Manual. The Guarantee shall cover replacing and/or refinishing to make good any defects in architectural woodwork due to faulty workmanship or defective materials supplied by this architectural woodworker, which appear during a two (2) year period following the date of substantial completion of the project.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Protect millwork against dampness and damage during and after delivery.
- .2 Store millwork in ventilated areas, protected from extreme changes of temperature or humidity.

Part 2 Products

2.1 MATERIALS

- .1 Softwood lumber: unless specified otherwise, S4S, moisture content 10 % or less for interior work in accordance with following standards:
 - .1 CAN/CSA-O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
 - .3 AWMAC premium grade, moisture content as specified.
- .2 Hardwood lumber: moisture content 10 % or less for interior work in accordance with following standards:
 - .1 National Hardwood Lumber Association (NHLA).
 - .2 AWMAC premium grade, moisture content as specified.
 - .3 Species: to be Maple unless otherwise noted.
- .3 Hardwood plywood: to CSA O115, of thickness indicated, rotary cut face veneer, birch plywood, veneer core, No. 1 grade. Select veneers to provide book match veneer strips to be 240 mm wide minimum.
 - .1 Species: to be Birch or Maple, unless otherwise noted.
- .4 Nails and staples: to CSA B111, galvanized for exterior work, interior high-humidity areas and for treated lumber; plain finish elsewhere. Use spiral thread nails except where specified elsewhere.
- .5 Particle Board core: to CAN3-0188.1-M78, minimum 45 density, in thickness indicated.

2.2 PLASTIC LAMINATE

- .1 Conforming to CAN3-A172, General Purpose - standard grade (GP-S), 1.25 mm thick for tops, Post Forming - standard grade (PF-S) 1.25 mm thick for post forming. Balance

all panels with 0.5 mm backing sheet (BK) by same manufacturer as face panel. Use waterproof adhesive capable of holding materials together without failure. Provide acid resistant grade where shown. "Matte" finish is typical.

- .2 Acceptable Manufacturers include: Formica, Nevamar-ARP abrasion resistant surface distributed by McFaddens, or Arborite. Submit product data. Allow for maximum of 4 colours from full range as chosen by Consultant.

2.3 MELAMINE FACED PARTICLEBOARD

- .1 To CAN3-0.188.1-M78, minimum 45 density, particleboard sanded faces, 13 mm, 16 mm, and 19 mm thickness, faced with laminated plastic on both sides. Melamine resin impregnated cover sheet with coloured and/or pattern paper inner layer. Thermally fuse to rigid particleboard substrate. Melamine faces shall be 8 mil thickness. Wood grain pattern to be "Hard Rock Maple".
 - .1 Acceptable Material: Melamine faced particleboard as manufactured by Flakeboard, Formica or Arborite Division of Domtar Construction Materials Ltd., are of acceptable quality but colour/pattern requires approval prior to confirmation of full acceptance. No alternatives or substitutions are acceptable.

2.4 EDGE BANDING

- .1 Solid polyvinyl chloride (PVC), 3 mm thickness x full width of panel edge banding, colour/pattern to match finished face of melamine panel or as selected by Consultant. All exposed edges of banding to be radiused to 2 mm radius after installation on panels. Submit sample of edge-banded panel with radiused edges to Consultant for approval prior to fabrication of architectural woodwork.
 - .1 Acceptable Material: Solid PVC edging as manufactured by "Woodtape" Edge-Banding.
 - .2 Acceptable Material: Solid PVC edging as manufactured by "Complast Inc."
- .2 All exposed edges are to have edge banding, including front facing edges of shelves within units, doors and gables (including edges facing floor).

2.5 CABINET HARDWARE

- .1 Furnish and install all hardware to custom casework as follows:
 - .1 Cupboard Doors - 19 mm thick.:
 - .1 Hinges 110° Blum or Hettich
 - .2 Roller Catches 807N 2G(SgDr) Onward
 - .3 Elbow Catches T03222 C15 (DhDr)
 - .4 Door Pulls CBH235-3 1/2" C32D
 - .5 Cupboard Locks 8703/8704 14a National
 - .2 Drawers - 19 mm thick.:
 - .1 Drawer Slides "Accuride Slide" 3832-2G full extension with ball bearing rollers, 100lb. capacity
 - .2 Drawer Pulls CBH235-3 1/2" C32D
 - .3 Drawer Locks 8703 - 14a National

- .3 Shelving:
 - .1 System 32 with 5mm holes, 32mm apart
 - .2 Ferow sleeves for adjustable shelving
 - .4 Display Cabinet Shelving:
 - .1 Pilaster strips KV255 Zinc Knape & Vogt
 - .2 Shelf Clips KV256 Zinc Knape & Vogt
 - .5 Cupboard Doors - 35 mm thick.:
 - .1 Hinges F179 76x76 Stanley C15
 - .2 Roller Catches 504N Onward C26
 - .3 Surface bolt 043-4 X Angle Strike C15
 - .4 Door Pulls CBH245-4 1/2" C32D
 - .5 Cupboard Locks supplied and installed under Section 08710
 - .6 Closet Rods and Flanges
 - .1 Rods: chrome finish, Ø 33 mm.
 - .2 Flanges: chrome finish, closed flanges at both ends of rods.
 - .7 Shelf and Rod Steel, white enamel, model No. 1797, manufactured by Hager.
 - .8 Display Case Frame
 - .1 Tracks Knape & Vogt KV P1092
 - .2 Locks Knape & Vogt KV 963
 - .3 Standards Knape & Vogt KV 80
 - .4 Knife Brackets Knape & Vogt KV 180
 - .9 Kindergarten Toy Carts
 - .1 Rubber Bumpers, Colson 6905, Grey.
- .2 Acceptable alternates: equivalent cabinet hardware products by Blum, Hager & Stanley. 19mm Cabinet door hinges must be Blum or Hettich.
- .3 This section shall also include accessories such as rubber door silencers (2 per drawer or door), and other items necessary for the completion of the millwork.
- .4 Cabinet Keying: Key all cabinet and drawer locks alike for the entire school, except teachers' closets.

2.6 MELAMINE CLAD CABINETWORK

- .1 All cabinet frames whether for base, wall or tall floor standing cases, shall be fabricated so each is a self-contained module. Front side top and bottom, exterior and interior surfaces shall be finished allowing future relocation of any module, into any bench arrangement, without need of any additional finishing. Melamine gables are not to be in contact with floor. All wood bases are to be wrapped with rubber base.
- .2 Maximum width between gables shall be 900mm.
- .3 Gables and panels shall be fabricated from 19 mm thick melamine surfaced panels with a P.V.C. edging applied to all exposed edges including exposed edge facing floor.

- .4 Bottoms shall be fabricated utilizing the same materials and edge finish as gables. Front edge will be edged with solid 3 mm thick PVC edging. All other edges will be thoroughly sealed and moisture proofed prior to attachment to gables.
- .5 Rails shall be fabricated and machined to join the gables and form a rigid cabinet frame.
- .6 Tops (applies to wall and tall units only) shall be fabricated utilizing the same material and edge finish as gables. Front edge will be edged with P.V.C. edging.
- .7 Toe kick rail shall have a 100 mm x 19 mm section, machined to receive four screw nails for attachment to bottom front edge of gables. Cabinet base shall be plywood attached to melamine cabinet separately, insuring the melamine particle core gables do not come in contact with the floor.
- .8 Backs in base cupboards shall be fabricated from a 13 mm thick melamine surfaced panels.
- .9 Backs in wall and tall cabinets shall be fabricated from 13 mm thick melamine surfaced panels securely glued and screw nailed into the check out provided in the backs of gables, tops, and bottoms.
- .10 Shelves shall be fabricated from 25 mm melamine surfaced panels with a P.V.C. edging applied to front edge. All shelves shall be adjustable using System 32, with 5mm holes spaced at 32mm apart. Shelves are to have ferow sleeves inserted.
- .11 Doors shall be fabricated from 19 mm thick melamine surfaced panels. All four edges shall be P.V.C. edging.
- .12 Drawer fronts shall be fabricated from 19mm thick melamine surfaced panels. All four edges shall be P.V.C. edging. Fronts will be secured to drawer bodies with five screw nails through the front of the drawer body into the core of the drawer front.
- .13 Drawer bodies shall consist of box construction fabricated from 13 mm thick melamine surfaced panels front, sides and back with PVC edging on top edges. Joint front, sides and back with carefully fitted glued and tenoned joints. Alternately, Blum Metabox drawer body and side can be used.
- .14 Finish:
 - .1 Melamine surfaced panels shall be finished both sides in Hard Rock Maple.
 - .2 Miscellaneous solid hardwood pieces shall be sanded, then sealer coated, and sanded with two finish coats of catalytic type varnish.

2.7 SHOP FABRICATION

- .1 Shop install cabinet hardware.
- .2 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
- .3 Shop assemble work for delivery to site in size easily handled and to insure passage through building openings.

2.8 BENCHES

- .1 32 x 92 solid maple boards with 32 x 108 solid maple edges. Lengths, as indicated on Plans, secured to metal supports. Polyurethane finish, semigloss.

2.9 PLASTIC LAMINATED WINDOW SILLS

- .1 19 mm thick plywood core with post-forming grade plastic laminate finish bonded with resorginal formaldehyde resin glue. All window sills to be double layer at front edge, rounded.
- .2 All exposed edges to be finished with same material as used for the top.

2.10 PLASTIC LAMINATED TOPS

- .1 19 mm thick particle board core with post-forming grade plastic laminate finish bonded with resorginal formaldehyde resin glue to a particleboard core. All countertop front face to return vertically 35 mm ± . All front and backsplash edges to be rounded.
- .2 Underside to receive a backing sheet, sanded one side and bonded same as surfacing material.
- .3 Exposed edges to be finished with same material as used for the top.
- .4 Drip grooves to be cut into underside of the top where exposed edges occur.
- .5 Splash backs, curbs and curb shelves are to be of similar construction as the tops.
- .6 At all wall termination, provide backsplash return.

2.11 QUARTZ COMPOSITE COUNTERTOPS

- .1 Countertops as noted to be engineered quartz composite by 'Corian by Dupont', coordinated, supplied and installed by this Section.
- .2 Fabricate counters as described on millwork AD drawings.
- .3 Allow for one (1) colour to be selected by Consultant from full colour line.
- .4 Fabricate quartz surface counters according to manufacturer's recommendations to achieve design intent shown on details and dimensions on drawings.
- .5 Submit two 300 x 300 samples of all surfacing to show all edge details, cutouts, and splashes etc.

2.12 MOULDING AND TRIMS

- .1 Fabricate mouldings in maximum practical lengths to profile shown. Install with concealed fasteners.

2.13 FABRICATION

- .1 Set nails and countersink screws apply plain wood filler to indentations, sand smooth and leave ready to receive finish.
- .2 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.
- .3 Shelving to cabinetwork to be adjustable unless otherwise noted.
- .4 Provide cut-outs for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
- .5 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.
- .6 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.
- .7 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .8 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.
- .9 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
- .10 Apply laminate backing sheet to reverse side of core of plastic laminate work.
- .11 Apply laminated plastic liner sheet where indicated.

2.14 CABINET LOCKS

- .1 Supply and install matching locksets to all cupboard and drawer units.
- .2 Locksets for all groups of units to be keyed alike and keying to be grouped as follows:
 - .1 Key 1: Kindergartens
 - .2 Key 2: Library Resource and Work rooms and Computer Resource Room
 - .3 Key 3: Classrooms
 - .4 Key 4: Seminar and Resource Rooms
 - .5 Key 5: Work room, Heath Room and Ortho washroom.
- .3 Provide minimum of six identical keys matching all lock types.
- .4 Provide locks in the following numbers to specific units:
 - .1 Library Control desk units: all uppers and all lowers.
 - .2 Library Workroom: all uppers and all lowers.
 - .3 Kindergarten: all uppers and lowers and all tall cupboards
 - .4 Classrooms: all uppers and all lowers.
 - .5 PIP Room: to all upper and lower millwork units (kitchen area, perimeter storage, etc. except. Teachers Closet-refer to drawings.

Part 3 Execution

3.1 INSTALLATION

- .1 Do architectural woodwork to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.
- .2 Install prefinished millwork at locations shown on drawings. Position accurately, level, plumb straight.
- .3 Set and secure all material and components in place, rigid, plumb and square.
- .4 Provide heavy duty fixture attachments for wall mounted cabinets.
- .5 Use draw bolts in countertop joints.
- .6 At junction of plastic laminate counter back splash and adjacent wall finish, apply small bead of sealant.
- .7 Apply water resistant building paper over wood framing members in contact with masonry or cementitious construction.
- .8 After installation, fit and adjust operating hardware for wood and laminated plastic cabinet doors, drawers and shelves.

3.2 CLEANING

- .1 Clean millwork and cabinet work inside cupboards and drawers and all outside surfaces.
- .2 Remove excess glue from surfaces.

3.3 PROTECTION

- .1 Protect millwork and cabinet work from damage until final inspection.

END OF SECTION

PART 1 – GENERAL

1.1 General

- .1 Provided as required for **new window installation**. Ensure openings are properly prepared and waterproofing membrane flashing installed prior to window installation.
- .2 The General Conditions, the Supplementary Conditions, the Instructions to Bidders and Division One – General Requirements shall be read in conjunction with and govern this Section.
- .3 The Specification shall be read as a whole by all parties concerned. Each Section may contain more or less than the complete Work of any trade. The Contractor is solely responsible to make clear to the Sub-Contractors the extent of their Work.

1.2 Related Sections

- .1 Section 04 20 00 – Unit Masonry
- .2 Section 07 92 00 – Joint Sealants
- .3 Section 08 50 50 – Aluminum Windows

1.3 References

- .1 ASTM E96/E96M-05: Standard Test Methods for Water Vapour Transmission of Materials.

1.4 System Description

- .1 Supply labour, materials, plant, tools and equipment to complete the Work as shown on the Drawings and as specified herein to bridge and seal the following air leakage pathways and gaps to provide continuity of the building envelope:
 - .1 Connections of the walls to the roof air/vapour barriers.
 - .2 Connections of the walls to the foundations.
 - .3 Seismic and expansion joints.
 - .4 Openings and penetrations of window and door frames, curtain wall.
 - .5 Piping, conduit, duct and similar penetrations
 - .6 Masonry ties, screws, bolts and similar penetrations.
 - .7 All other air leakage pathways in the building envelope.
- .2 Materials and installation methods of the primary air/vapour & rain barrier membrane system.
- .3 Materials and installation methods of dampproof coursing and through-wall flashing membranes.
- .4 Materials and installation methods for the adhesion of rigid and semi-rigid insulating materials.

1.5 Submittals

- .1 Submit Product Data and Manufacturer's Installation Instructions as specified in Section 01 33 00.
- .2 Product Data: including material characteristics, performance criteria, and limitations.
- .3 Manufacturer's Installation Instructions: indicate preparation and installation requirements,

and/or techniques.

- .4 Prior to commencing the Work submit Manufacturers' complete set of standard Details for the air/vapour barrier membrane systems showing a continuous plane of air tightness throughout the building envelope.

1.6 Quality Assurance

- .1 Perform Work to Sealant and Waterproofers Institute – Sealant and Caulking Guide Specification.
- .2 Submit in writing, a document stating that the applicator of the primary air/vapour barrier membranes specified in this Section is recognized by the Manufacturer as suitable for the execution of the Work.
- .3 Perform Work in accordance with the Manufacturer's written instructions of the air/vapour barrier membrane and this Specification.
- .4 Maintain one copy of Manufacturer's written instructions on site.
- .5 At the beginning of the Work and at all times during the execution of the Work, allow access to work site by the air/vapour barrier membrane Manufacturers' representative.
- .6 Components used in this Section shall be sourced from one Manufacturer, including sheet membrane, air/vapour barrier sealants, primers, mastics and adhesives.

1.7 Scheduling

- .1 Sequence Work to permit installation of materials in conjunction with other barrier materials and seals.

1.8 Product Handling

- .1 Handle and store membrane materials to prevent tearing, puncturing and other damage.
- .2 Store roll goods in upright position and protected from the weather.
- .3 Deliver materials to the job site in undamaged and original packaging indicating the name of the Manufacturer and product.
- .4 Store roll materials on end in original packaging.
- .5 Store adhesives and primers at temperatures of 5°C (40°F) and above to facilitate handling.
- .6 Keep solvent away from open flame or excessive heat.
- .7 Protect rolls from direct sunlight until ready for use.

1.9 Job Conditions

- .1 Apply membrane during dry weather and to dry substrates only.
- .2 Apply materials only within acceptable application temperature range determined by Manufacturer. Use product from single Manufacturer throughout entire project.

1.10 Mock-Up

- .1 Construct mock-up in accordance with Section 01 33 00 - Shop Drawings, Product Data, Samples and Mock-ups.

- .2 Where directed construct typical exterior wall panel, 2 metres (6'-6") long by 2 metres (6'-6") wide, incorporating substrate, window frame, attachment of insulation, and showing air/vapour barrier membrane application Details.
- .3 Allow 24 h for inspection of mock-up before proceeding with air/vapour barrier work. Mock-up may remain as part of the Work.

1.11 Warranty

- .1 Provide Manufacturer's standard 5-year material warranty.

PART 2 – PRODUCTS

2.1 Materials

- .1 Air/vapour barrier membrane components and accessories must be obtained as a single-source from the membrane Manufacturer to ensure total system compatibility and integrity.
- .2 Self-Adhered Reinforced Membrane: Self-adhesive, modified bitumen membrane 450 mm (18") wide; one of the following; use the same product for entire project:
 - .1 Blueskin SA by Bakor
 - .2 Perm-A-Barrier by W.R. Grace
 - .3 Sopraseal STICK-1100 by Soprema
 - .4 Sealtight Airshield by W.R. Meadows
 - .5 Exo Air 110 by Tremco
- .3 Through-Wall Flashing: reinforced self-adhering membrane by Manufacturer of air/vapour barrier membrane.
- .4 Primer for Self-Adhesive Membrane: as recommended by membrane Manufacturer.
- .5 Adhesives, Mastics, Joint Backing: as recommended by membrane Manufacturer.
- .6 Roof vapour retarders as specified in Sections 07 51 00, 07 52 00 and 07 55 00.
- .7 Seal around masonry ties and other penetrations with liquid adhesive/mastic by membrane Manufacturer.
- .8 Adhesive: compatible with sheet barrier and substrate, permanently non-curing.
- .9 Termination Sealants: as recommended by membrane Manufacturer.
- .10 Joint Sealant: as specified in Section 07 92 00.

PART 3 – EXECUTION

3.1 Examination

- .1 Verify that surfaces and conditions are ready to accept the Work of this Section. Notify Architect in writing of any discrepancies. Commencement of the Work or any parts thereof shall mean acceptance of the prepared substrate.
- .2 All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrate to provide an even plane. Strike masonry joints flush.
- .3 New concrete should be cured for a minimum of 14 days and must be dry before air/vapour barrier membranes are applied.

- .4 Where curing compounds are used they must be clear resin based without oil, wax or pigments.

3.2 Primer for Transition and Through-Wall Flashing Membrane

- .1 Apply primer at rate recommended by Manufacturer.
- .2 Apply primer to all areas to receive transition sheet and/or through-wall flashing membrane, as indicated on Drawings by roller or spray and allow minimum 30 minute open time. Primed surfaces not covered by self-adhering transition membrane or self-adhering through-wall flashing membrane during the same working day must be re-primed.

3.3 Transition Membrane

- .1 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 50 mm (2") overlap at all end and side laps.
- .2 Tie-in to window frames, aluminium screens, hollow metal doorframes, spandrel panels, roofing system and at the interface of dissimilar materials as indicated in Drawings.
- .3 Promptly roll all laps and membrane with a counter top roller to affect seal.
- .4 Ensure all preparatory work is complete prior to applying liquid applied air/vapour barrier membrane.

3.4 Through-Wall Flashing Membrane

- .1 Apply through-wall flashing and dampproof coursing membrane in accordance with CSA A371-94 Masonry Construction for Buildings; along the base of masonry veneer walls, over windows, doors and other wall openings required to be protected.
- .2 Applications shall form a continuous flashing membrane and shall extend up a minimum of 200 mm (8") up the back-up wall and as shown on Drawings. Where shown on Drawings install pre-finished metal drip sandwiched between two (2) layers of membrane.
- .3 At the end of each day's work seal the top edge of the membrane where it meets the substrate using liquid air seal mastic. Trowel-apply a feathered edge to seal termination and shed water.
- .4 Ensure through-wall flashing membrane extends fully to the exterior face of the exterior masonry veneer. At locations where flashing terminates or intersects wall openings including door frames, "end dam" flashing to protect openings and redirect water out. Trim off excess as directed by the Consultant.
- .5 Align and position the leading edge of self-adhering through-wall flashing membrane with the front horizontal edge of the foundation walls, self angles and other substrates to be protected, partially remove protective film and roll membrane over surface and up vertically.
- .6 Press firmly into place. Ensure minimum 50 mm (2") overlap at all end and side laps. Promptly roll all laps and membrane to affect the seal.
- .7 Ensure all preparatory work is complete prior to applying self-adhering through-wall flashing membrane.
- .8 Ensure through-wall flashing membrane extends fully to the exterior face of the exterior masonry veneer. Trim off excess as directed by the Consultant.

3.5 Air/Vapour Barrier Membrane

- .1 Apply self-adhering membrane complete and continuous to prepared and primed substrate in an overlapping shingle fashion and in accordance with Manufacturer's recommendations and written instructions. Stagger all vertical joints.
- .2 Align and position self-adhering membrane, remove protective film and press firmly into place. Ensure minimum 50 mm (2") overlap at all end and side laps. Promptly roll all laps and membrane with a counter top roller to affect the seal.
- .3 At the end of each day's work seal the top edge of the membrane where it meets the substrate using liquid air seal mastic. Trowel-apply a feathered edge to seal termination and shed water.
- .4 Tie-in to window frames, aluminium screens, hollow metal doorframes, spandrel panels, roofing system and at the interface of dissimilar materials as indicated in Drawings. Refer to Manufacturers' standard Details.
- .5 Ensure all projections, including wall ties, are properly sealed with a caulk application of liquid air seal mastic.
- .6 Mechanically fasten membrane through securement bars to all window, door, louvers and curtain wall sections as recommended by membrane Manufacturer where proper adhesion and bonding cannot be maintained.
- .7 Membrane applied to the underside of substrate surfaces shall receive special attention on application to ensure maximum surface area adhesion is obtained.

3.6 Installation of Insulation

- .1 Co-ordinate with Cavity Wall Insulation Section 07 21 13 for insulating materials.
- .2 Upon the completion of the air/vapour barrier membrane system apply the liquid air seal mastic and insulation adhesive in a serpentine pattern over completed air/vapour barrier membrane system.
- .3 Immediately embed insulation into the adhesive and press firmly into place to ensure full contact. Apply additional adhesive if allowed to skin over.
- .4 Fully butter all joints of insulation panels with adhesive during installation, except at expansion joints.

3.7 Inspection

- .1 Notify Architect when sections of Work are complete so as to allow for review prior to installing insulation.

3.8 Protection of Finished Work

- .1 Membranes are not designed for permanent exposure. Product designed to withstand reasonable job site exposure, however good practice calls for covering as soon as possible.
- .2 Damp substrates must not be inhibited from drying out. Do not expose the backside of the substrate to moisture or rain.
- .3 Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane. Drying time varies depending on temperature and relative humidity. At a temperature of 20°C (70°F) and 50% RH, protect air/vapour barrier work against wet weather conditions for a minimum of 24 hours.
- .4 Membranes are not designed for permanent exposure. Good practice calls for covering as soon as possible.

END OF SECTION 07 26 00

1. GENERAL

1.1 Section Includes

1. Section includes for provision of all labour, materials, equipment and services for sheet metal flashing and trim Work in accordance with Contract Documents.

1.2 Related Sections

1. Section 06 10 00 Rough Carpentry
2. Section 07 51 00 Built-up Bituminous Roofing
3. Section 07 51 01 2-Ply Modified Bitumen Roofing
4. Section 07 92 00 Joint Sealers
5. Section 08 50 50 Aluminum Windows

1.3 References

1. Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA) – Architectural Sheet Metal Manual
2. ASTM A 525M, Standard Specification for Sheet Steel, Zinc Coated (Galvanized) by the Hot Dipped Process, General Requirements.
3. Canadian Roofing Contractors Association (CRCA) – Specification Manual
4. Canadian Sheet Steel Building Institute (CSSBI) Bulletin No. 9, Core and Maintenance of Pre-finished Sheet Steel Building Products.

1.4 Operations

1. Perform operations, at times designated by the *Owner*, that will not adversely affect occupants of building and operations in and around site access and egress.

1.5 Protection

1. Protect work of this section from damage. Damaged work which cannot be satisfactorily repaired, restored or cleaned, shall be replaced at no cost to *Owner*.

1.6 Submittals

1. Submit samples of flashing and sheet metal type and colour to *Consultant* and *Owner* for review prior to commencing work.

1.7 Mock-Up

1. Fabricate mock-ups in minimum 2440 mm (8 ft.) lengths with reviewed materials, approved methods including, joints, seams, expansion joints, starter strips and fasteners.
2. Mock-up, if accepted, shall represent the minimum standard for work. Mock-up may be included as part of final work

1.8 Quality Assurance

1. Flashing and Sheet Metal Work shall be executed in accordance with SMACNA Architectural Sheet Metal Manual - 1993 (Addendum No. 1 – October 31, 1997), by skilled trades having experience installing this product.

1.9 Warranty

1. Provide minimum two (2) year Warranty from date of Substantial Performance, as certified by *Consultant*. Warranty shall be submitted against defects in workmanship and materials.
2. *Contractor* must extend the Warranty on replaced parts and workmanship for a period of two (2) years from date of acceptance of replacement parts and workmanship. Defects will include but will not be limited to leaking, failure to stay in place, lifting, deformation and breaking of weathertight seals.
3. Provide all additional Warranties that may be available from manufacturer.

2. PRODUCTS

2.1 Material

1. Prefinished steel sheet: Galvanized steel, 0.71 mm (24 gauge) core nominal thickness, conforming to ASTM A525, Z275 zinc coated (galvanized) to designation G90 by the hot dip process, with a prefinished coat. Profiles as detailed.
2. Precoat Finish: Perspectra Plus Series, factory applied coating. Colour to be approved by *Owner* from standard colours listed in General Colour Card.
 1. Colour – to be selected by consultant from standard colours.
3. Starter strips: Fabricated from prefinished steel sheet, 0.87 mm (22 gauge) core nominal thickness. Minimum 75 mm (3 in.) wide face or as detailed and to be continuous.
4. Termination Bar: 3 mm x 25 mm (1/8 x 1 in.) extruded aluminum bar.
5. Touch-up paint: As supplied and recommended by sheet steel manufacturer.
6. Exposed Sheet Metal Fasteners: Self-Drilling Hex Head with washer and colour coded cap.
7. Cap, Counter and Fascia Metal to be fabricated to layouts and details shown on drawings and to extent required.
8. Overflow Scuppers: Overflow (Where Shown on Drawings): Fabricated from 0.71 mm (24 gauge) stainless steel. To be a minimum 200 mm wide x 100 mm high (8 x 4 in.) with continuously soldered seams with a 150 mm (6 in.) wide apron/flanges.
9. Fasteners: In accordance with Section 06 10 00 – Rough Carpentry
10. Sealants: In accordance with Section 07 92 00 – Joint Sealers

3. EXECUTION

3.1 Fabrication

1. Shop fabricate flashing, sheet metal and trim in accordance with requirements of SMACNA and the Contract Documents. Form sheet metal on bending brake, shaping, trimming and hand seaming on bench.
2. Form sections square, true, and accurate to size. Flashings shall be free from distortion, oil canning, twists, buckles, discolouration and other defects detrimental to appearance and performance.
3. Double back all edges a minimum of 13 mm (1/2 in.). Raw cut-edges are not acceptable.
4. Form joints with S-locks and make allowances for movement. Mitre and form standing seams at all corners. Make allowance for movement at joints.
5. Fabricate cap flashings, counter flashings and starter strips to details shown and where required.
6. Fabricate metal in 2400 mm (8 ft.) maximum lengths with an unbroken face less than 225 mm (9 in.). Form flashings with an exposed unbroken face exceeding 225 mm (9 in.) and a girth greater than 610 mm (24 in.) in 1220 mm (4 ft.) maximum lengths.
7. Provide horizontal stiffening rib "V" on all face metal exceeding 225 mm (9 in.) in girth and where shown on drawings.
8. Provide an 'S-Lock' joint at all end joints and at all horizontal joints between the cap flashing and the vertical flashing and between the vertical flashing and base counter flashing.
9. Where soldered joints are absolutely necessary and where approved for use in prepainted metal, clean paint off both surfaces before soldering for minimum area necessary.
10. Exposed sheet metal coming in contact with a metal of a different type must be back painted with two (2) coats of isolation coating.

3.2 Sheet Metal Flashing and Trim

1. Provide a continuous starter strip on exterior side for all metal cap, fascia and counter flashings and secure at a maximum 305 mm (12 in.) on centre with flat headed screws.
2. Install flashings and sheet metal that includes but not limited to; cap flashings, counter flashings, curb and sleeper counter flashings, starter strips and other miscellaneous trim work in accordance with Contract Documents.

3. Parapet and perimeter cap flashings shall be installed with a **minimum 10% positive slope** to interior of roof. Slope to be provided by installation of continuous wood shims, plywood and wood blockings as detailed and in accordance with Section 06 10 00 – Rough Carpentry.
4. Saw cut new reglet, minimum 13 mm high x 25 mm deep (1/2 in. x 1 in.) into masonry surfaces to accommodate installation of sheet metal counter flashings.
5. Return top edge of metal counter flashings into reglet 19 mm (3/4 in.). Secure flashings with pin grips spaced at maximum 305 mm (12 in.) on centre and apply sealant bead to shed water.
6. Install sheet metal work with concealed fasteners. Install exposed fasteners only when and where permitted by *Consultant*. Install fasteners in an approved manner as to prevent water penetration at point of fastening and to be evenly and neatly distributed.
7. Provide continuous termination bar at top edge of membrane flashings. Fasten termination bar to substrate at a maximum 305 mm (12 in.) on centre with appropriate and approved fasteners. Top edge of counter flashing shall be inserted under cap flashings.
8. Fasteners are to be located minimum of 305 mm (12 in.) above roof membrane – where possible.
9. End joints of adjacent lengths shall be completed using ‘S-Lock’ joints. This shall be accomplished by inserting end of one length in a 25 mm (1 in.) deep "S" lock formed in end of adjacent length. Concealed portion of "S" lock shall extend 25 mm (1 in.) outwards and shall be secured to substrate with flat head screws at 100 mm (4 in.) on centre.
10. Provide three (3) exposed fasteners on interior side of cap flashing, evenly spaced at 610 mm (24 in.) per 2400 mm (8 ft.) length. Use colour ceded screws with washers.

3.3 Overflow Scuppers

1. Where indicated on drawings, install new scuppers and secure to substrate. Overflow scuppers shall be set no higher than 50 mm (2 in.) above lowest point of roof area.
2. Flash in scupper flanges in accordance with Section 07 52 16 SBS Modified Bituminous Membrane Roofing

3.4 Clean-up

1. Remove all excess materials, debris, tools and equipment as work proceeds and on completion, or sooner if requested by *Consultant*.

End Of Section 07 62 00

1. GENERAL

1.1 Section Includes

1. Section includes for provision of all labour, materials, equipment and services for joint sealers in accordance with Contract Documents.

1.2 Related Sections

1. Section 06 10 00 Rough Carpentry
2. Section 07 52 16 SBS Modified Bituminous Membrane Roofing
3. Section 07 62 00 Sheet Metal Flashing and Trim

1.3 References

1. Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualifications Board for Joint Sealant.
2. CAN/CGSB-19.24 - Multi-Component, chemical curing sealing compound.
3. CAN/CGSB-19.13 - Single Component, elastomeric, chemical curing sealing compound.
4. CGSB 19-GP-14 - Sealing Compound, One-Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.

1.4 Operations

1. Perform operations, at times designated by the *Owner*, that will not adversely affect occupants of building and operations in and around site access and egress.

1.5 Protection

1. Protect work of this section from damage. Damaged work which cannot be satisfactorily repaired, restored or cleaned, shall be replaced at no cost to *Owner*.

1.6 Submittals

1. Submit samples of sealant type and colour to *Consultant* and *Owner* for review prior to commencing work.

1.7 Quality Assurance

1. Skilled trades with specific training and expertise in related experience shall execute Work.

1.8 Mock-Up

1. Construct mock-up to show location, size, shape and depth of joints complete with back-up material, primer, sealant and tooling. Mock-up may be included as part of finished work.

1.9 Warranty

1. Provide minimum two (2) year Warranty from date of Substantial Performance, as certified by *Consultant*. Guarantee shall be submitted against defects in workmanship and materials.

2. *Contractor* must extend Warranty on replaced parts and workmanship for a period of two (2) years from date of acceptance of replacement parts and workmanship. Defects will include but will not be limited to; joint leakage, hardening, cracking, crumbling, melting, bubbling, shrinkage, running, sagging, change of colour, loss of adhesion, loss of cohesion and staining of adjoining or adjacent materials on surfaces.
3. Provide all additional Warranties that may be available from manufacturer.

1.10 Environmental Requirements

1. Conform to manufacturer's recommended temperatures, relative humidity and substrate moisture content for application and curing of sealants.
2. Materials must be stored at minimum of 20°C (68°F) immediately prior to application. Sealant applications must be carried out when ambient temperature is above 0°C (32°F).

2. PRODUCTS

2.1 Material

1. All materials in a sealant system shall be compatible with each other and with substrate.
2. Colour(s) of sealants shall be selected to match adjacent substrate and shall be approved by *Consultant* or *Owner*.
3. Elastomeric Sealants: One part elastomeric, non-sag urethane based sealant, for masonry to masonry, masonry to metal junctions. Acceptable Material:
 1. Dymonic as manufactured by Tremco Incorporated.
 2. Precast Wall (Vertical Joints) - Three-component, chemically curing, epoxidized polyurethane sealant, 'Dymeric 240' by Tremco Incorporated.
4. Silicone sealants: Silicone based sealant, for metal to metal junctions. Acceptable Material:
 1. Spectrum 2 as manufactured by Tremco Incorporated.
 2. Dow Corning 999-A Silicone Building & Glazing Sealant by Dow Corning Canada Inc. Colour to match adjacent surfaces.
 3. DOWSIL983 Structural Glazing Sealant by Dow Corning Canada Inc.

5. Butyl sealants: Butyl rubber and polyisobutylene blend sealant. Butyl sealant to be compatible with modified bituminous membrane flashings. Acceptable Material:
 1. Tremco Butyl Sealant as manufactured by Tremco Incorporated.
 2. Modified Membrane manufacturer's approved sealant.
6. Joint Backing: Polyethylene, urethane, neoprene or vinyl, extruded foam recommended by the sealant manufacturer. Circular shape with diameter 25% greater than joint width before installation.
7. Void Filler: Glass fibre insulation with a nominal density of 14 kg/m³ (Sized for 25% compression).
8. Primer: As recommended by sealant manufacturer to assure adhesion of compound and to prevent staining of substrate materials.
9. Joint Cleaner: Non-corrosive and non-staining type, compatible with joint forming materials and sealant as recommended by sealant manufacturer.
10. Bond Breaker Tape: Polyethylene bond breaker tape, which will not bond to sealant.

3. EXECUTION

3.1 Preparation

1. Clean joint surfaces of: dust, oil, grease, oxidation, millscale, coatings and all other loose and deleterious material by cutting, brushing, scrubbing, scraping and grinding of substrate that may impair work.
2. Examine joint sizes and conditions to establish correct depth to width ratio for joint backing and sealant.
3. Rake out joints, cracks and crevices to receive sealant, to a depth measuring half the joint width. Provide new reglets at all masonry mortar joints to receive metal counter flashing and sealant.
4. Ensure joint surfaces are dry and frost free. Prepare substrate as recommended by sealant manufacturer ensuring adjacent surfaces are not damaged.
5. Commencement of Work implies acceptance of existing conditions and assuming full responsibility for finished condition of the Work.

3.2 Priming

1. To prevent staining, mask adjacent surfaces prior to priming and caulking.
2. Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.3 Sealant Application

1. Install joint backing all joints prior to applying sealants. Diameter of backing material shall be 25% more than width of joint.
2. **Maintain minimum 2:1 width to depth ratio for sealant.**
3. Apply bond breaker tape where joints are of insufficient size to install joint backing or at 90° junctions or where required by sealant manufacturer or *Consultant*. Ensure bond surface area meets the minimum required size recommended by sealant manufacturer.
4. Apply sealant in continuous beads, in solid contact to underlying surfaces with sufficient pressure to fill voids and joints solid.
5. Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets and embedded impurities. Superficial skin bead is not acceptable.
6. Tool exposed surfaces before skinning occurs to attain concave shape using approved tools.
7. Cure sealant in accordance with the manufacturer's requirements. Do not cover up sealants until proper curing has taken place.

3.4 Clean-up

1. Clean adjacent surfaces immediately and leave work neat and clean.
2. Remove excess and droppings using recommended cleaners as work progresses.
3. Remove bonding tape after initial set of sealant.
4. Remove all excess material, debris, tools and equipment as work proceeds and on completion, or sooner if requested by *Consultant*.

End of Section 07 92 00

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 07 92 10 - Joint Sealing: Caulking of joints between frames and other building components.
- .3 Section 08 71 10 - Door Hardware - General: Supply of finish hardware, including weatherstripping and mounting heights.
- .4 Section 09 91 23 - Interior Painting.
- .5 Section 09 91 13 - Exterior Painting.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A653/A653M-[01a], Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM B29-[92(1997)], Specification for Refined Lead.
 - .3 ASTM B749-[97], Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181-[99], Ready-Mixed Organic Zinc-Rich Coating.
 - .2 CGSB 41-GP-19Ma-[84], Rigid Vinyl Extrusions for Windows and Doors.
- .3 Canadian Standards Association (CSA International)
 - .1 G40.20/G40.21-[98], General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA W59-[M1989(R2001)], Welded Steel Construction (Metal Arc Welding) (Metric Version).
- .4 Canadian Steel Door Manufacturers' Association, (CSDMA).
 - .1 CSDMA, Specifications for Commercial Steel Doors and Frames, [1990].
 - .2 CSDMA, Recommended Selection and Usage Guide for Commercial Steel Doors, [1990].
- .5 National Fire Protection Association (NFPA)
 - .1 NFPA 80-[99], Standard for Fire Doors and Fire Windows.
 - .2 NFPA 252-[99], Standard Methods of Fire Tests of Door Assemblies.
- .6 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN4-S104-[80(R1985)], Fire Tests of Door Assemblies.
 - .2 CAN4-S105-[85(R1992)], Fire Door Frames Meeting the Performance Required by CAN4-S104.

- .7 CAN/ULC-S701-[01], Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .8 CAN/ULC-S702-[97], Thermal Insulation, Mineral Fibre, for Buildings.
- .9 CAN/ULC-S704-[01], Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

1.3 DESIGN REQUIREMENTS

- .1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35°C to 35°C.
- .2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.

1.4 WORK INCLUDED

- .1 A single manufacturer shall fabricate products included within the scope of this Section.
- .2 Manufacturer shall be a member in good standing of the Canadian Steel Door Manufacturers Association (CSDMA).
- .3 Supply only of steel frame products including frames, transom frames, sidelight and window assemblies with provision for glazed, paneled or louvered openings, fire labeled and non-labeled, as scheduled or detailed by the Consultant.
- .4 Supply only of flush steel doors with provision for glazed, paneled or louvered openings, insulated and un-insulated, fire labeled, with or without temperature rise ratings and non-labeled, as scheduled or detailed by the Consultant.
- .5 Supply only of steel panels, similar in construction to steel doors, with flush or abetted bottoms for steel frames, transom frames, sidelight and window assemblies, fire labeled and non-labeled, as scheduled or detailed by the Consultant.

1.5 RELATED WORK

- .1 Building-in of frame product into unit masonry, previously placed concrete, structural or steel or wood stud walls.
- .2 Supply and installation of wood, plastic or composite core doors.
- .3 Supply and installation of builders' hardware except as specified for acoustic assemblies.
- .4 Drilling and tapping for surface mounted or non-templated builders' hardware.
- .5 Caulking of joints between frame product and other building components.
- .6 Supply and installation of gaskets or weather-strip.
- .7 Supply and installation of louvers or vents.
- .8 Supply and installation of glazing materials.

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- .9 Site touch-up and painting.
 - .10 Wiring for electronic or electric hardware.
 - .11 Field measurements.
 - .12 Fasteners for frame product in previously placed concrete, masonry or structural steel.
 - .13 Steel lintels, posts, columns or other load-bearing elements.
 - .14 Field welding.

1.6 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, or louvred, arrangement of hardware and fire rating and finishes.
- .3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing and fire rating finishes.
- .4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
- .5 Submit test and engineering data, and installation instructions.

1.7 REQUIREMENTS

- .1 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104M [NFPA 252] for ratings specified or indicated.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Divert unused paint and sealant materials from landfill to official hazardous material collections site approved by Consultant.
- .3 Do not dispose of unused paint and sealant materials into sewer systems, into lakes, streams, onto ground or in other locations where it will pose health or environmental hazard.
- .4 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .5 Damaged or broken glazing materials are not recyclable. These materials must not be disposed of with materials destined for recycling.

1.9 TESTING AND PERFORMANCE

- .1 Door constructions covered by this specification shall be certified as meeting Level “A” (1,000,000 cycles) and Twist Test Acceptance Criteria (deflection not to exceed 6.4 mm /13.6kg force, total deflection at 136.1kg force not to exceed 63.5 mm and permanent deflection not to exceed 3.2 mm) when tested in strict conformance with ANSI-A250.4-1994. Test shall be conducted by an independent nationally recognized accredited laboratory.
- .2 Fire labeled product shall be provided for those openings requiring fire protection and temperature rise ratings, as determined and scheduled by the Architect. Doors, frames, transom frames and sidelight assemblies shall be tested in strict accordance with CAN4-S106. Product shall be listed by Underwriters Laboratories of Canada under an active Factory Inspection Program and shall be constructed as detailed in Follow-Up Service procedures issued to the manufacturer.
- .3 Should any door or frame specified by the Architect to be fire rated, not qualify for labeling due to design, hardware, glazing or any other reason, the Consultant shall be so advised before manufacturing commences.
- .4 Core materials for exterior doors shall attain a thermal resistance rating of RSI 1.06 (R6.0) when tested in accordance with ASTM C177 or ASTM C518.
- .5 Product shall be manufactured by a firm experienced in the design and production of standard and custom commercial steel door and frame assemblies, the integration of builders’ or electronic hardware and glazing materials and their impact on the scope of work.
- .6 Manufacturer shall be assessed and registered as meeting the requirements of Quality Systems under ISO 9001.
- .7 Product quality shall meet standards set by the Canadian Steel Door Manufacturers Association.

1.10 TEST REPORTS

- .1 All alternates to this specification shall be submitted to the Architect for acceptance ten (10) days prior to bid date, complete with test reports from independent, nationally recognized testing authorities, certifying that:
 - .1 Steel door and frame assemblies furnished under this section meet the acceptance criteria of ANSI-A250.4-1994, Level “A”.
 - .2 Insulated door cores furnished in exterior doors under this Section meet the specified thermal resistance rating.
- .2 All reports shall include name of testing authority, date of test, location of test facility, descriptions of test specimens, procedures used in testing and indicate compliance with acceptance criteria of the test.

1.11 WARRANTY

- .1 All steel door and frame product shall be warranted from defects in workmanship for a period of two (2) years from date of shipment.

- .2 All steel door and frame product shall be warranted against rust perforation for a period of ten (10) years when the installed and finish painted with a commercial quality paint to the manufacturers recommendations.
- .3 Finish paint adhesion on all door and frame product shall be warranted for a period of ten (10) years when the product has been properly cleaned and finish painted with a commercial quality paint applied as recommended by the paint manufacturer. This warranty shall not exceed that provided by the paint manufacturer.

Part 2 Products

2.1 MATERIALS

- .1 Doors shall be fabricated from tension leveled steel to ASTM A924-M97, galvanized to ASTM A653-M97, Commercial Steel (CS), Type B, coating designation ZF75, known commercially as paintable Galvanneal.
 - .1 Acceptable Manufacturer: Flemming
 - .2 Acceptable Alternate Manufacturer: Trillium Steel Doors Limited, or others meeting these exact specifications outlined in this section and accepted in writing during the tender period.
- .2 Door Cores:
 - .1 Honeycomb:
 - .1 Structural small cell (25.4 mm maximum) kraft paper “honeycomb”. Weight: 36.3 kg per ream (minimum), density: 16.5 kg/m³ (minimum), sanded to the required thickness.
 - .2 Polystyrene:
 - .1 Rigid extruded, fire retardant, closed cell board, density 16kg/m², thermal values: RSI 1.06 minimum, conforming to ASTM C578.
 - .3 Temperature Rise Rated (TRR):
 - .1 Solid slab core of non-combustible, inorganic composite to limit temperature rise on the “unexposed” side of door to 250°C at 30 or 60 minutes, as required by governing building code requirements and determined and scheduled by the Architect.
 - .4 Adhesives:
 - .1 Honeycomb Cores and Steel Components: Heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement or ULC approved equivalent.
 - .5 Interlocking Edge Seams:
 - .1 Resin reinforced polychloroprene (RRPC), fire resistant, high viscosity, sealant/adhesive or UL approved equivalent.
 - .6 Polystyrene Cores:
 - .1 Heat resistant, epoxy based, low viscosity, contact cement.
 - .7 Primer:
 - .1 Rust inhibitive touch-up only.
 - .8 Exterior Top Caps:

.1 Rigid polyvinylchloride (PVC) extrusion.

2.2 DOOR FABRICATION

- .1 Contractor is to site confirm dimensions of all existing hollow metal frames to remain and receive new hollow metal doors, including coordination of all hardware installation between frame and door.
- .2 This section is based on doors and frames as manufactured by Fleming. Doors and frames by other manufacturers are acceptable subject to be similar to the one specified and meeting the terms of this section.
- .3 Doors shall be swinging, 44.4 mm thick of the types and sizes indicated on the Architect's schedules or drawings.
- .4 Exterior doors shall be lock seam, flush.
- .5 Face sheets for exterior doors shall be fabricated from (16) gauge steel.
- .6 Longitudinal edges of exterior doors shall be fully welded, ground smooth with no visible seams.
- .7 Face sheets of interior doors shall be fabricated from 18 gauge steel, except for heavy traffic doors (noted **HT** in Door Schedule) face sheet to be 16 gauge.
- .8 Longitudinal edge of heavy traffic doors (noted **HT** in Door Schedule) shall be mechanically interlocked, fully welded, ground smooth with no visible seams. Do not fill seams.
- .9 Interior doors shall be stiffened, insulated and sound deadened with honeycomb core laminated under pressure to each face sheet.
- .10 Stiffened, insulated and sound deadened with Fleming's propriety core where Temperature Rise Rated (TRR) fire labeled doors are specified on the Architect's schedules.
- .11 Longitudinal edges of interior doors shall be mechanically interlocked, adhesive assisted with edge seams and tack-welded every 150 mm and filled flush.
- .12 Door faces of all steel doors shall be fabricated without visible seams, free of scale, pitting, coil brakes, buckles and waves.
- .13 Formed edges shall be true and straight with a minimum radius for the thickness of steel used.
- .14 Lock and hinge edges shall be beveled 3 mm in 50 mm unless builders' hardware or door swing dictates otherwise.
- .15 Top and bottom of doors shall be provided with inverted, recessed, 16 gauge steel end channels, welded to each face sheet at 150 mm on center maximum.
- .16 Exterior doors shall be provided with factory installed flush PVC top caps. Fire labeled exterior doors shall be provided with factory installed flush steel top caps.

- .17 Unless ineligible due to design, size, hardware or glazing specified on the Architects' or hardware Suppliers' schedules or details, fire labeled doors shall be provided for those openings requiring fire protection ratings and temperature rise ratings, as determined and scheduled by the Architect.
- .18 Exterior doors and high traffic doors shall be internally reinforced with 20 gauge continuous; interlocking steel stiffeners at 150mm O.C. max, with voids between stiffeners filled and insulated with 24kg/m³ density loose batt type fiberglass material to suit fully welded design.
- .19 Doors shall be factory blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templates provided by the hardware supplier.
- .20 Doors shall be factory blanked and reinforced only for mortised hardware that is not fully templated.
- .21 Doors shall be factory reinforced only for surface mounted hardware.
- .22 Templated holes 12.7mm diameter and larger shall be factory prepared, except mounting and through bolt holes, which shall be by the contractor responsible for installation on site, at the time of application. Templated holes less than 12.7mm diameter shall be factory prepared only when required for the function of the device (for knobs, levers, cylinders, thumb or turn pieces) or when these holes over-lap function holes.
- .23 Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.
- .24 Hinge and pivot reinforcements shall be 10 gauge steel minimum high frequency type reinforcing.
- .25 Hinge reinforcements for acoustic doors and doors in excess of 2450mm rabbet height shall be 10 gauge minimum with each cutout provided with 114.3mm heavy weight (4.6mm) high frequency type.
- .26 Lock, strike and flush bolt reinforcements shall be 12 gauge steel minimum.
- .27 Reinforcements for concealed closers and holders shall be 12 gauge steel minimum.
- .28 For surface mounted hardware, reinforcements shall be 16 gauge steel minimum.
- .29 All pairs of fire labeled doors shall be provided with 12 gauge steel surface mounted flat bar astragal, shipped loose for application on site, by the contractor responsible for installation.
- .30 Pairs of doors up to 2450mm x 2450mm, to 1½ hour fire rating maximum shall be provided without astragals. Lock edge seam of such doors shall be tacked-welded and ground smooth. All other fire labeled pairs shall be provided with 12 gauge steel surface mounted flat bar astragal, shipped loose for application on site, by the contractor responsible for installation.

- .31 Where electrically or electronically operated hardware is specified on the Architects' schedules or details of the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on the templates, shall be provided and interconnected with CSA Approved 12.7mm diameter conduit and connectors.
- .32 Prepare doors to receive security door contacts – refer to electrical drawings for locations. Door contacts to be installed at 100 mm from the latch side door edge.

2.3 GLAZING

- .1 Where 6mm thick glazing materials are specified on the Architects schedules or details, doors shall be provided with 20 gauge steel glazing trim and snap-in glazing stops.
- .2 Where other than 6mm glazing is specified on the Architect's schedules or details, doors shall receive 20 gauge steel trim and screw fixed glazing stops. Screws shall be #6 x 32mm oval head scrulox (self-drilling) type at 300mm on center maximum.
- .3 Glazing trim and stops shall be accurately fitted, butted at corners, with removable glazing stops located on the 'push' side of the door.

2.4 LOUVER

- .1 Where specified on the Architect's schedules or details, non-labeled doors shall be prepared on accordance with the louver manufacturer's details.
- .2 Where specified on the Architect's schedules or details, fire labeled doors shall be prepared for UL listed sight-proof fusible link louvers in accordance with the louver manufacturer's details.
- .3 Louvers shall be supplied and installed by others.

2.5 FINISHING

- .1 Remove weld slag and splatter from exposed surfaces.
- .2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth uniform surfaces.
- .3 On exposed surfaces where zinc coating has been removed during fabrication, doors shall receive a factory applied touch-up primer.
- .4 Primer shall be fully cured prior to shipment.

2.6 PANELS

- .1 Panels shall be fabricated from the same materials, construction and finished in the same manner as doors as specified in Section 2.1.

2.7 PRIMER

- .1 Touch-up prime CAN/CGSB-1.181.

2.8 PAINT

- .1 Field paint steel doors and frames in accordance with Section[s] 09 91 22 – Painting. Protect weatherstrips from paint. Provide final finish shall be free of scratches or other blemishes.

2.9 FRAMES FABRICATION GENERAL

- .1 Steel:
 - .1 Frame product shall be fabricated from tension leveled steel to ASTM A924-M97, galvanized to ASTM A653-M97, Commercial Steel (CS), Type B, coating designated ZF75, known commercially as paintable Galvanneal.
- .2 Primer:
 - .1 Rust inhibitive touch up only.
- .3 Miscellaneous:
 - .1 Door Silencers: GJ-64, Single Stud rubber/neoprene type
 - .2 Thermal Breaks: Rigid polyvinylchloride (PVC) extrusion
 - .3 Fiberglass: Loose batt type, density: 24kg/m³ (minimum), conforming to ASTM C665.
- .4 General:
 - .1 All steel frame product shall be as manufactured by Fleming of the types, sizes and profiles indicated on the Architects' schedules or details.
 - .2 Exterior frames shall be thermally broken, Fleming *Therma-Frame* Series, fabricated from 16 gauge steel.
 - .3 Exterior frame product shall be supplied profile welded (PW)
 - .4 Interior and exterior sections of thermally broken frames shall be separated by a continuous PVC thermal break.
 - .1 Thermally broken sections shall not be assembled by means of screws, grommets or other fasteners and welds shall not cause thermal transfers between interior and exterior surfaces of the frame sections.
 - .2 Closed sections (mullions and center rails) of thermally broken frames shall be factory insulated with 24kg/m³ loose batt type fiberglass material.
- .5 Insulation of open sections (jambs, heads and sills) on exterior frame product shall be provided and installed by the contractor responsible for installation.
- .6 Interior frames shall be Fleming F-Series, fabricated from 16 gauge steel.
- .7 Interior frame product shall be supplied profile welded (PW)
- .8 Knocked-down and knocked-down drywall frames shall not be acceptable.
- .9 Jambs, heads, mullions, sills and center rails shall be straight and uniform throughout their lengths.
- .10 Frame product shall be square, free of defects, wraps or buckles.

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- .11 Corner joints shall be profile welded (PW) (continuously welded on the inside of the profiles' faces, rabbets, returns and soffit intersections with exposed faces filled and ground to a smooth, uniform, seamless surface)"
 - .12 Joints at mullions, transom bars, sills or center rails shall be coped accurately, butted and tightly fitted, with faces securely welded, matching corner joint faces.
 - .13 All steel mullions will be fabricated from the same materials as specified for the steel frames. Steel mullions will be fabricated as a fully assembled three piece unit consisting of a front, back and full height one piece attachment clip as per Fleming F Series. The attachment clip will completely fill the stop area of the mullion on both sides and span the void between each side forming a grid channel like structure. Mullions used as hinge mullions or strike mullions between doors will be filled with grout by the general contractor either prior to or following installation of the frame. The head of the frame shall have an opening sufficient for the grout to be poured in to the mullion.
 - .14 Mullions shall be fabricated with continuous 20 gauge galvaneal steel internal reinforcing clips.
 - .15 Frame product shall be fabricated with integral door stops having a minimum height of 16mm.
 - .16 Glazing stops shall be formed 20 gauge steel, 16mm height channel, accurately fitted, butted at corners and fastened to frame sections with #6 x 32mm oval head scrulox (self-drilling) type screws at 300mm on center maximum.
 - .17 Where required due to site access, as indicated on the Architects' schedules or details, when advised by the contractor responsible for co-ordination or installation, or when shipping limitations so dictate, frame product shall be fabricated in sections for splicing in the field.
 - .1 Field spliced jambs, heads and sills shall be provided with 16 gauge steel splice plates securely welded into one section, extending 100mm minimum each side of splice joint.
 - .2 Field splices at closed sections (mullions or center rails) shall be 16 gauge steel splice angles securely welded to the abutting member. Face of splice angle shall extend 100mm minimum into closed sections when assembled.
 - .3 Field splice joints shall be welded, filled and ground to present a smooth uniform surface by the contractor responsible for installation after assembly.
 - .18 Each door opening shall be provided with two (2) temporary steel jamb spreaders welded to the base of the jambs or mullions to maintain proper alignment during shipping and handling. Spreaders shall be removed by the contractor responsible for installation prior to anchoring of frame to floor.
 - .19 Each door opening shall be prepared for GJ-64 or equivalent, single stud door silencers, three (3) for single door openings, two (2) for double door openings. Silencers shall be shipped loose for installation by the contractor after finish painting.
 - .20 Unless ineligible due to design, size, hardware or glazing specified on the Architects' or Hardware Suppliers' schedules or details, fire labeled frame product shall be provided for those openings required fire protection ratings as determined and scheduled by the Architect.

.21 Hardware Preparations:

- .1 Frame product shall be blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templated provided by the hardware supplier.
- .2 Frame product shall be factory blanked and reinforced only for mortised hardware that is not fully templated.
- .3 Frame product shall be reinforced only for surface mounted hardware.
- .4 Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.
- .5 Frames shall be prepared for 114.3mm standard weight hinges (minimum).
- .6 Hinge and pivot reinforcements shall be 10 gauge steel minimum reinforcing, high frequency type shall be provided.
- .7 Hinge reinforcements for acoustic frames and frames in excess of 2450mm rabet height shall be 10 gauge minimum with each cutout provided with 114.3mm heavy weight (4.6mm) high frequency type.
- .8 Strike reinforcements shall be 16 gauge steel minimum.
- .9 Reinforcements for surface mounted hardware, concealed closers and holders and flush bolts shall be 12 gauge steel minimum.
- .10 Mortised cutouts shall be protected with 22 gauge steel minimum guard boxes.
- .11 Where electrically or electronically operated hardware is specified on the Architects schedules or details or the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on templates, shall be provided and inter-connected with CSA Approved 12.7mm diameter conduit and connectors.
- .12 Prepare frames to receive security door contacts – refer to electrical drawings for locations. Door contacts to be installed at 100 mm from the latch side door edge.

.22 Anchorage:

- .1 Frame product shall be provided with anchorage appropriate to floor, wall and frame construction.
- .2 Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb, except as indicated below.
- .3 Frame product installed in unit masonry partitions shall be provided with 4.0mm diameter steel wire anchors, 18 gauge steel adjustable stirrup and strap or “T” type anchors as conditions dictate.
- .4 Where frame product is installed prior to construction of the adjacent wall, each jamb shall be provided with 16 gauge steel floor anchors. Each anchor shall be provided with two (2) holes for mounting to the floor and shall be securely welded to the inside of the jamb.
- .5 Floor anchors for thermally broken exterior frames shall be designed so as not to permit thermal transfers from exterior to interior surfaces of the frame sections.
- .6 Frame product installed in drywall partitions shall be provided with 20 gauge steel snap-in or “Z” type stud type anchor.

- .7 Jamb of frames in previously placed concrete, masonry or structural steel shall be punched and dimpled to accept machine bolt anchors, 6.4mm diameter, located not more than 150mm from the top and bottom of each jamb. Anchor preparations and guides shall also be located immediately above or below the intermediate hinge reinforcing and directly opposite on the strike jamb. Each preparation shall be provided with 16 gauge anchor bolt guides.
 - .8 Anchor bolts and expansion shell anchors for the above preparations shall be provided by the contractor responsible for installation.
 - .9 After sufficient tightening of the anchor bolts, the heads shall be welded do as to provide a non-removable application. Welded bolt head and dimple shall be filled and ground to present a smooth uniform surface by the contractor responsible for installation, prior to finish painting.
 - .10 Where indicated on the Architects' schedules or details, channel extensions shall be provided from the top of the frame assembly to the underside of the structure above. Extensions shall be fabricated from 12 gauge steel formed channel, mounting angles welded to inside of frame head and adjusting brackets. Formed channels, adjusting brackets and fasteners shall be shipped loose. Channels shall be mechanically connected to mounting angles and adjusting brackets with supplied fasteners, on site, by contractor responsible for installation.
- .23 Finishing:
- .1 Remove weld slag and spatter from exposed surfaces.
 - .2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth and uniform surfaces.
 - .3 On exposed surfaces where zinc has been removed during fabrication, frame product shall receive a factory applied touch-up primer.
 - .4 Primer shall be fully cured prior to shipment.

2.10 SIZES AND TOLERANCES

- .1 All sizes and tolerances shall be in accordance with the Canadian Steel Door Manufacturers Association "Recommended Dimensional Standards for Commercial Steel Doors and Frames" as follows:
 - .1 Widths of door openings shall be measured from inside of frame jamb rabbet with a tolerance of +1.6mm, -0.8mm.
 - .2 Heights of door openings shall be measured from the finished floor (exclusive of floor coverings) to the head rabbet of the frame with a tolerance of ± 1.2 mm.
 - .3 Unless builders' hardware dictates otherwise, doors shall be sized so as to fit the above openings and allow a 3mm clearance at jambs and head. A clearance of 19mm between the bottom of the door and the finished floor (exclusive of floor coverings) shall be provided. Tolerances on door sizes shall be ± 1.2 mm.
 - .4 Manufacturing tolerances on formed frame profiles shall be ± 0.8 mm for faces, door stop heights and jamb depths. Tolerances for throat openings and door rabbet shall be ± 1.6 mm and ± 0.4 mm respectively. Hardware cutout dimensions shall be as per template dimensions, +0.4mm, -0.

2.11 HARDWARE LOCATIONS

- .1 Hardware preparations in frame product shall be as noted below and locations on doors shall be adjusted for clearances specified in 2.4.
- .2 Top of upper hinge preparation for 114.3mm hinges shall be located 180mm down from head, transom mullion or panel as appropriate. The top of the bottom hinge preparation for 114.3mm hinges shall be located 310mm from finished floor as defined in 2.4.3. Intermediate hinge preparations shall be spaced equally between top and bottom cutouts. For dutch door frames, top and bottom hinge locations shall be as above, with the tops of intermediate hinges located at 930mm and 1403mm from finished floor.
- .3 Strike preparations for unit, integral, cylindrical and mortise locks and roller latches shall be centered 1033mm from finished floor. Strikes for deadlocks shall be centered at 1200mm from finished floor. Strikes for panic or fire exit hardware shall be located as per device manufacturer's templates.
- .4 Push and/or pulls on doors shall be centered 10701mm from finished floor.
- .5 Preparations not noted above shall be as per hardware manufacturer's templates.
- .6 Hardware preparation tolerances shall comply with the ANSI A115 series standards.

Part 3 Execution

3.1 SITE AND PROTECTION OF MATERIALS

- .1 The contractor responsible for installation shall remove wraps or covers from door and frame product upon delivery at building site.
- .2 All materials shall be thoroughly inspected upon receipt and all discrepancies, deficiencies and/or damages shall be immediately reported in writing to the supplier. All damage shall be noted on the carriers' Bill of Lading.
- .3 Contractor responsible for installation shall ensure all materials are properly stored on planks or dunnage in a dry location. Product shall be stored in a vertical position, spaced with blocking to permit air circulation between them. Materials shall be covered to protect them from damage from any cause.
- .4 Contractor shall notify the supplier in writing of any errors or deficiencies in the product itself before initiating any corrective work.

3.2 INSTALLATION GENERAL

- .1 Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .2 Install doors and frames to CSDMA Installation Guide.
- .3 Install doors and frames in accordance with the Door and Hardware Institute "Installation guide for doors and hardware".
- .4 Set frame product plumb, square, aligned, without twist at correct elevation.

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- .5 Frame Product Installation Tolerances:
- .1 Plumbness tolerance, measured through a line from the intersecting corner of vertical members and the head to the floor, shall be $\pm 1.6\text{mm}$.
 - .2 Squareness tolerance, measured through a line 90^0 from one jamb at the upper corner of the product, to the opposite jamb, shall be $\pm 1.6\text{mm}$.
 - .3 Alignment tolerance, measured on jambs, through a horizontal line parallel to the plane of the wall, shall be $\pm 1.6\text{mm}$.
 - .4 Twist tolerance, measured at face corners of jambs, on parallel lines perpendicular to the plane of the wall, shall be $\pm 1.6\text{mm}$.
- .6 Fire labeled product shall be installed in accordance with NFPA-80.
- .7 Secure anchorages and connections to adjacent construction.
- .8 Brace frame product rigidly in position while building-in. Remove temporary steel shipping jamb spreaders. Install wood spreaders at mid points of frame rabbet height and at floor level to maintain frame widths. Provide vertical support at center of head for openings exceeding 1250mm in width. Remove wood spreaders after product has been built-in.
- .9 Frame product in unit masonry shall be fully grouted in place.
- .10 Install doors maintaining clearances outlined in Section 2.4.
- .11 Install louvers and vents.
- .12 Adjust operable parts for correct clearances and function.
- .13 Steel surfaces shall be kept free of grout, tar or other bonding materials or sealers.
- .14 Any grout or other bonding material shall be cleaned from products immediately following installation.
- .15 Exposed field welds shall be finished to present a smooth uniform surface and shall be touched-up with a rust inhibitive primer.
- .16 Exposed surfaces that have been scratched or otherwise marred during shipment, installation or handling shall be touched-up with a rust inhibitive primer.
- .17 Finish paint in accordance with Section 099116 and 099123.
- .18 Install glazing materials and door silencers.

3.3 INSPECTION

- .1 In accordance with Section 011100- Summary of Work, upon assignment of an inspection agency the following inspections shall be performed:
 - .1 review of shop drawings for compliance with specification
 - .2 shop inspection during production. Should inspection notification not be given suitable to review fabrication, destructive testing of one or more doors will be

undertaken either in the shop or on site at no additional cost to the owner. Doors destroyed for invasive inspection shall be replaced as part of the contract price.

- .2 Upon notification of initial door installation, contractor shall notify inspector to witness installation practice and at periodic points for duration of installation period.

3.4 FINISH REPAIRS

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

3.5 GLAZING

- .1 Install glazing for doors and frames in accordance with Section 08 80 50 - Glazing.

END OF SECTION

Part 1 General

1.1 GENERAL NOTES

- .1 Find the Door Schedule on the following pages.
- .2 Refer to the large format drawings for door and frame types and details.

1.2 ABBREVIATIONS CODE

- .1 The following abbreviations are used in the Door Schedule.
- .2 Code Reference
- .3 DC Door Contact (security)
- .4 P Paint
- .5 HM Hollow Metal
- .6 TG Tempered Glass
- .7 45 MIN 45 minute fire rating
- .8 HT Heavy Traffic – see spec for welded seams, special reinforcing.
- .9 B/F Barrier-Free
- .10 WD Laminate Faced Wood Door
- .11 P.LAM Plastic Laminate Finish on Wood Door
- .12 ALUM. Aluminum
- .13 ANNO. Anodized Finish
- .14 ST Stained

1.3 DOOR SCHEDULE

- .1 Door Schedule designation “DC” refers to “Door Contacts” used in the security system. Refer to Electrical Drawings and Division 16 Specifications for locations, zoning and description of system.

END OF SECTION

Hespeler P.S. Office Renovation
Door Schedule

DOOR #	ROOM NAME	DOOR								FRAME					REMARKS
		WIDTH	HEIGHT	FIRE	H.T.	TYPE	MAT'L	FIN	GLASS	TYPE	MAT'L	FIN	DC	GLASS	
FIRST FLOOR															
A103 A	GENERAL OFFICE	1000	2150		HT	B	ALUM	ANNO	TG	-	ALUM	ANNO	-	TG	B/F OPERATOR, CONT. HINGES
A104 A	OFFICE	950	2150			C	WD	ST	TG	3	HM	P		TG	
A105 A	OFFICE	950	2150			C	WD	ST	TG	3	HM	P		TG	
A106 A	OFFICE	950	2150			C	WD	ST	TG	3	HM	P		TG	
A108 A	STORAGE	950	2150			A	WD	ST	-	1	HM	P		-	
A109 A	WASHROOM	950	2150			A	WD	ST	-	1	HM	P		-	
A110 A	VESTIBULE	TO MATCH EX.	TO MATCH EX.			C	WD	ST	TG	1	HM	P		-	NEW DOOR AN FRAME IN EXISTING OPENING. CONFIRM DIMENSIONS ON SITE.
A110 B	VESTIBULE	950	2150			C	WD	ST	TG	1	HM	P		-	
A110 C	VESTIBULE	EXISTING TO REMAIN								EXISTING TO REMAIN					
A111 A	STAFF LOUNGE	950	2150			C	WD	ST	TG	1	HM	P		-	B/F OPERATOR
A112 A	STAFF WR	850	2150			A	WD	ST	-	1	HM	P		-	
A113 A	STAFF WR	950	2150			A	WD	ST	-	1	HM	P		-	
A114 A	G.N. WR	950	2150			A	WD	ST	-	1	HM	P		-	
A115 A	STAFF WORKROOM	950	2150			C	WD	ST	TG	1	HM	P		-	
A116 A	MEETING ROOM	950	2150			C	WD	ST	TG	2	HM	P		TG	

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Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 Submittal Procedures.
- .2 Section 08 44 13 Glazed Aluminum Curtain Wall.
- .3 Section 08 80 50 Glazing.

1.2 REFERENCES

- .1 American Architectural Manufacturers Association (AAMA):
 - .1 AAMA 2605-05, Voluntary Specification for High Performance Coatings on Architectural Extrusions and Panels.
 - .2 AAMA CW-10-04, Care and Handling of Architectural Aluminum from Shop to Site.
- .2 American National Standards Institute (ANSI):
 - .1 ANSI, H35.1M-2009, Alloy and Temper Designation Systems for Aluminum (Metric).
- .3 American Society for Testing and Materials (ASTM):
 - .1 ASTM A167-99(2009), Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
 - .2 ASTM B221M-08, Specification for Aluminum-Alloy Extruded Bars, Rods, Wires, Shapes and Tubes.
 - .3 ASTM F738M-02(2008), Specification for Stainless Steel Metric Bolts, Screws, and Studs.
- .4 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB-1.108-M89, Bituminous Solvent Type Paint.
- .5 Canadian Standards Association (CSA):
 - .1 CSA W59-M-03(R2008), Welded Steel Construction (Metal Arc Welding).

1.3 DESIGN REQUIREMENTS

- .1 Design aluminum doors in accordance with following Climatic Design Data for Oakville contained in the Ontario Building Code:
 - .1 Design temperature: January 1%, July 2 1/2% .
 - .2 Hourly wind pressures: 1 in 50 year occurrence.
- .2 Design aluminum doors to accommodate following without producing detrimental effect:
 - .1 Cyclic 40 degrees C daily thermal swing of components.
 - .2 Cyclic, dynamic loading and release of loads such as wind loads.
 - .3 13 mm vertical deflection in supporting structure and movement of supporting structure due to live, dead load, and creep or deflections, seismic load, sway displacement and similar items.

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- .3 Prevent deflection and permanent or progressive glazing displacement. Restrict horizontal and vertical deflection to less than $L/175$ (under uniformly distributed positive design wind load), and 10 mm maximum regardless of span.

1.4 SUBMITTALS

- .1 Shop drawings:
 - .1 Submit shop drawings in accordance with the Section 01 33 00 indicating:
 - .1 Plans, sections, details, type of extrusions, profiles, anchorage, glazing details, and finishes.
 - .2 Section and hardware reinforcement.
 - .2 Samples:
 - .1 Submit samples in accordance with the Section 01 33 00 of the following:
 - .1 One complete corner detail of door frame, glazing, and finish for each door type.
 - .2 Each door hardware item for the Consultant's approval.
 - .3 Reports:
 - .1 Submit substantiating engineering data, and independent test results of pre-tested, existing doors to substantiate compliance with the design criteria.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Handle aluminum work in accordance with AAMA CW-10.
- .2 Protect aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather. Do not remove before final cleaning of building.

Part 2 Products

2.1 ACCEPTABLE MANUFACTURER(S) AND SYSTEM(S)

- .1 Aluminum doors:
 - .1 Interior – non-thermal, heavy duty: approved products:
 - .1 'Canadiana HD' by Alumatic Limited.
 - .2 '350 Tuffline' by Kawneer Company Canada Limited.

2.2 MATERIALS

- .1 General:
 - .1 All materials under Work of this Section, including but not limited to, sealants and coatings are to have low VOC content limits.
 - .2 Wherever possible, metals used in work of this Section are to contain recycled content.

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- .2 Aluminum extrusions and channels: ASTM B211 and ANSI H35.1 AA6063 alloy, T6 temper.
 - .3 Reinforcements and anchors: ASTM A167, Type 304 to AISI No. 2B finish. Size as shown.
 - .4 Glass and glazing materials: As specified in Section 08 80 50.
 - .5 Frame sealant: Type as recommended by the aluminum work manufacturer.
 - .6 Screws, bolts and other fasteners: ASTM F738M; Stainless Steel Type 304.
 - .7 Isolation coating: CAN/CGSB-1.108-M; Bitumastic coating, acid and alkali resistant material.
 - .8 Foam insulation: One component polyurethane foam for installation within closures and fillers; Enerfoam by Dow Chemical Canada Inc.
 - .9 Weatherstripping: Durable, non-absorbing material resistant to deterioration by aging and weathering.
 - .10 Door hardware: Supplied by Section 08 71 00, preparation and installation by this Section.

2.3 FABRICATION

- .1 Fabricate sections true to detail, free from defects impairing appearance, strength and durability. Fabricate extrusions with sharp, well defined corners.
- .2 Fabricate, fit, and secure framing joints and corners accurately, with flush surfaces, and hairline joints. Apply frame sealant at joints for weatherproof seams.
- .3 Conceal anchors, reinforcement and attachments from view. Fabricate reinforcement in accordance with design requirements.
- .4 Do not expose manufacturer's identification labels on aluminum assemblies.
- .5 Fabricate doors and frames complete with internal reinforcements, cut-outs, and recesses to accommodate finish hardware. Reinforce cut-outs to assure adequate strength.
- .6 Double weatherstrip doors. Install weatherstripping in specially extruded ports and secure to prevent shrinkage or movement.
- .7 Fabricate doors of welded construction.
- .8 Glazing stop: Square, snap-on type, designed for neoprene glazing system.

2.4 FINISH

- .1 Extrusion finish: Clear anodized to AAMA 611 per Aluminum Association Designation System for Aluminum Finishes AA-M12C22A41.

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Part 3 Execution

3.1 INSTALLATION

- .1 Install aluminum doors in accordance with reviewed shop drawings, and manufacturer's written instructions.
- .2 Install Work of this Section securely, in correct location, level, square, plumb, at proper elevations, free of warp or twist.
- .3 Apply isolation coating at 0.8 mm dry film thickness to prevent corrosive or electrolytic action between dissimilar materials such as aluminum to concrete, masonry, galvanized steel and similar conditions.
- .4 Fill voids between aluminum framing and adjacent construction with foam insulation.
- .5 Install aluminum door manufacturer's standard weatherstripping at door frame perimeter. Install weatherstripping throughout entire length and width of doors at jambs and heads.
- .6 Install doors and hardware to manufacturers' written instructions. Clean and adjust hardware for correct performance.
- .7 Adjust operable parts for correct function.
- .8 Remove damaged or unacceptable Products and assemblies from Site and replace to Consultant's acceptance.
- .9 Install glass presence markers, in two cross stripes extending from diagonal corners. Maintain markers until final clean-up.

3.2 CLEANING

- .1 Maintain aluminum doors, inside and outside, in clean condition throughout construction period.
- .2 Remove labels, protective material, and glass presence markers from prefinished surfaces.

END OF SECTION

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Part 1 General

1.1 RELATED SECTIONS

1. Section 08 71 10 – Door Hardware
2. Section 01 33 00 – Submittals

1.2 REQUIRMENTS OF REGULATORY AGENCIES

1. Fabricate and install all doors to the following standards. AWMAC Quality Standards for Architectural Woodwork, latest edition
2. CAN/CSA-0132.2 Series-90, Wood Flush Doors
3. CAN4-S104-M80, fire tests of door assemblies
4. CAN4-S105-M85, Fire Door Frames
5. NFPA-80, Fire doors and Windows, latest edition.

1.3 SAMPLES

1. Submit samples in accordance with Section 01 33 00
2. Submit one 12” x 12” corner sample of each type of door
3. Show door construction, core, glazing details and faces.

1.4 SHOP DRAWINGS

1. Submit shop drawings in accordance with Section 01300 Submittals.

1.5 GUARANTEE

1. All doors shall be fully guaranteed for a period of three (3) years against manufacturing defects, core ghosting and warping, delamination of veneer, after Substantial Completion.

Part 2 General

2.1 MATERIALS

1. Acceptable door manufacturers:
 - .1 Algoma
 - .2 Cambridge
 - .3 Dormond
 - .4 Lambton
 - .5 Marshfield

2. Doors shall be of the sizes, thickness and type as shown on the drawings.
3. Solid core doors shall be constructed with urea-formaldehyde free particle board to ANSI A208.1, ID2. For Fire rated doors provide core in accordance with fire test requirements..
4. Doors shall be provided with vision panels as called for on the Door Schedules and supplied complete with wood glazing stops for 20 minute rated doors and ULC approved metal glazing stops for 45 minute or 60 minute rated doors.
5. Doors shall be complete with labels indicating approved fire resistance rated as required.
6. Undercut or rebate bottom rails as required.
7. Crossband – 3 ply hardwood plywood not less than 1/8” thick before sanding
8. Vertical and horizontal edges, stops and beads for glass and grilles to match face veneer. Edges shall be minimum 1 ½” wide by thickness of door.
9. Stiles and rails to be low density softwood staved type minimum 1 ½” wide with ¾” thick hardwood edge banding. Moisture content shall not exceed 8%.
10. Glazing beads to be flush type front edge recessed 1/8” at bottom. Mitre cut and fil all corners to form tight flush joints.
11. Face veneer shall be 3-ply grade A hardwood veneer, quarter sliced. Finish to be TR-8 Poly-urethane. Wood to be maple, white oak or birch.
12. Final stain colour to be later selected by Consultant from standard range of stains.

2.2 FABRICATION

1. Door cores unframed, solid laminated wood stave core construction, comprising narrow pieces of kiln dried wood, grain running vertically and end joints well staggered, solid, (no voids) and electronically glue bonded. Floating core construction will not be accepted. Sand door cores both sides prior to application of faces.
2. If particle board core or fire rated cores used, frame with 1 1/8” minimum wood stiles and 2 ¾” minimum wood rails; edge stiles with birch ¾” wide minimum, full length piece. Glue stiles and rails to core and apply face veneer and machine flush with door edges.
3. Seal top and bottom edges with two coats urethane finish or lacquer applied to door manufacturer’s plant.
4. Attach ULC labels to fire doors and frames as required
5. Preparation of doors shall include provision for extra hinges, heavy weight butts and mortised or cylinder locksets as required of hardware tender documents.
6. Preparation of doors and frames shall make appropriate provision for sound seals as indicated on Door Schedule.
7. Prepare glazing stops to receive insulated, sealed glazing as required on Door Schedule.

Part 3 Execution

3.1 FITTING AND HANGING DOORS

1. Doors shall be delivered to site, protected in transit from any damage from weather or handling and similarly stored in a protected area until hung in place.
2. Doors shall be hung by skilled carpenters.
3. Any planning of edges required for proper installation shall be sanded smooth prior to final installation.
4. Neatly and accurately fit required finishing hardware. Refer to section 08 71 10 - Finishing Hardware.
5. The completed installation required all doors to fit accurately in their frames, swing easily without binding and close snugly without movement when latch is engaged.

3.2 HARDWARE INSTALLATION

- .1 Receive hardware from Section 08 71 10.
- .2 Installation of the hardware is the responsibility of the General Contractor.
- .3 Adjust for correct function.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 61 00 - Common Product Requirements.
- .3 Section 01 78 00 - Closeout Submittals.
- .4 Section 05 50 00 - Metal Fabrications: Metal fabricated framed openings, structural support framing for sloped glazing.
- .5 Section 07 27 10 - Air Barriers - Descriptive or Proprietary.
- .6 Section 07 84 00 - Firestopping: Fire safing between floor edge and curtain wall system.
- .7 Section 07 92 10 - Joint Sealing: System perimeter sealant and back-up materials.
- .8 Section 08 80 50 - Glazing.
- .9 Section 09 91 23 - Interior Painting: Field painting of interior surface of infill.

1.2 REFERENCES

- .1 Aluminum Association Designation System For Aluminum Finishes (AA)-[1997].
 - .1 DAF 45 [2003], Designation System For Aluminum Finishes.
- .2 American Architectural Manufacturers Association (AAMA).
 - .1 AAMA CW-DG-1-[96], Aluminum Curtain Wall Design Guide Manual.
 - .2 AAMA CW-10-[97], Care and Handling of Architectural Aluminum From Shop to Site.
 - .3 AAMA CW-11-[85], Design Wind Loads for Buildings and Boundary Layer Wind Tunnel Testing.
 - .4 AAMA T1R-A1-[02], Sound Control for Fenestration Products.
 - .5 AAMA 501-[94], Methods of Test for Exterior Walls.
 - .6 AAMA 503-[92], Voluntary Specification for Field Testing of Metal Storefronts, Curtain Wall and Sloped Glazing Systems.
 - .7 AAMA 611-[98], Voluntary Specifications for Anodized Finishes Architectural Aluminum.
 - .8 AAMA 612-[02], Voluntary Specifications, Performance Requirements, and Test Procedures for Combined Coatings of Anode Oxide and Transparent Organic Coatings on Architectural Aluminum.
 - .9 AAMA 2603-[02], Voluntary Specification Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

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- .10 AAMA 2604-[02], Voluntary Specification Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
 - .3 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A36/A36M-[103a], Specification for Carbon Structural Steel.
 - .2 ASTM A123/A123M-[02], Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM A167-[99], Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .4 ASTM A653/A653M-[03], Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .5 ASTM B209-[02a], Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - .6 ASTM B221-[02], Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - .7 ASTM E283-[91(1999)], Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - .8 ASTM E330-[02], Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls, by Uniform Static Air Pressure Difference.
 - .9 ASTM E331-[00], Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform Static Air Pressure Difference.
 - .10 ASTM E413-[87(1999)], Classification for Rating Sound Insulation.
 - .11 ASTM E1105-[00], Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.
 - .4 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB 1.108-[M89], Bituminous Solvent Type Paint.
 - .2 CAN/CGSB-12.20-[M89], Structural Design of Glass for Buildings.
 - .5 Canadian Standards Association (CSA International).
 - .1 CSA-G40.20/G40.21-[98(R2003)], General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels.
 - .2 CAN/CSA-G164-[M92(R2003)], Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA-S136-[01], North American Specification for the Design of Cold-Formed Steel Structural Members.
 - .4 CAN3-S157-[M83(R2002)], Strength Design in Aluminum.
 - .5 CSA W59.2-[M1991(R2003)], Welded Aluminum Construction.
 - .6 Environmental Choice Program (ECP).
 - .1 CCD-45-[95], Sealants and Caulking Compounds.
 - .2 CCD-47-[1998], Surface Coatings.

- .3 CCD-48-[95], Recycled Water-Borne Surface Coatings.
- .7 Society for Protective Coatings (SSPC).
 - .1 SSPC - Paint 20 Zinc Rich Coating.
 - .2 SSPC - Paint 25 Alkyd, Zinc Oxide Linseed Oil and Primer for Use Over Hand Cleaned Steel Type 1 and Type 2.

1.3 SYSTEM DESCRIPTION

- .1 Work included: Furnish labour, materials and other services to complete the fabrication and installation of the framing, including all materials and fitments required for the operation of any entrance units included, in the manner, direction and performance shown on the shop drawings and specified herein. Work not included: Structural support of framing, interior trims. Related work specified elsewhere.

1.4 QUALITY ASSURANCE

- .1 Installation crews engaged or provided by the approved supplier shall have expertise and proven experience specifically trained and qualified in this work. Individuals are to be either employees of the manufacturer and/or workers approved by the manufacturer.
- .2 Provide one (1) thoroughly experienced, reliable, qualified and competent foreman in charge of the work to be on site at all times when work is taking place. Individual to be designated in charge from start of activities on site until final deficiencies are complete. Foreman may only be changed by written approval *or request* of the Consultant or owner.
- .3 Window supplier is to have adequate plant and skilled tradesmen with expertise installing similar products in the Province of Ontario.

1.5 PERFORMANCE REQUIREMENTS

- .1 Structural performance shall be based on CSA standard CAN3-S157 "Strength Design in Aluminum" and a maximum deflection of 1/175 of the span.
- .2 Air infiltration shall not exceed 0.06 cfm/ft² (0.0003 m³/s-m²) when tested in accordance with ASTM E283 at a pressure differential of 6.24 p.s.f. (300 Pa.)
- .3 There shall be no water infiltration when tested in accordance with ASTM E331 with a pressure differential of 15.0 p.s.f. (720 Pa.) Thermally, the grid members shall have a condensation resistance equal to or better than the area along the bottom of a 1" sealed glass unit with standard metal spacer edge construction.
- .4 Size glass units and glass dimensions to limits established in CAN/CGSB-12.20.
- .5 Provide system to accommodate, without damage to components or deterioration of seals:
 - .1 Movement within system.
 - .2 Movement between system and perimeter framing components.
 - .3 Dynamic loading and release of loads.
 - .4 Deflection of structural support framing.
 - .5 Shortening of building concrete structural columns.

- .6 Creep of concrete structural members.
- .6 Vapour seal with interior atmospheric pressure of 25 mm sp, 22 degrees C, 40% RH: No failure.
- .7 Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.
- .8 Ensure no vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system occur.

1.6 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide component dimensions; describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details and water flow diagrams.

1.7 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate system dimensions, framed opening requirements and tolerances, internal millon reinforcement, adjacent construction, anchor details anticipated deflection under load, affected related Work, weep drainage network, expansion and contraction joint location and details, and field welding required.
- .3 Curtain wall shop drawings are to be approved for structural integrity by a Professional Engineer licensed to design structures in the Province of Ontario. Shop drawings are to bear Engineer's seal of approval.

1.8 SAMPLES

- .1 Drawings and specifications for work of this section are based upon FlushGlaze TL 1800 series storefront system by Alumicor. For all approved products and acceptable alternatives, submit supporting technical literature, samples, drawings and performance data to meet or exceed these specifications.
- .2 Submit two samples 800 x 800 mm in size illustrating prefinished aluminum surface, finish, colour, texture, specified glass units, insulated infill panels, glazing materials illustrating edge and corner.

1.9 DESIGN DATA

- .1 Submit design data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide framing member structural and physical characteristics, calculations, dimensional limitations, special installation requirements.

1.10 TEST REPORTS

- .1 Submit test reports in accordance with Section 01 33 00 - Submittal Procedures.

- .2 Submit substantiating engineering data, test results of previous tests by independent laboratory which purport to meet performance criteria, and supportive data.

1.11 REGULATORY REQUIREMENTS

- .1 Conform to applicable code for acoustic attenuation, and sound transmission.
- .2 Use the following paragraph for assessing full sized erected assemblies for review of construction, coordination of work of several sections, testing, or observation of operation. A mock-up may also be used for assessing field applied finishes.

1.12 MOCK-UP

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Locate where directed.
- .3 Allow 24 hours for inspection of mock-up Consultant before proceeding with work.
- .4 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may not remain as part of finished work.

1.13 PRE-INSTALLATION MEETING

- .1 Convene one week before starting work of this section.

1.14 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, handle and protect materials in accordance with Division 1 requirements.
- .2 Handle work of this section in accordance with AAMA CW-10.
- .3 Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.15 ENVIRONMENTAL REQUIREMENTS

- .1 Do not install sealants when ambient and surface temperature is less than 5 degrees C.
- .2 Maintain this minimum temperature during and after installation of sealants.

1.16 SEQUENCING

- .1 Coordinate work of this section with installation of fire stopping, air barrier placement, vapour retarder placement, flashing placement, installing ductwork to rear of louvers.

1.17 WARRANTY

- .1 Submit a manufacturer's warranty against defects in materials and workmanship covering the components of the window system for a period of ten (10) years. The manufacturer shall supply a non-pro-rated warranty covering labour, materials, tools and equipment to

repair and/or replace any materials defects at no additional cost, for a period of ten (10) years including defects or failures due to poor workmanship and installation.

- .2 The supplier shall also submit a warrantee, in accordance with Section 088050-Glazing, for 10 years warranting the sealed units against defects.

1.18 MAINTENANCE DOCUMENTS AND MATERIALS

- .1 Provide 2 copies of data for maintenance and routine cleaning.
- .2 Provide 2 copies of final record reviewed shop drawings for owner's records.
- .3 Contractor shall supply all accessories as may be required for the operation and performance of the windows system.

1.19 EXTRA MATERIALS

- .1 Provide extra materials of glass units in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide protected and packaged in wood crates suitable for storage. Clearly identify each crate.
- .3 Deliver Consultant, upon completion of the work of this section.
- .4 Store where directed by Consultant.

1.20 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

Part 2 Products

2.1 MATERIALS

- .1 **Interior Aluminum Curtain Wall Systems** - Drawings and Details are based on FlushGlaze TL 1800, non-thermal storefront system.
- .2 Acceptable Materials: Curtain wall systems meeting or exceeding the performance requirements, as manufactured by:
 - .1 Alumatic
 - .2 Aerloc Industries
 - .3 Alwind Industries
 - .4 Kawneer Company of Canada
 - .5 Windspec Inc.
- .3 Extrusions shall be 6063 T54 alloy and temper.

2.2 FINISHES

- .1 CLEAR ANODIZED.
 - .1 Exposed aluminum sections shall be given an anodic oxide treatment in accordance with Aluminum Association specification AA-M12C22A31: "Clear anodized".

2.3 FABRICATION

- .1 Fabricate aluminum work in accordance with reviewed shop drawings and manufacturer's written instructions.
- .2 Fabricate framing from extrusions of size and shape shown on shop drawings.
- .3 Vertical and horizontal members shall be tubular extrusions designed for shear block corner construction.
- .4 All joints shall be accurately machined, assembled and sealed to provide neat weather tight joints. Shielded drainage and pressure equalization vents shall be provided where required. AH horizontal members shall be sealed to vertical members to provide individual compartments within the system in accordance with the rain screen principle.
- .5 Fabricate system components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- .6 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- .7 Prepare components to receive anchor devices. Install anchors.
- .8 Arrange fasteners and attachments to ensure concealment from view.
- .9 Reinforce framing members for external imposed loads.
- .10 Visible manufacturer's identification labels not permitted.
- .11 Break shapes must be approved by the Consultant prior to use.
- .12 At all curtain wall spandrel panels exposed on interior of building, curtain wall spandrel panels shall be laminated w/ aluminum panel of same pre-finish as mullions with bent edges.
- .13 Provide spandrel panels at locations of exterior light fixtures as shown on elevations. Coordinate with Div. 16 for lighting location and size of openings.
- .14 All perimeter sections to be tubular/closed back sections for continuous adhesion and continuity of building envelope membrane.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify dimensions, tolerances, and method of attachment with other work.
- .2 Verify wall openings and adjoining air barrier and vapour retarder materials are ready to receive work of this section.

3.2 INSTALLATION

- .1 Framing shall be installed, glazed and adjusted by experienced personnel in accordance with the manufacturer's instructions and approved shop drawings. All items in this section shall be set in their correct location and shall be set level, square, plumb and at proper elevations and in alignment with other work.
- .2 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- .3 Provide alignment attachments and shims to permanently fasten system to building structure. Clean weld surfaces; apply protective primer to field welds and adjacent surfaces.
- .4 Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances and align with adjacent work.
- .5 Provide thermal isolation where components penetrate or disrupt building insulation.
- .6 Co-ordinate attachment and seal of perimeter air barrier and vapour retarder materials.
- .7 Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- .8 Install fire-safing in areas as indicated.

3.3 FIELD QUALITY CONTROL

- .1 Inspection will monitor quality of installation and glazing.
- .2 Test to ASTM E1105, and AAMA 501.
- .3 Evaluate installed system by thermo-photographic scan.

3.4 ADJUSTING

- .1 Adjust operating sash for smooth operation.

3.5 CLEANING

- .1 Remove protective material from prefinished aluminum surfaces.
- .2 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

- .3 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

3.6 PROTECTION

- .1 Protect finished Work from damage.
- .2 Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.”

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 11 – Final Cleaning.
- .3 Section 08 80 50 – Glazing.
- .4 Section 07 92 10 - Joint Sealing.

1.2 REFERENCES

- .1 American Architectural Manufacturers Association (AAMA).
 - .1 AAMA 611-98, Voluntary Specifications for Anodized Finishes Architectural Aluminum.
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM B209-07, Specification for Aluminum and Aluminum Alloy Sheet and Plate.
 - .2 ASTM B221-08, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- .3 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.
- .4 Canadian Standards Association (CSA) International
 - .1 CSA-A440-00/A440.1-00 (R2005), A440-00 (R2005), Windows / Special Publication A440.1-00 (R2005), User Selection Guide to CSA Standard A440-00 (R2005), Windows.

1.3 DESIGN REQUIREMENTS AND PREQUALIFIED WINDOW SUPPLIERS

- .1 Base performance standard: Products to be supplied from the list of acceptable manufacturers listed below shall meet or exceed the following performance standard product upon which this specification is largely based: 970 Series with 1350 Series Vents as manufactured by Alumicor Ltd.
- .2 Acceptable Manufacturers/Suppliers: Aluminum Windows meeting this specification for this project shall be supplied by one of the following pre-approved suppliers:
 - .1 Aerloc Industries Ltd. (905) 628-6061
 - .2 Alwind Industries Ltd (905) 738-4266
 - .3 Barton Glass (905) 385-3599
 - .4 Glass Canada Limited (519) 642-4100
 - .5 KW Glass Systems Inc (519) 725-9305
 - .6 Sherwood Windows Group (416) 675-3262
 - .7 Windspec Inc (905) 738-8311

- Note: All window frames have been drawn to a std. framing depth of 5 1/4".
All curtain wall framing has been drawn to match windows so that curtain wall framing is inset 67 mm from the veneer face. Provide data at drawn sizes to design loads required.
- .3 Design framing and glazing to withstand design loads as per Ontario Building Code with a maximum reflection of 1/200th of clear span.
 - .4 Work of this Section must be designed by and bear stamp of a Professional Engineer licensed to design structures in the Province of Ontario certifying their strength and safety.
 - .5 By submitting a price for supply and install, the Contractor, for Work to this Section, shall guarantee that he has carried products and pricing from one of the above approved manufacturers.

1.4 PERFORMANCE

- .1 The overall thermal transmittance of fenestration assemblies shall be less than 0.81 Btu. Thermal transmittance for the fenestration shall be determined using ASHRAE 90.1 calculation procedures and shall include the effect of sash, frame, edge effect and spacer for multiple-glazed units.
- .2 Fenestration shall meet CAN/CSA – A440 windows:
 - .1 Air Leakage: A3
 - .2 Water Leakage: B7
 - .3 Wind Load Resistance: C5
 - .4 Condensation Resistance Factor: fixed frame: 60 minimum
 - .5 Glass: 59 minimum
- .3 Window shall also meet the requirements for blocked operation, ease of operation, sash strength, stiffness and resistance to forced entry.
- .4 Submit manufacturer's certificate, certifying compliance with the above-noted requirements.

1.5 QUALITY ASSURANCE

- .1 Installation crews engaged or provided by the approved supplier shall have expertise and proven experience specifically trained and qualified in this work. Individuals are to be either employees of the manufacturer and/or workers approved by the manufacturer.
- .2 Provide one (1) thoroughly experienced, reliable, qualified and competent foreman in charge of the work to be on site at all times when work is taking place. Individual to be designated in charge from start of activities on site until final deficiencies are complete. Foreman may only be changed by written approval *or request* of the Consultant or owner.
- .3 Window supplier is to have expertise and adequate skilled tradesmen who have installed similar windows within the Province of Ontario.

- .4 Mock-up: Construct a window mock-up in accordance with Section 01 45 00 – Quality Control. Allow 24 hours for inspection of mock-up by Consultant before proceeding with the Work. When accepted, mock-up will demonstrate minimum standard for this Work. Mock-up may not remain as part of finished Work.

1.6 SUBMITTALS

- .1 Submittals:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Clearly indicate on shop drawings all materials and large scale details for head, jamb and sill as they will be installed in contact with building components for this project, profiles of components, elevations of unit, anchorage details, location of isolation coating, location of insulation to jambs head and sill, drainage locations, description of related components and exposed finishes and fasteners.
 - .3 Show paths of interior drainage and venting.
- .2 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit samples of each window hardware item for Consultant's approval of type, finish and material.
- .3 Certificates: Submit manufacturer's certificate, and test performance data certifying compliance with specification requirements, for:
 - .1 windows
 - .2 finishes.
 - .3 removable self framed insect screens.
 - .4 infiltration/exfiltration rates.
 - .5 thermal transfer resistance of frames.
 - .6 locking hardware
 - .7 vandal resistance
- .4 Closeout submittals:
 - .1 Submit closeout submittals in accordance with Section 01 78 00.
 - .2 Provide 2 copies of data for maintenance and routine cleaning.
 - .3 Provide 2 copies of final record reviewed shop drawings for owner's records.
 - .4 Contractor shall supply all accessories as may be required for the operation and performance of the windows system.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal recyclable packaging materials in appropriate on-site for recycling.

- .3 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.
- .4 Divert unused or damaged wood materials from landfill to recycling facility approved by Consultant.
- .5 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .6 Divert unused caulking material from landfill to official hazardous material collections site approved by Consultant.
- .7 Plastic caulking tubes are not recyclable and must not be diverted for recycling with other plastic materials.

1.8 WARRANTY

- .1 Submit a manufacturer's warranty against defects in materials and workmanship covering the components of the window system for a period of ten (10) years. The manufacturer shall supply a non-pro-rated warranty covering labour, materials, tools and equipment to repair and/or replace any materials defects at no additional cost, for a period of ten (10) years including defects or failures due to poor workmanship and installation.
- .2 The supplier shall also submit a warrantee, in accordance with Section 088050-Glazing, for 10 years warranting the sealed units against defects.

Part 2 Products

2.1 SYSTEMS AND MANUFACTURERS

- .1 Drawings and Details are based on 970 Series with 1350 Series Vents as manufactured by Alumicor Ltd. (416) 745-4222.
- .2 Approved exterior window systems meeting or exceeding these specifications by the following manufacturers will be considered:
 - .1 Alumicor
 - .2 Aerloc Industries
 - .3 Alwind Industries
 - .4 Kawneer Company of Canada
 - .5 Windspec Inc.

2.2 MATERIALS

- .1 DARK BRONZE ANODIZED (TO MATCH EXISTING)
 - .1 Exposed aluminum sections shall be given an anodic oxide treatment in accordance with Aluminum Association specification AA-M12C22A31.
- .2 Extrusions shall conform to ASTM B221 and be AA6063 T54 alloy and temper for framing.

- .3 Formed aluminum sheet and plate components shall be AA1100-H14 alloy and temper suitable for their purpose and finish.
- .4 Exposed anodized sheet and plate shall conform to ASTM B209, to AA5005-H14 alloy and temper or AA1100-H14 alloy and temper (anodizing quality, 1.6 mm thickness).
- .5 Non-exposed sheet and plate to AA3003-H14 alloy and temper, mill finish.
- .6 Fasteners shall be 300 series stainless steel or 400 series stainless steel cadmium plated and of sufficient size and quantity to perform their intended function.
- .7 Weathering and glazing gaskets shall be extruded, black, closed cell or dense elastomer of durometer appropriate to the function.
- .8 Glass and glazing materials: In accordance with Section 08 80 50 – Glazing.
- .9 Glazing tapes shall be preformed polyisobutylene-butyl glazing tape with integral shim strip, 10-15 durometer, hardness, paper release, black color. Acceptable materials: Tremco Polyshim II by Tremco Ltd.
- .10 Exterior Sills: extruded aluminum, minimum 3 mm thick, complete with joint covers, complete with jamb drip deflectors on both sides of each sill (refer also to drawings for type), chairs, anchors, anchoring devices. All corners shall be ground or rounded to eliminate burrs and sharp edges. Submit details with shop drawings. Sills to be one continuous piece along sill of window.
- .11 Sealants: ASTM C920, Type S, Grade NS, Class 100; One-part, Moisture -curing silicone, '790 Silicone Building Sealant' by Dow Corning Corporation or Spectrum 1 by Tremco. Colour: As selected by Consultant.
- .12 Foam Backer Rod: to be extruded, closed cell foam, round polyethylene rope, minimum 25% wider than width of joint cavity to be caulked. To be compatible with primers and sealants.
- .13 Void filler foam: one part expanding polyurethane closed cell foam by BASF, Hilti or approved alternate specifically designed for window applications. To be compatible with primers and sealers
- .14 Bedding Compound: to CGSB 19-GP-14M.
- .15 Isolation Coating: alkali resistant bituminous paint.
- .16 Window hardware: Heavy duty roto operator window hardware to include all components as required for smooth, secure and complete operation and to be reviewed by the Consultant prior to ordering. Provide samples for Consultant's approval.
- .17 All perimeter sections to be tubular/closed back sections for continuous adhesion and continuity of building envelope membrane.
- .18 Window supplier / installer to provide and install continuous angles or clips as required for fastening windows to building structure.

2.3 FABRICATION

- .1 Fabricate aluminum windows in accordance with reviewed shop drawings and manufacturer's written instructions.
- .2 Fabricate in accordance with CSA-A440/A440.1 supplemented as follows:
- .3 Fabricate framing from extrusions of size and shape shown on shop drawings. Interior and exterior extruded aluminum framing sections shall be integrated with a glass reinforced nylon thermal break to form a rigid composite assembly without the use of fasteners or other thermal bridging elements.
- .4 Composite frame assembly shall have a minimum of 1100 lbf/4 in. (4815N/ 100 mm) resistance to shear between the aluminum and the thermal break materials.
- .5 Dry shrinkage of the thermal break shall not exceed 0.1% of the framing member length.
- .6 All framing joints shall be accurately machined, assembled, and sealed to provide neat weather tight connections. Coupling mullions shall be designed to provide a functional split to permit modular construction and allow for thermal expansion. Glass stops shall be lock-in screwless type.
- .7 Elastomeric air seal gasket shall be installed around the full perimeter of glass and sealed at corners with silicone sealant. Air seal gasket must provide adhesion with silicone sealant.

2.4 ALUMINUM FINISHES

- .1 Exposed aluminum sections and infill panels or interior column covers, if any, shown on drawings be given an anodic oxide treatment in accordance with Aluminum Association specification AA-M12C22A31. and **CAN/CSA-A440 dark bronze anodized Class II, 10µm (.0004 inch.) in accordance with AAMA 611.**
- .2 For exterior spandrel panels –if required on the project, to be a clear anodized infill panel to match windows finish complete with solid support substrate and insulation layer, clear anodized aluminum smooth or textured finish to Consultant selection.
- .3 If Colour finish other than anodized is indicated on drawings or required to match existing, enamel finish shall be PPG Duranar finish (minimum 8000 series) or approved alternate.
- .4 Final approval of finish and colour to be made by Consultant.

2.5 HARDWARE

- .1 Provide heavy duty roto operator hardware in conjunction with friction arms, aluminum hinges, and concealed allen key with removable type knob handle and all required additional components. Provide samples for Consultant's approval.
- .2 Limiting stops: All operable windows within reach of occupants to have limiting stops to each hinge to restrict the opening to a maximum of 225mm.

- .3 Operating pole: Provide one varnish finished hardwood pole with blunt end hook suitable for spring catch latch, for each room in which operating hardware is more than 1800 mm from floor.
- .4 Verify all site conditions regarding location and exact assembly requirements.

2.6 INSECT SCREENS

- .1 Fly screens: Provide to all operable units meeting CGSB 79-GP-1M and CSA/CAN-A440 rating heavy duty shall consist of extruded aluminum frame having a wall thickness of 1.9 mm, finish to match windows. Screen cloth shall be 18 x 14 aluminum mesh, spring loaded plunger retainers, 4 per frame.

2.7 ISOLATION COATING

- .1 Isolate aluminum from following components, by means of isolation coating:
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze or small area.
 - .2 Concrete, mortar and masonry.
 - .3 Wood.

2.8 GLAZING

- .1 Prepare windows to receive 25 mm thick double glazed insulating glass specified under Section 088050 – Glazing. Glaze windows in accordance with CSA-A440/A440.1.

2.9 THRU-WALL FLASHING

- .1 Sub-sill flashings to be Blueskin SA by Bakor in locations shown on drawings. Adhere to substrate using primer approved by manufacturer. Ensure clean-up of excess primer and no visible edges of flashing upon completion of the work.

2.10 EXTRUDED SILLS

- .1 Sills are to be a minimum of 7 degree (7°) downward slope and integral drip which extends a minimum of 25 mm from the face of the wall cladding.
- .2 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces. Break form shapes are not permitted.

2.11 ALUMINUM PANNING

- .1 Panning to be extruded aluminum minimum 1.6 mm thick with pre-coated finish to be identical process and match to aluminum frames and sills. Break form shapes are not permitted.
- .2 Submit samples of panning along with samples of other extrusions and materials.
- .3 Metal panning to be designed to lock into new window frames and have true flat planes with no twists, buckles dents, “oil canning” or other similar visual defects caused by manufacturing or handling.

Part 3 Execution

3.1 PREPARATION

- .1 Protect adjacent surfaces from damage resulting from work under this specification.

3.2 WINDOW INSTALLATION

- .1 Install in accordance with CSA-A440/A440.1, reviewed shop drawings and manufacturer's written instructions.
- .2 Coordinate with Section 08 80 50 as required for installation of glass and glazing materials.
- .3 Arrange components to prevent abrupt variation in colour.
- .4 Install the windows in accordance with the manufacturer's instructions. Install the windows plumb, level and true relative to building structure. Do not exceed 3mm in 3050 mm (1/8" in 10'0") variation from plumb and level. Foam insulate between the frame members and the window opening using a single component polyurethane foam, insulating sealant.

3.3 SILL INSTALLATION

- .1 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces. Ensure integral end caps are secured with no burrs or exposed sharp edges and do not require excessive caulking due to profiles at jamb. Break form shapes are not permitted.

3.4 CAULKING

- .1 Seal joints between frame members and other non-operating components with sealant to provide weathertight seal at outside.
- .2 Seal joints between windows and window sills with sealant. Bed sill expansion joint cover plates and drip reflectors in bedding compound. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.
- .3 Apply sealant in accordance with manufacturer's written instructions and additional requirements as outlined in Section 07 92 10 - Joint Sealing. Conceal sealant within window units except where exposed use is permitted by Consultant.
- .4 Interior trims and sealant not to be applied until installed window has been inspected and approved by the Consultant.

3.5 ADJUSTING

- .1 Adjust operable units to move smoothly, with proper tension, throughout their full range of motion and to fit tightly when closed and locked.
- .2 Lubricate hardware in accordance with manufacturer's instructions.

- .3 Ensure that weatherstripping makes weathertight contact and does not cause binding to affect closing and locking.

3.6 CLEAN UP

- .1 Clean glass at the factory. For final cleaning of glass to remove job site soiling refer to Section 088050 - Glazing. Leave all surfaces clean, free from sealants, caulking or other foreign material. Remove all surplus materials and debris resulting from the work of this Trade.
- .2 Refer to other sections for requirements to make good all finishes.

3.7 PROTECTION

- .1 Aluminum shall be isolated from concrete, mortar, plaster or dissimilar metals with bituminous paint or epoxy solution. Framing shall be protected from other building materials during and after installation until acceptance.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 1
- .2 Section 06 40 00 – Architectural Woodwork.
- .3 Section 08 11 14 – Metal Steel Doors and Frames.
- .4 Section 16 – Electrical wiring for magnetic strikes, hold open devices, electric releases and electric locks.

1.2 SECTION INCLUDES

- .1 For continuity and ready reference, this section includes hardware Installation and Inspection which in total will involve more than one contractor, as described following. The General Contractor will ensure in submitting his tender that specific roles and scope delineations are clear.
- .2 Hardware Supply: It is the intention of this contract that the **Supply is by a specialist hardware supplier as part of the Cash Allowance.**
- .3 Hardware Installation: It is the intention of this section that Installation is by the General Contractor if so qualified or qualified personnel appointed by the General Contractor for all systems and methods described herein. **Installation of all hardware is to be included in the base bid price.**
 - .1 Scope: Installation of door hardware for all interior and exterior steel doors, locksets to teachers closets and coordination of installation of automatic operators with Division 26.
- .4 Hardware Inspection: It is the intention of this section that Installation is by the General Contractor for all systems and methods described herein.
 - .1 Scope: inspection of installation of door hardware.

1.3 REFERENCES

- .1 CAN/CGSB-69.17-M86 – Bored and Pre-assembled Locks and Latches
- .2 CAN/CGSB-69.18-M90/ANSI/BHMA-A156.1-1981 – Butts & Hinges
- .3 CAN/CGSB-69.19-M93/ANSI/BHMA-A156-3-1989 – Exit Devices
- .4 CAN/CGSB-69.20-M90/ANSI/BHMA-A156-4-1986 – Door Controls (Closers)
- .5 CAN/CGSB-69.29-93/ANSI/BHMA-A156-13-1930 – Mortise Locks & Latches
- .6 CAN/CGSB-69.34-93/ANSI/BHMA-A156.18-1987 – Materials & Finishes

- .7 Canadian Steel Door & Frame Manufacturers Association (CSDFMA),
- .8 Canadian Metric Guide for Steel Doors & Frames (Modular Construction)
- .9 NFPA 80-1995 – Fire Doors and Fire Windows

1.4 REQUIREMENTS FOR REGULATORY AGENCIES

- .1 Hardware for doors in fire separations and exit doors shall be certified by a Canadian Certification Organization accredited by the Standards Council of Canada.

1.5 SUBMITTALS

- .1 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Butt hinges
 - .2 Continuous hinges
 - .3 Door closers
 - .4 Exit devices
 - .5 Overhead stops
 - .6 Storeroom set with lever trim
 - .2 Identify each sample by a label indicating location for installation, applicable specification paragraph number, brand name and number, finish, and hardware package number.
 - .3 Samples will be retained by the Consultant during the initial review period, but not exceeding one month. Samples will be returned at that time and, if acceptable, they may be incorporated into the Work.
 - .4 Substitute new samples for those rejected by the Consultant.
 - .5 Do not supply door hardware to the site until all samples are approved by the Consultant.
- .2 Hardware List:
 - .1 Submit contract hardware list in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit six copies of a detailed final door hardware list prepared by a qualified Architectural Hardware Consultant.
 - .3 List all items to be furnished and delivered under this section.
 - .4 Indicate door hardware proposed, identifying each item by manufacturer name, manufacturer's catalogue model number, material, function, finish, location, and other pertinent information.
 - .5 The list shall be in the same format as the door hardware list bound in this project manual.
 - .6 Approval of the Final Door Hardware List by the Consultant and the Owner shall not relieve the Contractor from responsibility for providing all required door hardware.
- .3 Template:

- .1 Within ten working days of being requested by the Consultant or the Contractor, submit templates for door and frame preparations and mounting of door hardware items.
- .2 Identify each template by label indicating applicable specification paragraph number, brand name and number, door number, and hardware package number.
- .3 Submit manufacturer's specifications, catalogue cuts, and other data required to identify individual components listed and to demonstrate compliance with specified requirements for items contained in the final door hardware list. Submission of manufacturer's full line brochures is not acceptable.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
 - .1 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .2 Storage and Protection:
 - .1 Store finishing hardware in locked, clean and dry area.

1.7 WASTE DISPOSAL AND MANAGEMENT

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Dispose of recyclable packaging material in appropriate on-site bin for recycling.

1.8 MAINTENANCE DATA

- .1 Provide parts list, manufacturers' instructions, and operation and maintenance data for each type of door hardware for incorporation into maintenance manual specified in Section 017800 – Closeout Submittals.
- .2 Brief the Owner's maintenance staff regarding proper care, cleaning, and general maintenance of door hardware.

1.9 MAINTENANCE MATERIALS

- .1 Supply four sets of wrenches for door closers, locksets, latchsets, and exit devices.
- .2 Supply four sets of other special parts or tools required for proper maintenance and adjustment of door hardware (excluding tools required for keying.)

1.10 WARRANTY

- .1 Submit a warranty for door hardware on a form approved by the Owner and in accordance with the General Conditions, but for a period of three (3) years unless specified otherwise. Where a manufacturer's standard warranty period exceeds three years it shall prevail.
- .2 The warranty for both fire exit devices and power door operators shall be for a period of five (5) years.

- .3 The warranty for door closers shall be for a period of ten (10) years.
- .4 Provide a lifetime warranty for all mortise hinges.
- .5 Door hardware warranties shall cover all defects in material and workmanship that become apparent during the warranty period and such defects shall be made good or the defective product shall be replaced, to the satisfaction of the Owner and at no cost to the Owner.

Part 2 Products

2.1 HARDWARE ITEMS

- .1 Not applicable. Supply of hardware part of the project's Cash Allowance.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Furnish door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware. Advise door and frame manufacturers to be aware that strike heights as listed in the table below are required for this project.
- .2 Furnish manufacturers' instructions for proper installation of each hardware component.

3.2 INSTALLATION

- .1 ALL DOORS, FRAMES, AND FINISHING HARDWARE SHALL BE INSTALLED BASED ON DHI INSTALLATION GUIDE FOR DOORS AND HARDWARE (ANSI/DHI A115.1G-1994 – Approved 8/19/94)
- .2 Power door operators, complete with hook-up to power rough-in, low voltage control wiring, and exit device release, shall be installed by the manufacturers' recommended installer.
- .3 Power door operators to be installed by hardware supplier. Low voltage control wiring to push button locations, exit device release, and 4" x 4" back boxes to be completed by Division 26 (Electrical Contractor.)
- .4 CONSULTANTURAL HARDWARE CONSULTANT:
 - .1 The hardware supplier shall have in its employ an Architectural Hardware Consultant who is a current member of the American Society of Hardware Consultants, and who shall be made available for consultation during the course of construction at no additional cost to the Owner.
 - .2 The Architectural Hardware Consultant must supervise hardware installation, provide assistance to the Hardware Installer, and carry out inspection and provide written certification of the finished door hardware installation.

- .3 Allow for a minimum of three inspections during the course of hardware installation and one final inspection.
- .4 Ten percent (10%) of this subtrade’s contact will be considered as fair value for supervision and inspection with regard to progress certificates.
- .5 Locate and mount hardware at standard location dimensions in accordance with CSDFMA, Canadian Metric Guide for Steel Doors and Frames (Modular Construction), and as indicated in the following table:

HARDWARE MOUNTING HEIGHTS	
HARDWARE ITEM	DIMENSION ABOVE FINISHED FLOOR
LOCKSET or LATCHSET	950 mm to Centreline of Strike
DEADLOCK	1200 mm to Centreline of Strike
EXIT DEVICE	950 mm to Centreline of Strike
PUSH PLATE/DOOR PULLS	900 mm to Centreline of Strike

.5 HARDWARE MOUNTING HEIGHTS

- .1 The Hardware Installer shall carefully check manufacturer’s installation instructions supplied with hardware products for conflicts with the above noted dimensions.
- .2 The Hardware Installer shall use manual or “Yankee” screw drivers to turn screws into pre-drilled pilot holes for installation of hinges on mineral core fire protection rated doors. Please note that other methods of installation may void the door manufacturer’s warranty.
- .3 Refer to AD drawings for mounting heights. Center latch/levers in center of stiles, and off set panic bars on opposite side of door if required to achieve centered latches.
- .4 Locate door stops to contact doors 75mm from latch edge.
- .5 Install hardware and trim square and plumb to doors.
- .6 Install mullion stabilizers on all double doors with panic hardware.
- .7 Supply locksets to Section 064000 – Architectural Woodwork for 35mm and 45mm thick doors where such doors are a part of millwork units. Keying shall be in accordance with the building keying system for

3.3 ADJUSTING

- .1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety and for weather tight closure.
- .2 Ensure doors with closers close firmly and against wind and building air pressure, and can be opened readily as suitable for installation.
- .3 Inspection:
 - .1 The Hardware Supplier shall have in his employ an Architectural Hardware Consultant who is a current member of the American Society of Hardware

Consultants, and who shall be made available for consultation during the course of construction at no additional cost to the Board.

- .2 In addition to this available consultant, a Hardware Inspector shall be engaged upon recommendation to the Board by the Consultants and costs for inspection paid for from Cash Allowances.
 - .3 The Consultant shall advise the Contractor that Hardware Inspector shall be assigned to supervise the hardware installation, provide assistance to the Hardware Installer, and carry out inspection and provide written certification of the finished door hardware installation. Costs for this inspection shall be paid from the Cash Allowance. The Contractor shall notify the Hardware Inspector at least 72 hours prior to commencing the installation and cooperate with the advice of the inspector.
 - .4 Upon completion of door hardware installation, the Architectural Hardware Inspector shall conduct an inspection of all door hardware as installed, accompanied by the Consultant, the Owner's representative, and the Contractor.
 - .5 If requested by the Consultant, the manufacturer's technical representative for each make of the hardware used in the Work shall be in attendance during the hardware inspection.
 - .6 During the inspection, the Architectural Hardware Inspector shall note all unsatisfactory installations and products and re-inspect these items after re-adjustment or replacement to ensure all hardware is in optimum working condition and specified function.
- .4 Upon completion of door hardware installation, the Hardware Supplier shall submit a written certificate that all hardware has been correctly supplied and installed in accordance with the drawings, specifications, schedules, and approved final door hardware list, for type, function, and location, and that door hardware has been checked and adjusted.
 - .5 Clean hardware after installation following the hardware supplier's recommendations.
 - .6 At project completion all items of door hardware shall be clean and free from disfigurement. The Contractor shall repair or replace hardware found to be defective.

3.4 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacture's instructions.
- .3 Remove protective material from hardware items where present.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 11 – Final Cleaning.
- .3 Section 01 78 00 - Closeout Submittals
- .4 Section 08 11 14 – Metal Doors and Frames.
- .5 Section 08 50 50 – Aluminum Windows.
- .6 Section 07 92 10 - Joint Sealing: caulking of joints between frames and other building components.
- .7 Section 10 28 10 – Toilet, Bath and Laundry Accessories.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI).
 - .1 ANSI/ASTM E330-[02], Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C542-[94(1999)], Specification for Lock-Strip Gaskets.
 - .2 ASTM D790-[02], Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - .3 ASTM D1003-[00], Test Method for Haze and Luminous Transmittance of Plastics.
 - .4 ASTM D1929-[96(R2001)e1], Test Method for Determining Ignition Temperature of Plastics.
 - .5 ASTM D2240-[02b], Test Method for Rubber Property - Durometer Hardness.
 - .6 ASTM E84-[01], Test Method for Surface Burning Characteristics of Building Materials.
 - .7 ASTM F1233-[98], Test Method for Security Glazing Materials and Systems.
- .3 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-12.1-[M90], Tempered or Laminated Safety Glass.
 - .2 CAN/CGSB-12.2-[M91], Flat, Clear Sheet Glass.
 - .3 CAN/CGSB-12.3-[M91], Flat, Clear Float Glass.
 - .4 CAN/CGSB-12.4-[M91], Heat Absorbing Glass.
 - .5 CAN/CGSB-12.5-[M86], Mirrors, Silvered.
 - .6 CAN/CGSB-12.6-[M91], Transparent (One-Way) Mirrors.

- .7 CAN/CGSB-12.8-[97], Insulating Glass Units.
- .8 CAN/CGSB-12.9-[M91], Spandrel Glass.
- .9 CAN/CGSB-12.10-[M76], Glass, Light and Heat Reflecting.
- .10 CAN/CGSB-12.11-[M90], Wired Safety Glass.
- .11 CAN/CGSB-12.12-[M90], Plastic Safety Glazing.
- .12 CAN/CGSB-12.13-[M91], Patterned Glass.
- .13 CAN/CGSB-12.1-M90 Tempered or Laminated Safety Glass
- .14 CAN/CGSB-12.3-M76 Glass, Polished Plate or Float, Flat, Clear
- .4 Canadian Standards Association (CSA International).
 - .1 CSA A440.2-[98], Energy Performance Evaluation of Windows and Sliding Glass Doors.
 - .2 CSA Certification Program for Windows and Doors [2000].
- .5 Environmental Choice Program (ECP).
 - .1 CCD-045-[95], Sealants and Caulking.
- .6 Flat Glass Manufacturers Association (FGMA).
 - .1 FGMA Glazing Manual - [1997].
- .7 Laminators Safety Glass Association (LSGA).
 - .1 LSGA Laminated Glass Design Guide [2000].

1.3 SAMPLES

- .1 Submit a 300 x 300 sample of all glass products in accordance with Section 01 33 00 - Submittal Procedures.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 013300 – Submittal Procedures. Coordinate location with Consultant.

1.5 WARRANTY

- .1 Contractor hereby warrants glass against defects and failure, including leakage, under normal conditions of use, in accordance with the Contract, but for ten (10) years total, as follows:
 - .2 Supplier shall submit a written warranty from the insulated glass manufacturer to replace or repair any defects in materials or sealed units for a period of ten (10) years from the date of Substantial Completion.
- .3 Mirrors:
 - .1 Submit a warranty for mirrors, covering the repair or replacement of defective work in accordance with the Contract, but for five (5) years total.
 - .2 Warranty shall apply against defects in workmanship and materials and, against silver deterioration and loosening of fastenings.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal [paper] [plastic] [polystyrene] [corrugated cardboard] packaging material [in appropriate on-site] for recycling.
- .3 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.
- .4 Divert unused or damaged wood materials from landfill to [recycling] [reuse] [composting] facility approved by Consultant.
- .5 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .6 Divert unused caulking material from landfill to official hazardous material collections site approved by Consultant.
- .7 Plastic caulking tubes are not recyclable and must not be diverted for recycling with other plastic materials.

Part 2 Products

2.1 MATERIALS

- .1 Acceptable Manufacturers:
 - .1 AFG Glass Inc
 - .2 Libby-Owens Ford
 - .3 PPG Industries
- .2 Exterior Tempered Safety Glass: All exterior Vision Glass to exterior windows, curtain wall and non-fire-rated screens to be sealed insulated units conforming to CAN/CGSB-12.8. Exterior lite 6mm tempered clear glass, Solarban 67 Low Emmissivity Coating on inner pane (2nd surface), 13mm Argon filled air space, inner lite 6 mm clear tempered glass.
 - .1 All tempered glass to conform to CAN2-12.1 M-90 Type 2 tempered glass, Class B Double glazed units to have an integral non-metallic space creating a 13 mm hermetically sealed Argon filled air space. Spacers shall be continuous with butt joints (if any) at corners only. Pieces are not permitted. Butyl based spacers are not permitted.
- .3 Polished Plate or Float Glass: To CAN/CGSB-12.3 clear.
- .4 Spandrel Glass (SP): CAN/CGSB-12.9-M, 6 mm thick unless otherwise indicated, with water-based silicone emulsion coating applied to backside, 'Opaci-Coat 300' by ICD High Performance Coatings or approved alternative. Colour: To be selected by the Consultant.
- .5 Interior Tempered Safety Glass: CAN/CGSB-12.1-M, Type 2, Class B, Category II, clear, minimum 6 mm thick.

- .1 All interior Vision Glass to non-fire rated interior doors and screens to be tempered 6 mm tempered clear float glass complete with etched tempered glass designation visible.
- .6 Georgian Wired rated glazing: not to be used on this project.
- .7 Spandrel glass (SP): CAN/CGSB-12.9-M, 6 mm thick unless otherwise indicated, with water-based silicone emulsion coating applied to backside, 'Opaci-Coat 300' by ICD High Performance Coatings or approved alternative. Colour: To be selected by the Consultant.
- .8 Mirrors: Refer to Section 10 28 10 Washroom Accessories.
- .9 Setting blocks: neoprene, 80 durometer hardness, 102 mm x 6 mm width to suit glass to extend from the fixed stop to the opposite face of the glazing unit.
- .10 Spacer Blocks: neoprene, thickness to provide a minimum glass to face clearance of 3mm.
- .11 Glazing tape: preformed polyisobutylene-butyl glazing tape with integral shim strip, 10-15 durometer, hardness, paper release, black color. Acceptable materials: Tremco Polyshim II by Tremco Ltd. or approved alternate.
- .12 Gasket: black neoprene "U" cavity type with lock strip.
- .13 Sealant: one component silicone, Spectrem 2 by Tremco Ltd. Refer to Section 07900.
- .14 Display cases: shelves to be 13mm tempered glass with polished rounded edges. Door to 6mm tempered glass. Coordinate sizes and provide to Section 06 40 00 for installation.

2.2 FABRICATION

- .1 Fabricate in accordance with CSA-A440/A440.1 supplemented as follows:
- .2 Make field measurements before cutting and assembling materials.
- .3 Maintain minimum bite or lap of glass as recommended by the glazing unit manufacturer.
- .4 Each glass lite shall be labeled with the name of the product, weight and quality and year manufactured.
- .5 If requested, provide owner or consultant access to the plant or shop to review fabrication. Consultant or owner to provide 24 hour advance notice of visit.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 EXAMINATION

- .1 Verify that openings for glazing are correctly sized and within tolerance.
- .2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.3 PREPARATION

- .1 Clean contact surfaces with solvent and wipe dry.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.

3.4 INSTALLATION:

- .1 Inspect all glazing channels prior to application. All openings in joints and channels to be sealed shall be clean, dry and free of dust, oil, grease, loose mortar or any foreign material.
- .2 All surfaces to receive glazing tape shall be wiped dry with a clean rag dampened in Xylol, followed by a dry wipe.
- .3 Examine all sashes prior to glazing to determine if the openings are square and plumb. Any butt and miter joints which are open shall be sealed prior to glazing. Adjust all operating sashes and glaze in the closed position.
- .4 Compression Glazing:
 - .1 When butt joint is in a vertical direction, the glazier shall first run the tape on the head and sill members while going over the joint. If joints at the sash run horizontally, the tape must be applied first to the jambs so that it crosses over the joint.
 - .2 When an offset condition exists at each corner where a horizontal member passes behind vertical mullions, two different sized tapes shall be used to equalize the pressure seal. The thinner tape is to applied first on the glazing leg closest to the interior. The thicker tape shall be cut to the length between the two tapes and applied.
 - .3 Each section of tape shall butt the adjoining tape and be united with a tool to eliminate any openings. Lapping of the adjoining tapes at the corners is not permitted.
 - .4 Remove paper backing just prior to setting glass and apply a toe bead of sealant 150 mm long in each of the corners.
 - .5 Position one setting block at the quarter point of each corner on the sill members or as recommended by IGMA guidelines.
 - .6 Set the glass on the setting blocks and press firmly in place. Snap in the interior glazing stops.
 - .7 Set the spacer blocks to prevent any “walking” of the lite.
- .5 Mirrors:

- .1 Install mirrors by means of concealed vandalproof clips. If clips are used, install cushioning tape completing around perimeter of mirror back, set in concealed location within 25 mm of edge. Install fixed mirrors in washrooms at two different heights as indicated on drawings.
- .2 Follow manufacturer's installation recommendations.
- .6 Install any wired glass with the wire parallel to the opening.
- .7 Replace any loose glazing stops and tighten all screws.
- .8 Contractor shall include for needle point (cap beads) at all lower horizontal rail joints of all sash/glazing units at the discretion of and as may be requested by the Consultant or owner.

3.5 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Remove traces of primer, caulking.
- .3 Remove glazing materials from finish surfaces.
- .4 Remove labels after work is complete.
- .5 Immediately upon job completion and when sealants have cured, remove any temporary protection and clean all exposed interior and exterior surfaces. Use proper cleaning materials only which will not harm the window components or any adjacent surfaces.
- .6 Ensure all temporary labels have been removed and fully cleaned.
- .7 Mirrors:
 - .1 Clean mirrors using non-abrasive soap or detergent and rinse with clean water. Leave in clean, polished condition for Owner occupancy.

3.6 INSPECTION

- .1 Where inspection is called for elsewhere in the specification, perform Window air and water leakage test to ensure installation meets performance requirements stated herein. Should test fail, take remedial measures and re-test a different location at not additional cost to the owner until the test passes.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 04 21 13 – Masonry
- .3 Section 09 22 16 – Non-structural Metal Framing.
- .4 Supply of access doors for mechanical and electrical devices in mechanical and electrical sections.

1.2 REFERENCES

- .1 Aluminum Association
 - .1 Designation for Aluminum Finishes-[1997].
- .2 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C36/C36M-[01], Specification for Gypsum Wallboard.
 - .2 ASTM C79/C79M-[01], Standard Specification for Treated Core and Non-treated Core Gypsum Sheathing Board.
 - .3 ASTM C442/C442M-[01], Specification for Gypsum Backing Board, Gypsum Coreboard, and Gypsum Shaftliner Board.
 - .4 ASTM C475-[01], Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - .5 ASTM C514-[01], Specification for Nails for the Application of Gypsum Board.
 - .6 ASTM C557-[99], Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
 - .7 ASTM C630/C630M-[01], Specification for Water-Resistant Gypsum Backing Board.
 - .8 ASTM C840-[01], Specification for Application and Finishing of Gypsum Board.
 - .9 ASTM C931/C931M-[01], Specification for Exterior Gypsum Soffit Board.
 - .10 ASTM C954-[00], Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
 - .11 ASTM C960/C960M-[01], Specification for Pre-decorated Gypsum Board.
 - .12 ASTM C1002-[01], Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - .13 ASTM C1047-[99], Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
 - .14 ASTM C1280-[99], Specification for Application of Gypsum Sheathing Board.
 - .15 ASTM C1177-[01], Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - .16 ASTM C1178/C1178M-[01], Specification for Glass Mat Water-Resistant Gypsum Backing Board.

- .3 Association of the Wall and Ceilings Industries International (AWEI)
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-[M86(R1988)], Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CAN/CGSB-71.25-[M88], Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.
- .5 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-[1988(R2000)], Surface Burning Characteristics of Building Materials and Assemblies.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in original packages, containers or bundles bearing manufacturers brand name and identification.
- .2 Store materials inside, level, under cover. Keep dry. Protect from weather, other elements and damage from construction operations and other causes.
- .3 Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal accessories and trim from being bent or damaged.

1.4 SITE ENVIRONMENTAL REQUIREMENTS

- .1 Maintain temperature minimum 10 degrees C, maximum 21 degrees C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.
- .2 Apply board and joint treatment to dry, frost free surfaces.
- .3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal [paper] [plastic] [polystyrene] [corrugated cardboard] packaging material [in appropriate on-site] for recycling.
- .3 Divert unused gypsum from landfill to gypsum recycling facility for disposal approved by Consultant.
- .4 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .5 Divert unused wood materials from landfill to [recycling] [composting] facility approved by Consultant.
- .6 Divert unused paint and caulking material from landfill to official hazardous material collections site approved by Consultant.

- .7 Do not dispose of unused paint and caulking materials into sewer systems, into lakes, streams, onto ground or in other locations where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

- .1 Standard board: to ASTM C36/C36M, 16 mm or 19 mm thick or as indicated, tapered edges.
- .2 Standard board: to ASTM C36/C36M, X Rated, 16 mm or 19 mm thick or as indicated, tapered edges.
- .3 Water-resistant board: to ASTM C630/C630M, 13 mm water resistant, tapered edges (WRGB in Finish Schedule). Reinforced cement board may be used in lieu of water-resistant gypsum board.
- .4 Abuse resistant/Fire rated: to CSA A82.27-M1977 Fire-Rated Type X, 5/8" thick, "Abuse Resistant Fire Code" gypsum board panels, tapered edges, by CGC, Fibrerock interior AquaTuff panel. All gypsum board to have anti-microbial and anti-mould properties.
- .5 Moisture resistant sheathing: 13mm (1/2") DensShield as manufactured Georgia-Pacific.
- .6 All gypsum board to have Anti-Microbial and Anti Mold properties.
- .7 Nails: to ASTM C514.
- .8 Steel drill screws: to ASTM C1002.
- .9 Stud adhesive: to CAN/CGSB-71.25.
- .10 Laminating compound: as recommended by manufacturer, asbestos-free.
- .11 Concrete Anchors: Phillips Red Head TW-614 or equivalent. Do not use powder activated fasteners for ceiling support.
- .12 Tie Wire: #16 ga. galvanized soft annealed steel wire.
- .13 Caulking: Acoustical sealant.
- .14 38 mm thick mineral wool batts ULC labeled, if indicated on drawings.
- .15 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, 0.5 mm base thickness commercial sheet steel with G90 zinc finish, perforated flanges, and one piece length per location.
- .16 Sealants: in accordance with Section 07 92 10 - Joint Sealing.
- .17 Insulating strip: rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, 12 mm wide, with self sticking permanent adhesive on one face, lengths as required.

- .18 Joint compound: to ASTM C475, asbestos-free.

2.2 ACOUSTIC INSULATION MATERIALS FOR ALL PARTITION WALLS

- .1 **Location: All interior Gypsum Board Partition walls:** Note that all walls extend to underside of Deck and shall be assembled with the following materials in addition to those specified above.
- .2 Acoustic insulation inside all GB partitions: AFB Acoustic Fire Bat by Roxul or equivalent product by Fibrex, or Quietzone by Owens Corning.
- .3 Steel deck closures: Emseal 25V Expanding Foam Sealant sized and shaped to fit flutes.
- .4 Acoustic Insulation: mineral fibre acoustical batt insulation, as specified under Section 07210. Thickness of 90% of wall assembly cavity depth; Acceptable products:
- .1 Fibrex 'Sound Attenuation Fire Batt (SAFB)'
 - .2 Johns Manville 'Sound-SHIELD'.
 - .3 Roxul 'AFB'.
 - .4 Owens-Corning 'QuietZone'.
- .5 Acoustical sealant: CAN/CGSB-19.21-M87; non-skinning acoustic sealant, non-hardening type.
- .6 Fasteners: use mechanical fasteners to secure batts into position as recommended by manufacturer.

Part 3 Execution

3.1 ERECTION

- .1 Do application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.
- .2 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C840 except where specified otherwise.
- .3 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .4 Install work level to tolerance of [1:1200].

3.2 APPLICATION

- .1 Do not apply gypsum board until bucks, anchors, blocking, sound attenuation, electrical and mechanical works are approved.
- .2 Apply single layer gypsum board to metal furring or framing using screw fasteners and laminating adhesive. Maximum spacing of screws 300 mm on centre.
- .1 Single-Layer Application:

- .1 Apply gypsum board on ceilings prior to application of walls in accordance with ASTM C840.
- .2 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.
- .2 Double-Layer Application:
 - .1 Install gypsum board for base layer and exposed gypsum board for face layer.
 - .2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.
 - .3 Apply base layers at right angles to supports unless otherwise indicated.
 - .4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.
- .3 Apply water-resistant gypsum board or cement board at all locations where wall tiles or special coating are to be applied, and adjacent to slop sinks or janitors closets if not constructed of Concrete Block. Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.
- .4 Apply gypsum board to concrete block surfaces, where indicated, using laminating adhesive.
- .5 Apply type X gypsum board where indicated, in accordance with U.L.C. requirements and with supplement to the National Building Code of Canada to obtain the required fire protection, fire rating and fire separation.
- .6 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.
- .7 Where indicated on drawings, staple blanket to wallboard in accordance with ULC design requirements. Blanket shall be continuous and tightly fitted between studs and at perimeter.
- .8 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.
- .9 Install gypsum board with face side out.
- .10 Do not install damaged or damp boards.
- .11 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.
- .12 Where a floor or roof structural member interferes with an interior partition wall at which a smoke or fire separation is required, a gypsum board enclosure with a fire rating not less than required for the wall must be provided to continue the required, a gypsum board enclosure with a fire rating not less than required for the wall must be provided to continue the required separation to the floor or roof above (typical)

3.3 INSTALLATION

- .1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure [at [150] mm on centre] [using contact adhesive for full length].
- .2 Install casing beads around perimeter of suspended ceilings.
- .3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. [Seal joints with sealant.]
- .4 Construct control joints of [preformed units] [two back-to-back casing beads] set in gypsum board facing and supported independently on both sides of joint.
- .5 Provide continuous polyethylene dust barrier behind and across control joints.
- .6 Locate control joints [where indicated] [at changes in substrate construction] [at approximate [10] m spacing on long corridor runs] [at approximate [15] m spacing on ceilings].
- .7 Install control joints straight and true.
- .8 Construct expansion joints [as detailed], at building expansion and construction joints. Provide continuous dust barrier.
- .9 Install expansion joint straight and true.
- .10 Install cornice cap where gypsum board partitions do not extend to ceiling.
- .11 Fit cornice cap over partition, secure to partition track with two rows of sheet metal screws staggered at [300] mm on centre.
- .12 Splice corners and intersections together and secure to each member with 3 screws.
- .13 Seal with acoustical sealant at ceilings, floors, wall intersections and all penetrations such as electrical outlets.
- .14 Install access doors to electrical and mechanical fixtures specified in respective sections.
 - .1 Rigidly secure frames to furring or framing systems.
- .15 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.
- .16 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with Association of the Wall and Ceiling Industries (AWCI) International Recommended Specification on Levels of Gypsum Board Finish:
 - .1 Levels of finish:
 - .1 Level 0: No taping, finishing or accessories required.

- .2 Level 1: Embed tape for joints and interior angles in joint compound. Surfaces to be free of excess joint compound; tool marks and ridges are acceptable.
- .3 Level 2: Embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable.
- .4 Level 3: Embed tape for joints and interior angles in joint compound and apply two separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.
- .5 Level 4: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.
- .6 Level 5: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; apply a thin skim coat of joint compound to entire surface; surfaces smooth and free of tool marks and ridges.
- .17 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
- .18 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.
- .19 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .20 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.
- .21 Apply one coat of white primer sealer over surface to be textured. When dry apply textured finish in accordance with manufacturer's instructions.
- .22 Mix joint compound slightly thinner than for joint taping.
- .23 Apply thin coat to entire surface using trowel or drywall broadknife to fill surface texture differences, variations or tool marks.
- .24 Allow skim coat to dry completely.
- .25 Remove ridges by light sanding or wiping with damp cloth.
- .26 Provide protection that ensures gypsum drywall work will remain without damage or deterioration at time of substantial completion.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C645-[00], Specification for Nonstructural Steel Framing Members.
 - .2 ASTM C754-[00], Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.40-[97], Primer, Structural Steel, Oil Alkyd Type.
- .3 Environmental Choice Program (ECP).
 - .1 CCD-047a -[98], Paints - Surface Coatings.
 - .2 CCD-048-[98], Surface Coatings - Recycled Water-borne.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal [paper] [plastic] [polystyrene] [corrugated cardboard] packaging material in appropriate on-site bins for recycling.
- .3 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .4 Divert unused gypsum materials from landfill to recycling facility approved by Consultant.

Part 2 Products

2.1 MATERIALS

- .1 Non-load bearing channel stud framing: to ASTM C645, roll formed from 0.59mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum lath and metal lath. Knock-out service holes at 150 mm centres.
- .2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 30 mm legs for floor track, 50 mm for ceiling track.
- .3 Metal channel stiffener: 38 mm size, 2 mm thick cold rolled galvanized steel.
- .4 Metal Accessories: CSA A82.30-1965 (R-1971).
- .5 "Unistrut" support channel framing, by Tyco Electrical and Metal Products.

Part 3 Execution

3.1 ERECTION

- .1 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum.
- .2 Place studs vertically at 400 mm on centre and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
- .3 Erect metal studding to tolerance of 1:1000.
- .4 Attach studs to bottom track using screws.
- .5 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .6 Install steel frames and anchor frames securely to studs using minimum of three (3) anchors per jamb for jambs up to 2100 mm high and a minimum of four (4) anchors per jambs for jambs over 2100 mm high.
- .7 Provide two (2) studs at each side of openings wider than stud centre specified.
- .8 Install, cut to length, piece of runner horizontally over door frames and at top and bottom of rough opening in glazed partitions.
- .9 Provide 38 mm x 89 mm vertical and horizontal wood studs secured between metal studs for attachments of bathroom fixtures, accessories, cabinet work, and other fixtures, including grab bars, towel rails, attached to steel stud partitions.
- .10 Install steel stud or furring channel between studs for attaching electrical and other boxes.
- .11 Extend all partitions to underside of deck above for sound and fire separation.
- .12 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs.

3.2 CEILING FURRING TO CANOPIES & CEILING PANELS

- .1 Provide to all interior and exterior canopies where shown to receive wood slat or plywood finishes.
- .2 Framing channel to be model P1000 (1-5/8") ; 12 ga.
- .3 For exterior locations provide with 4 m dia. Holes at 500 o.c. for drainage and hot dip galvanize.
- .4 Provide shop drawings for layouts.
- .5 Refer to drawings for locations.

3.3 ACOUSTICAL SEALANT

- .1 Apply acoustical sealant to all sills, headers, jambs and furring channels in contact with walls floors and ceiling deck as part of the acoustical insulation system for interior partitions. Refer to *Section 09 21 16 - Gypsum Board Assemblies*.

3.4 CEILING FURRING

- .1 Install runners level to tolerance of 3 mm over 3.5 m. Provide runners at interruptions of continuity and change in direction.
- .2 Frame with furring channels, perimeter of openings to accommodate access panels, light fixtures, diffusers, grilles, etc.
- .3 Furr for bulkheads within or at termination or ceilings.
- .4 Install furring channels at 400 mm o.c. maximum.

3.5 WALL FURRING

- .1 Install steel furring, as indicated.
- .2 Frame opening and around built-in equipment on four (4) sides with channels.
- .3 Box-in beads, columns, pipes, and around exposed services.

3.6 FIRE RATED ASSEMBLIES

- .1 If required, install Metal Stud System and Furring in accordance with appropriate ULC Design and with supplement to the National Building Code of Canada 1985.

3.7 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 07 92 10 - Joint Sealing.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)
 - .1 ANSI A108.1-[99], Specification for the Installation of Ceramic Tile (Includes ANSI A108.1A-C, 108.4-.13, A118.1-.10, ANSI A136.1).
 - .2 CTI A118.3-[92], Specification for Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive (included in ANSI A108.1).
 - .3 CTI A118.4-[92], Specification for Latex Portland Cement Mortar (included in ANSI A108.1).
 - .4 CTI A118.5-[92], Specification for Chemical Resistant Furan Resin Mortars and Grounds for Tile Installation (included in ANSI A108.1).
 - .5 CTI A118.6-[92], Specification for Ceramic Tile Grounds (included in ANSI A108.1).
- .2 American Society for Testing and Materials (ASTM International) International
 - .1 ASTM C144-[99], Specification for Aggregate for Masonry Mortar.
 - .2 ASTM C 207-[91(1997)], Specification for Hydrated Lime for Masonry Purposes.
 - .3 ASTM C847-[95(2000)], Specification for Metal Lath.
 - .4 ASTM C979-[99], Specification for Pigments for Integrally Coloured Concrete.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-[M86(R1988)], Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CGSB 71-GP-22M-[78], Adhesive, Organic, for Installation of Ceramic Wall Tile.
 - .3 CAN/CGSB-75.1-[M88], Tile, Ceramic.
 - .4 CAN/CGSB-25.20-[95], Surface Sealer for Floors.
- .4 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000-[98], Cementitious Materials Compendium (Consists of A5-98, A8-98, A23.5-98, A362-98, A363-98, A456.1-98, A456.2-98, A456.3-98).
 - .2 CSA A123.3-[98], Asphalt Saturated Organic Roofing Felt.
- .5 Terrazzo Tile and Marble Association of Canada (TTMAC)
 - .1 Tile Specification Guide 09300 [2000], Tile Installation Manual.

.2 Tile Maintenance Guide [2000].

1.3 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Include manufacturer's information on:

.1 Ceramic tile, marked to show each type, size, and shape required.

.2 Chemical resistant mortar and grout (Epoxy and Furan).

.3 Cementitious backer unit.

.4 Dry-set Portland cement mortar and grout.

.5 Divider strip.

.6 Elastomeric membrane and bond coat.

.7 Reinforcing tape.

.8 Levelling compound.

.9 Latex-Portland cement mortar and grout.

.10 Commercial Portland cement grout.

.11 Organic adhesive.

.12 Slip resistant tile.

.13 Waterproofing isolation membrane.

.14 Fasteners.

1.4 SAMPLES

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Base tile: submit 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.

.3 Floor tile: submit 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.

.4 Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, colour, and size.

.5 Stair Accessories: submit duplicate samples of each trim.

.6 Adhere tile samples to [11] mm thick plywood and grout joints to represent project installation.

.7 Prepare a 2 m x 3m mock-up sample on site to ensure demonstration of installation details and quality control. Include stair accessories in mock-up.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in containers with labels legible and intact and grade-seals unbroken.

.2 Store material so as to prevent damage or contamination.

.3 Store materials in a dry area, protected from freezing, staining and damage.

.4 Store cementitious materials on a dry surface.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

- .2 Collect and separate for disposal packaging material in appropriate on-site bins for recycling.
- .3 Unused adhesive, sealant and coating materials must be disposed of at an official hazardous material collections site as approved by the Consultant.
- .4 Unused adhesive, sealant and coating materials must not be disposed of into the sewer system, into streams, lakes, onto the ground or in other location where it will pose a health or environmental hazard.
- .5 Broken ceramic materials must be diverted from landfill to a local facility as approved by Consultant.

1.7 ENVIRONMENTAL CONDITIONS

- .1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12 °C for 48 h before, during, and 48 h after, installation.
- .2 Do not install tiles at temperatures less than 12 °C or above 38 °C.
- .3 Do not apply epoxy mortar and grouts at temperatures below 15 °C or above 25 °C.

1.8 EXTRA MATERIAL

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide minimum 5% of each type and colour of tile required for project for maintenance use. Store where directed.
- .3 Maintenance material to be of same production run as installed material.

1.9 EXTENDED WARRANTY

- .1 Submit a warranty for entire wall tile installation, covering materials and labour and the repair or replacement of defective work in accordance with the Contract, but for three (3) years total.

Part 2 Products

2.1 FLOOR TILE

- .1 Porcelain floor tile (Designation: POR): to CAN/CGSB-75.1.
 - .1 Acceptable Materials: Size 300 mm x 600 mm; “Mayfair” by Centura, “Regal” by Olympia Tile, “Ultra Modern” by Daltile, or “Anchorage” by Daltile, all in matte finish. Allow for one (1) field colour from manufacturer’s full line and two (2) accent floor tiles.
 - .2 Locations: corridors, vestibules and washrooms – refer to drawings. Refer to Room Finish Schedule for locations.
 - .3 Install in a one-third staggered pattern.

- .4 Provide prefabricated movement joints in conjunction with slab saw cuts approx. 3500-6000mm distance (refer to floor pattern drawing).
- .2 Porcelain floor tile bull-nose base (Designation: POR): to CAN/CGSB-75.1.
 - .1 Acceptable Materials: Size 76mm or 100 mm x 300 mm 'sit-on' bull-nose base; "Vitra", by Centura or "Omnia", by Olympia Tile, "Ultra Modern" by Daltile, or "Anchorage" by Daltile, all in matte finish. Allow for two (2) colours from manufacturer's Category/Group 2 colours.

2.2 WALL TILE

- .1 Ceramic tile (Designation: CWT): to CAN/CGSB-75.1, Type 5, Class MR 4, **100mm (4") x 400mm (16")** x 6 mm size, glazed surface. Allow for three (3) colors or sheens. Thin-set application.
- .2 Acceptable Materials: "Maple Leaf CDC", by Olympia Tile or "Rainbow", by Centura.
- .3 Tile Edging: Purpose-made, anodized aluminum, polished chrome finish, metal edge strips as manufactured Schluter Systems at all exposed tile edging: Profile – JOLLY; thickness as required for tile and tile set. Provide square tile return to wall at tops and sides of tile areas in Vestibule 9, with purpose made outside edging.
- .4 Locations: In washrooms where shown on interior elevations or in Room Finish Schedule. Allow for 3 colours: 75% field and 25% accent. Patterns to be issued by Architect during construction.

2.3 TRIM SHAPES

- .1 Conform to applicable requirements of adjoining floor and wall tile.
- .2 Use slip resistant trim shapes for horizontal surfaces of showers, overflow ledges, recessed steps, shower curbs, drying area curbs, and stools.
- .3 Use trim shapes sizes conforming to size of adjoining field wall tile, including existing spaces, unless specified otherwise.
- .4 Internal and External Corners: Provide trim shapes as follows where indicated.
 - .1 Bullnose shapes for external corners including edges.
 - .2 Coved shapes for internal corners.
 - .3 Special shapes for:
 - .1 Base to floor internal corners to provide integral coved vertical and horizontal joint.
 - .2 Base to floor external corners to provide bullnose vertical edge with integral coved horizontal joint. Use as stop at bottom of openings having bullnose return to wall.
 - .3 Wall top edge internal corners to provide integral coved vertical joint with bullnose top edge.
 - .4 Wall top edge external corners to provide bullnose vertical and horizontal joint edge.
- .5 Provide cove and bullnose shapes for where indicated and required to complete tile work.

2.4 MORTAR AND ADHESIVE MATERIALS

- .1 Manufacturer's of commercial mortar, grout and adhesive having Product considered acceptable for use:
 - .1 Mapei
 - .2 Laticrete
 - .3 Flexile
- .2 Walls: Mortarcrete Latex Mortar conforming to ANS1A118.4-1973, manufactured by L & M Ceramo Inc.
- .3 Floors:
 - .1 Cement Mortar: Mixture of 1 part Portland cement, 4 parts dry sand and 1/10 hydraulic lime. Materials shall conform to the following:
 - .2 Portland Cement: To CAN3-A, Type 10.
 - .3 Hydrated Lime: To ASTM C-206 or 207, Type 5.
 - .4 Sand: To CSA A82.56, passing 1.6 mm sieve.
 - .5 Water: Potable, containing no contaminants which cause efflorescence.
 - .6 Thin Set Mortar: field mixed, blended sand-Portland cement-latex mortar, "Kerabond/Keralastic by Mapei."
 - .1 Acceptable Alternates: "Laticrete 4237 distributed by Ceratec Inc., or Flexile 52 thin set.
 - .2 Latex Additive: "Cemtex" by Master Builders, Laticrete 2022" distributed by Ceratec Inc.,

2.5 GROUT

- .1 Colouring Pigments:
 - .1 Pure mineral pigments, limeproof and nonfading, complying with ASTM C979.
 - .2 Colouring pigments to be added to grout by manufacturer.
 - .3 Job coloured grout are not acceptable.
 - .4 Use in Commercial Portland Cement Grout, Dry-Set Grout, and Latex-Portland Cement Grout.
- .2 Chemical-Resistant Grout for Walls:
 - .1 Epoxy grout: to ANSI A108.1, having quality, colour and characteristics to match epoxy bond coat. Adhesive and grout by same manufacturer.
 - .2 Epoxy Grout: "Latapoxy SP-100" Stainless, chemical resistant epoxy grout by Laticrete International. Colour from manufacturer's full range. Alternate: Kerapoxy by Mapei.
- .3 Floors:
 - .1 Polymer modified grout as manufactured by MAPEI.

2.6 ACCESSORIES

- .1 Stairs Nosings and Edge Trims:

- .1 Stair nosing to be Schluter, TREP-S, Aluminum support with thermoplastic rubber insert (26mm), installed in conjunction with porcelain tile as per manufacturer's recommendations. Thermoplastic rubber insert piece colour to be selected by consultant.
- .2 SCHIENE edge protection by Schluter, anodized aluminum to installed at all exposed stair tile edges. Mitre joints to suite stair angle. Size as required for tile and mortar bed.
- .2 Prefabricated Movement Joints: purpose made Schluter, Dilex-KSN aluminum, sized as required for tile and mortar bed. Colour to be selected by consultant. To be installed directly above slab saw-cuts. Refer to floor pattern drawing for locations.
- .3 Reinforcing mesh: 50 x 50 x 1.6 x 1.6 mm galvanized steel wire mesh, welded fabric design, in flat sheets.
- .4 Divider strips:
 - .1 Laminated strips, core 32 x 3 mm black neoprene, outsides (both sides) brass 32 x 1.29 mm complete with anchors, both sides spaced at 150 mm on centre.
 - .2 Brass complete with anchors, both sides spaced at 150 mm on centre.
- .5 Cleavage plane: [polyethylene film to CGSB 51-34] [No. 15 asphalt saturated felt to CSA A123.3] .
- .6 Metal lath: to ASTM C847 finish, 10 mm rib at 2.17 kg/m².
- .7 Transition Strips: purpose made metal extrusion; stainless steel type.
- .8 Reducer Strips: purpose made metal extrusion; stainless steel type; maximum slope of 1:2.
- .9 Prefabricated Movement Joints: purpose made, having a Shore A Hardness not less than 60 and elasticity of plus or minus 40 percent when used in accordance to TTMAC Detail 301EJ.
- .10 Sealant: in accordance with Section 07 92 10 - Joint Sealing.
- .11 Floor sealer and protective coating: [to CAN/CGSB-25.20, Type [1] [2]] [to tile and grout manufacturers recommendations].

2.7 MIXES

- .1 Portland Cement:
 - .1 Scratch coat: 1 part portland cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand, 1 part water, [and latex additive where required]. Adjust water volume depending on water content of sand.
 - .2 Slurry bond coat: portland cement and water mixed to creamy paste. Latex additive may be included.
 - .3 Mortar bed for floors: 1 part portland cement, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand. [Latex additive may be included].

- .4 Mortar bed for walls and ceilings: 1 part portland cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand and 1 part water. Adjust water volume depending on water content of sand. [Latex additive may be included].
- .5 Levelling coat: 1 part portland cement, 4 parts sand, minimum 1/10 part latex additive, 1 part water including latex additive.
- .6 Bond or setting coat: 1 part portland cement, 1/3 part hydrated lime, 1 part water.
- .7 Measure mortar ingredients by volume.
- .2 Dry set mortar: mix to manufacturer's instructions.
- .3 Organic adhesive: pre-mixed.
- .4 Mix bond and levelling coats, and grout to manufacturer's instructions.
- .5 Adjust water volumes to suit water content of sand.

2.8 PATCHING AND LEVELING COMPOUND

- .1 Portland cement base, acrylic polymer compound, manufactured specifically for resurfacing and levelling concrete floors. Products containing gypsum are not acceptable.
- .2 Have not less than the following physical properties:
 - .1 Compressive strength - 25 MPa.
 - .2 Tensile strength - 7 MPa.
 - .3 Flexural strength - 7 MPa.
 - .4 Density - 1.9.
- .3 Capable of being applied in layers up to 50 mm thick, being brought to feather edge, and being trowelled to smooth finish.
- .4 Ready for use in 48 hours after application.

2.9 TERRAZZO FLOOR PATCHING

- .1 Where applicable, saw cut existing terrazzo floor and base as required and remove to nearest metal 'panel' joint to enable replacement at a full panel. Replace with terrazzo flooring to match existing as closely as possible. Provide sample to consultant for approval.

2.10 CLEANING COMPOUNDS

- .1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and levelling compounds and elastomeric waterproofing membrane and coat.
- .2 Materials containing acid or caustic material are not acceptable.

Part 3 Execution

3.1 WORKMANSHIP

- .1 Do tile work in accordance with TTMAC Tile Installation Manual 2000, "Ceramic Tile", except where specified otherwise.
- .2 Apply tile [or backing coats] to clean and sound surfaces.
- .3 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.
- .4 Maximum surface tolerance 1:800.
- .5 Make joints between tile uniform and approximately [1.5 mm] wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.
- .6 Lay out tiles so perimeter tiles are minimum 1/2 size.
- .7 Install floor tiles as per pattern. Layout and install flash cove tile first, before floor tile, ensuring a flush edge on the horizontal surface by feathering to masonry walls as required to produce a straight line on the floor. Install floor tiles to pattern supplied by Architect at a later date. Contact consultant to review when approximately no more than 10 sq. m has been installed.
- .8 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .9 Make internal angles square, external angles rounded.
- .10 Make internal angles square, external angles chamfered at 45° with narrow tile strip.
- .11 Construct cove base, as described using all special pieces available for inside and outside corners.
- .12 For Floors: Use bull nose edged tiles at termination of wall tiles, except where tiles abut projecting surface or differing plane.
- .13 Seal grouted joints with sealer.
- .14 Keep building expansion joints free of mortar or grout.
- .15 For Walls: Use round edged tiles at termination of wall tile panels, except where panel abuts projecting surface or differing plane.
- .16 Install divider strips at junction of tile flooring and dissimilar materials.
- .17 Allow minimum 24 h after installation of tiles, before grouting.
- .18 Clean installed tile surfaces after installation and grouting cured.

3.2 FLOOR TILE

- .1 Install in accordance with TTMAC to applicable thinset detail.

3.3 STAIR TILE ACCESSORIES

- .1 Install all accessories specified per manufacturer's instructions using whole lengths.
- .2 Provide sample installation for architect for review.

3.4 FLOOR SEALER AND PROTECTIVE COATING

- .1 Apply in accordance with manufacturer's instructions.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 78 00 - Closeout Submittals.
- .3 Section 06 10 10/06101 - Rough Carpentry: Wood strapping.
- .4 Fabrication: to ASTM 365-78 and CAN/GSB-92.1-M77.
- .5 Installation: to ASTM C636-76, except where specified otherwise.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM E1264-[98], Classification for Acoustical Ceiling Products.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-[M86], Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.
 - .2 CAN/CGSB-92.1-[M89], Sound Absorptive Prefabricated Acoustical Units.
- .3 Canadian Standards Association (CSA)
 - .1 CSA B111-[74(R1998)], Wire Nails, Spikes and Staples.
- .4 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-[88(R2000)], Surface Burning Characteristics of Building Materials.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit two each 300 x 300 mm samples of each individual tile and grid type in accordance with Section 01340.

1.4 REGULATORY REQUIREMENTS

- .1 Fire-resistance rated floor/ceiling and roof/ceiling assembly: certified by a Canadian Certification Organization accredited by Standards Council of Canada.

1.5 DESIGN CRITERIA

- .1 Maximum deflection 1/360 of span to ASTM 365-78 deflection test.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan

1.7 ENVIRONMENTAL REQUIREMENTS

- .1 Permit wet work to dry before commencement of installation.
- .2 Maintain uniform minimum temperature of [15]⁰C and humidity of [20] - [40] % before and during installation.
- .3 Store materials in work area [48] hours prior to installation.

1.8 EXTRA MATERIALS

- .1 Provide extra materials of acoustic units in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide acoustical units amounting to [2] % of gross ceiling area for each pattern and type required for project.
- .3 Extra materials to be from same production run as installed materials.
- .4 Clearly identify each type of acoustic unit, including colour and texture.
- .5 Store where directed by Consultant.

Part 2 Products

2.1 MATERIALS

- .1 Acoustic units for suspended ceiling system: to CAN/CGSB-92.1.
- .2 Acoustic Ceiling Panels, Designation LAP: Acoustic Ceiling Panels, wet formed mineral fibre panels, by Armstrong World Industries Canada Inc., Mississauga. Colour: White; Types as noted below:
- .3 **Panel Types:**
 - .1 LAP 1: 600 x 1200 mm x 15.9 mm thick; 'Fine Fissured' with medium texture, Square Lay-In, Fire Guard #1830; Location: Refer to Room Finish Schedule.
 - .2 LAP 2: 600 x 1200 mm x 15.9 mm thick; 'Cortega' Fire Guard, Square Lay-In, #823; Location: Refer to Room Finish Schedule.
- .4 Acceptable alternates: similar purpose-designed high humidity ceiling panels by CGC Interiors, BPB Canada Inc. and Certainteed.
- .5 **Suspension system Type 1:** 23.8 mm (15/16") "Prelude XL" exposed tee bar grid, including wall moulding, by Armstrong. Colour: white. Acceptable alternate: similar suspension system by CGC Interiors, Oakville and Chicago Metal Corp. Grid sizes to suit ceiling panel types as shown on drawings.
- .6 **Perimeter Trim:** 4" 'Axiom' class trim or CGC 'Compasso' for edging at lower ceilings or clustered ceiling panels for clouds.

- .7 Suspension System for Radiant Panel Heaters: not applicable to this project.
- .8 Hangers: 2.6 mm galvanized soft annealed steel wire.
- .9 Accessories: splices, clips, retainers, etc., to complement suspension system components.
- .10 Adhesive: low VOC type recommended by acoustic unit manufacturer.
- .11 Staples, nails and screws: to CSA B111 non-corrosive finish as recommended by acoustic unit manufacturer.
- .12 Hold down clips: purpose made clips to secure tile to suspension system, approved for use in fire-rated systems.

Part 3 Execution

3.1 EXAMINATION

- .1 Do not install acoustical panels and tiles until work above ceiling has been inspected by Consultant.

3.2 INSTALLATION

- .1 Install acoustical panels and tiles in ceiling suspension system.
- .2 Install acoustic units parallel to building lines with edge unit not less than 50% of unit width.
- .3 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.
- .4 Support suspension system main runners at 1200 oc maximum with hangers from structure. Assembly shall support super-imposed loads. Maximum permissible deflection, 1/360 of span.
- .5 Attach cross member to main runner to provide rigid assembly.
- .6 Install suspension assembly to manufacturer's written instructions.
- .7 Install flush edge moulding at junction of acoustic unit ceiling and other materials around entire length of joint. Secure to construction. Butt joints neatly, square and true in alignment.
- .8 Set acoustic units in place.
- .9 Set all ceiling levels by the use of transit or laser level.
- .10 Ensure all installations are clean upon owner acceptance. Be responsible for monitoring damage and soiling after installation and before owner occupancy. Prior to owner takeover, replace all tiles with damage, blemishes or soiling whether caused by

subcontractor handling or post installation above-ceiling adjustments, balancing, cabling, etc.

- .11 Provide for Owner twelve (12) complete, undamaged ceiling tiles of each type, sealed and boxed. Leave in location as directed by Architect.

3.3 INTERFACE WITH OTHER WORK

- .1 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM F1303-[99], Specification for Sheet Vinyl Floor Covering with Backing.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-ISO 14040-[97], Environmental Management - Life Cycle Assessment - Principles and Framework (Adopted ISO 14040:1997, first edition).

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long base, nosing, feature strips, treads, edge strips.

1.4 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 ENVIRONMENTAL REQUIREMENTS

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20° for 48 hours before, during and 48 hours after installation.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Do not dispose of unused sealant and adhesive materials into landfill. Divert materials to municipal hazardous materials depot approved by Consultant.
- .2 Divert unused metal and wiring materials from landfill to metal recycling facility approved by Consultant.
- .3 Remove from site and dispose of packaging materials at appropriate recycling facilities.

1.7 QUALITY ASSURANCE

- .1 Supplier shall be an established firm experienced in the field.
- .2 Installer:
 - .1 Flooring contractor experienced in the field and approved by the manufacturer.

- .2 Flooring contractor shall have manual instructions and be trained by the manufacturer and distributor.
- .3 Manufacturer's recommendations for the correct preparation, finishing and testing sub floor surface.

1.8 EXTENDED WARRANTY

- .1 Submit a warranty for all the installation of all resilient sheet flooring, covering materials and labour and the repair or replacement of defective work in accordance with the General Conditions of the Contract, but for seven (7) years total.

Part 2 Products

2.1 MATERIALS

- .1 Resilient Sheet Flooring (SF): Acceptable materials:
 - .1 Acceptable Materials:
 - .1 IQ Homogeneous Vinyl, 'Optima' manufactured and distributed by Tarkett. Colour to be selected by Consultant from full line
 - .2 Locations: Storage A108, Literacy Room A117. Refer to Room Finish Schedule and Floor Pattern Drawing A05.
 - .2 Allow for four (4) colours from manufacturer's full range.
 - .1 Surface resistance: Unaffected by surface water and chemicals.
 - .2 Slip resistance tested in accordance with ASTM D2047 Static coefficient of friction: Dry 0.95, Wet 0.93.
 - .3 Meets ULC 102.2 Flame spread 5, Smoke developed 295.
 - .4 Wear Resistance: ASTM C501 Wear index 436.
 - .5 Static Load Limit: 500 PSI.
 - .6 Hygiene: Bacteriostat retards the growth of bacteria.
 - .3 Self Levelling Underlayment: "Ultraplan 1" by Mapei fast setting, polymer-modified; for over cured concrete, plywood, ceramic tile, old cutback adhesive, and old vinyl and vinyl composition flooring, feather edge to 1 1/2" (38 mm).for use to prepare floor at locations where existing flooring has been removed and subfloor is not level..
 - .4 Filler and Cover Former:
 - .1 As recommended by manufacturer to suit subfloor on which its material is installed and to suit vertical wall/floor junctions.
 - .5 Primers and Adhesives: As recommended by manufacturer of material to suit subfloor condition.
 - .6 Cleaner: Neutral chemical compound that will not damage sheet or affect its colour.
 - .7 Welding Rod: PVC welding rod, colour to match resilient sheet flooring.
 - .8 Cap strip: sized to suit application, type recommended by flooring manufacturer, Altro Stainless Steel Cap, mechanically fastened to wall

Part 3 Execution

3.1 SITE VERIFICATION OF CONDITIONS

- .1 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.

3.2 PREPARATION

- .1 Scope includes preparation of floor using self levelling coating and patching compound as required.
- .2 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .3 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
- .4 Remove or treat old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and/or interfering with the bonding of new adhesives.
- .5 As required, seal concrete slab to resilient flooring manufacturer's printed instructions.

3.3 INSTALLATION

- .1 Install on a smooth, flat concrete finish, which will be achieved manually or mechanically.
- .2 Ensure concrete sub floor temperature to be maintained at a minimum of 70°F during installation and ensure the moisture content does not exceed 3 Lbs per 1000 Sq Ft per 24 hours or lower.
- .3 Paint game lines using approved game line paint primer and game line paint in strict accordance with the game line paint manufacturer's instructions.
- .4 Before proceeding with any work, inspect the sub floor surface and report, in writing, to the project manager and the General Contractor any visible defect on the surface, such as cracks, bumps, rough areas or variations in planarity.
- .5 This installation is to proceed on an existing concrete slab in addition to new concrete work as required for mechanical services. Ensure slab is adequately cured and free of moisture or contaminants. If necessary, as part of the work of this section, scarify existing surfaces to prepare surface for adhesive, or to meet manufacturer's installation requirements. Fill joints, cracks, and holes in these surfaces and level surface irregularities with filler. Remove prime paint and wire brush steel base surfaces.
- .6 Check for any grease, oil, paint, duct or any combination remaining on the concrete sub floor.
- .7 Before proceeding with installation, clean concrete surface to remove any dirt or foreign materials, rinse thoroughly and allow eight (8) hours minimum to dry, if required, sanding is necessary in all installations.

- .8 Fill any areas not meeting $\pm 1/8''$ in 10' for level before installation. This will insure levelness and proper adhesion of material.
- .9 Lay each material in accordance with manufacturer's specifications.
- .10 Weld joints on flooring and internal and external angles of coves using welding rod in matching plain colours, and the standard hot-air-welding technique.
- .11 Install standard rubber base at resilient sheet flooring locations.
- .12 Flash into drain openings; do not cut on surface at edge of drain cover. Coordinate with Division 15 for installation with suitable drain type and cover. Bond flooring to drain flange under clamping ring using epoxy adhesive.
- .13 Extend resilient sheet under all cabinet work and casework to the wall line.

3.4 CLEANING

- .1 Remove excess adhesive from floor, base and wall surfaces without damage.
- .2 Clean, seal and wax floor and base surface to flooring manufacturer's printed instructions.

3.5 PROTECTION

- .1 Protect new floors from time of final set of adhesive, with polyethelene or Kraft paper until final inspection.
- .2 Prohibit traffic on floor for 48 hours after installation.
- .3 Do not wax.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 03 30 00 – Cast-in-Place Concrete.
- .3 Section 03 35 05 – Concrete Floor Hardeners.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM F1066-[99], Specification for Vinyl Composition Floor Tile.
 - .2 ASTM F1344-[00], Specification for Rubber Tile.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-25.20-[95], Surface Sealer for Floors.
 - .2 CAN/CGSB-25.21-[95], Detergent-Resistant Floor Polish.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate tile in size specified, [[300] mm long] [base,] [nosing,] [feature strips,] [treads,] [edge strips].

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling.
- .3 Dispose of unused finish and adhesive materials at official hazardous material collections site approved by Consultant.
- .4 Do not dispose of unused finish and adhesive materials into sewer system, into streams, lakes, onto ground or in other locations where it will pose health or environmental hazard.

1.5 ENVIRONMENTAL REQUIREMENTS

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20°C for 48 hours before, during and for 7 days after installation.

1.6 EXTRA MATERIALS

- .1 Provide 6 m² or 3% of each colour, pattern and type flooring material required for this project for maintenance use.

- .2 Extra materials to be from same production run as installed materials.
- .3 Clearly identify each container of floor tile and each container of adhesive.
- .4 Store where directed by Consultant.

Part 2 Products

2.1 MATERIALS

- .1 Luxury Vinyl Tile (LVT): 0.55mm heavy duty wear layer thickness, 2.5mm tile thickness, approx. 600 x 600 mm (24"x24") tile format OR 200 x 1200 (8" x 48") plank format sizes, R10 slip resistance, with 10 year commercial warranty. Allow for total of three (3) colours from full line.
 - .1 Expona Commercial PUR
 - .2 Uptown or Mirra, distributed by Centura London and Windsor
 - .3 Urban Textures, Creek Street by Avion Commercial Flooring
 - .4 I.D. Inspiration 70, distributed by Tarkett
 - .5 Gerflor Creation 55
- .2 Resilient base (RR): rubber, top set coved, 3 mm thick, rubber, 100 mm high minimum 1200 mm long, including premoulded end stops and external corners. Acceptable materials: non-shrink Rubber Wall Base with toe as manufactured by Johnsonite, Roppe or approved alternates. Colours: Six (6) from full Johnsonite "Coloright" colour line.
- .3 Primers and adhesives: waterproof, recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade. Use Johnsonite 990 Solvent Free Environmentally Safe White Acrylic Cove Base Adhesive for rubber base. Use Roberts #2057 clear water resistant low odour adhesive for VCT or acceptable alternate approved during tender period by consultant. Submit data sheets for any alternate products considered.
- .4 Sub-floor filler and leveller: white premix latex requiring water only to produce cementitious paste, as recommended by flooring manufacturer for use with their product.
- .5 Metal edge strips: aluminum extruded, smooth, with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .6 Polyethylene sheet: to CAN2 51.33-M77, Type 2, for protection.
- .7 Nose filler: Epoxy caulking compound Johnsonite 930.
- .8 Solid vinyl colour strips: smooth 3 mm thick pre-cut vinyl colour strips to location and dimensions as shown on gymnasium plan A18.

Part 3 Execution

3.1 INSPECTION

- .1 Ensure concrete floors are dry, by using test methods recommended by tile manufacturer. Inspect for negative alkalinity, carbonization or dusting.
- .2 Commencement of work indicates acceptance of conditions by flooring installer.

3.2 SUB-FLOOR TREATMENT

- .1 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .2 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.

3.3 TILE APPLICATION

- .1 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .2 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles minimum half tile width.
- .3 Install tiles in corridor as per pattern provided by Consultant. Pattern will be provided at a later date.
- .4 Cut tile and fit neatly around fixed objects.
- .5 Install flooring in pan type floor access covers. Maintain floor pattern.
- .6 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.
- .7 Install metal edge strips at unprotected or exposed edges where flooring terminates.
- .8 At doorways to incrapack units, extend tile and base fully into door opening to incrapack classroom.
- .9 Install solid colour vinyl strips, manufactured for this purpose, to form gymnasium game lines, as indicated on drawings. Cut field tiles tight and smooth contour against game lines. Strips to be minimum of 300 mm long on curves and of indicated width and colour.
- .10 Install solid colour vinyl strips, manufactured for this purpose, to indicate the hazardous zone around equipment in the STAC classroom. Cut field tiles tight and smooth contour against the solid coloured lines.

3.4 ~~STAIR APPLICATION~~

- ~~.1 Areas to receive stair treads shall be clean, fully enclosed, weathertight, and maintained at a uniform temperature of at least 70°F for 24 hours before, during, and after the~~

~~installation in completed. The stair treads and adhesives shall be conditioned in the same manner. Stair steps shall be smooth, flat, level, permanently dry, clean and free of all foreign material, such as dust, paint, grease, oils, solvents, curing and hardening compounds, sealers, asphalt and old adhesive residue. An epoxy caulking nose filler shall be applied to ensure a tight fit and eliminate any open spaces between the step edge and stair tread nosing. Stair treads shall be trimmed to within 1/16" of the riser and stringer to allow for expansion. Adhesives shall be applied to the stair step surface and the back and nosing area of the stair tread. Stair treads shall be rolled, with a J hand roller, after installation, to ensure proper bonding.~~

3.5 BASE APPLICATION

- .1 Lay out base to keep number of joints at minimum. Use lengths as long as practicable and not less than minimum 500 mm long.
- .2 Clean substrate and prime with one coat of adhesive.
- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.
- .5 Install straight and level to variation of 1:1000.
- .6 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- .7 Miter internal corners. Use premoulded corner pieces at all external corners and ensure full adhesion through to ends of corner pieces. See detail for termination at door frames.
- .8 Install toeless type base before installation of carpet on floors.
- .9 Leave in the building one (1) complete carton of each of two (2) colours of floor tile and twelve (12) tiles of each of the remaining colours. Colours of extra tile to be specified by Consultant.

3.6 INITIAL MAINTANANCE AFTER INSTALLATION

- .1 Broom sweep or vacuum thoroughly.
- .2 Do not wet mop, wash, scrub, or strip the floor. These procedures will be done by the Owner.

3.7 PROTECTION OF FINISHED WORK

- .1 Following broom sweeping, protect new floors with 0.15 mm thick Polyethylene cover and lay planking in all necessary traffic areas to minimize damage by other trades. Maintain until just before final inspection.
- .2 Prohibit traffic on floor for 48 hours after installation.

3.8 PREPARATION FOR INSPECTION

- .1 Only if so notified by Architect, and in the presence of the Owner, scrub the floor using a neutral detergent and a floor machine of 170-250 rpm capability equipped with a scrub brush or a scrubbing pad (3M blue or equal).
- .2 Lightly rinse and allow to dry. Note: Do not flood the floor with rinse water, scrubbing, or stripping solutions. Final re-washing, if required, and waxing will be done by owner.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 01 51 00 - Temporary Utilities.
- .3 Section 01 78 00 - Closeout Submittals.

1.2 REFERENCES

- .1 American Association of Textile Chemists and Colorists (AATCC)
 - .1 AATCC 16-[1998], Color Fastness to Light.
 - .2 AATCC 23-[1999], Color Fastness to Burn Gas Fumes.
 - .3 AATCC 118-[1997], Oil Repellency: Hydrocarbon Resistance Test.
 - .4 AATCC 129-[2001], Colour Fastness to Ozone in the Atmosphere Under High Humidities.
 - .5 AATCC 134-[2001], Electrostatic Propensity of Carpet.
 - .6 AATCC 171-[2000], Carpets: Cleaning of; Hot Water Extraction Method.
 - .7 AATCC 174-[1998], Antimicrobial Activity Assessment of Carpets.
 - .8 AATCC 175-[1998], Stain Resistance: Pile Floor Coverings.
 - .9 AATCC 189-[2001], Fluorine Content of Carpet Fibers.
- .2 American Society for Testing and Materials (ASTM International)
 - .1 ASTM D1055-[97], Specification for Flexible Cellular Materials - Latex Foam.
 - .2 ASTM D1335-[98], Tuft Bind of Pile Floor Coverings.
 - .3 ASTM D1667-[97], Standard Specification for Flexible Cellular Materials-Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam).
 - .4 ASTM D3936-[00] Standard Test Method for Resistance to Delamination of the Secondary Backing of Pile Yarn Floor Covering.
 - .5 ASTM D5252-[98a], Standard Practice for the Operation of the Hexapod Drum Tester.
 - .6 ASTM D5417-[99], Standard Practice for Operation of the Vettermann Drum Tester.
 - .7 ASTM E84-[01], Test Method for Surface Burning Characteristics of Bulding Materials.
 - .8 ASTM E648-[00], Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 - .9 ASTM E662-[01], Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-4.2 No.27.6-[M91], Textile Test Methods - Flame Resistance - Methemine Tablet Test for Textile Floor Coverings.

- .2 CAN/CGSB-4.2 No.77.1-[94]/ISO 4919:1978, Textile Test Methods - Carpets - Determination of Tuft Withdrawal Force.
- .3 CGSB 4-GP-36M-[78], Carpet Underlay, Fiber Type.
- .4 CAN/CGSB-4.129-[93(R1997)], Carpets for Commercial Use.
- .5 CGSB 20-GP-23M-[78], Cushion, Carpet, Flexible Polymeric Material.
- .6 CAN/CGSB-25.20-[95], Surface Sealer Floors.
- .4 Carpet and Rug Institute (CRI)
 - .1 CRI-104-[96], Standard Installation of Commercial Carpet.
 - .2 IAQ Carpet Testing Program.
- .5 National Floor Covering Association (NFCA)
 - .1 Floor Covering Specification Manual [1998].
- .6 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-[88(R2000)], Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 CAN/ULC-S102.2-[88(R2000)], Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.

1.3 SUBMITTALS

- .1 Submit control submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit verification to demonstrate compliance with CAN/ULCS102 and CAN/ULCS102.2.
- .3 Submit proof that carpet has been tested and passed the Indoor Air Quality (IAQ) Carpet Testing Program requirements of the Carpet and Rug Institute (CRI) and the Canadian Carpet Institute (CCI).
- .4 Submit report verifying that tuft bind meets requirements of CAN/CGSB-4.129 when tested to CAN/CGSB-4.2 No.77.1.
- .5 Submit report outlining proposed dust control measures.
- .6 Submit carpet schedule using same room designations indicated on drawings.
- .7 Submit carpet manufacturer's installation instructions: Indicate special procedures and perimeter conditions requiring special attention.
- .8 Submit certification and description of carpet recycling process

1.4 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit product data sheet for each carpet, adhesive, carpet protection and subfloor patching compound.

- .3 Submit WHMIS MSDS - Material Safety Data Sheets acceptable to Labour Canada and Health Canada for carpet adhesive and seam adhesive. Indicate VOC content.
- .4 Submit data on specified products, describing physical and performance characteristics, sizes, patterns, colours, and methods of installation.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

1.6 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate two (2) full carpet tile and base samples for each colour selected.

1.7 CLOSEOUT SUBMITTALS

- .1 Submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Submit maintenance data: Include maintenance procedures, recommendations for maintenance materials and equipment, and suggested schedule for cleaning.
- .3 Schedule of carpet reclamation activities indicating following:
 - .1 Detailed sequence of removal work.
 - .2 Inventory of items to be removed and reclaimed.
 - .3 Proposed packing and transportation measures.

1.8 QUALIFICATIONS

- .1 Installer Qualifications:
 - .1 Flooring contractor requirements:
 - .1 Specialty contractor normally engaged in this type of work, with prior experience in installation of these types of materials.
 - .2 Be responsible for proper product installation, including floor testing and preparation as specified and in accordance with carpet manufacturers written instructions.

1.9 REGULATORY REQUIREMENTS

- .1 Prequalification: tested to CAN/CGSB-4.2-No.27.6.
- .2 Indoor Air Quality: compliance with CRI/CCI Green Label Indoor Air Quality Program, CRI/CCI-IAQ requirements for maximum total volatile chemicals released into air. Label each carpet product with CRI/CCI-IAQ label.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Label packaged materials. For carpet tile products indicate nominal dimensions of tile and indicate installation direction.

- .2 Packaging, labelling, packing and marking details.
- .3 Store packaged materials in original containers or wrapping with manufacturer's seals and labels intact.
- .4 Store carpeting and accessories in location as directed by Consultant. Store carpet and adhesive at minimum temperature of 18°C and relative humidity of maximum 65% for minimum of 48 hours before installation.
- .5 Prevent damage to materials during handling and storage. Keep materials under cover and free from dampness.
- .6 Store materials in area of installation for minimum period of 48 hours prior to installation.
- .7 Modular carpet: store on pallet form as supplied by Manufacturer. Do not stack pallets.

1.11 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

1.12 ENVIRONMENTAL REQUIREMENTS

- .1 Moisture: Ensure substrate is within moisture limits and alkalinity limits prescribed by manufacturer. Prepare moisture testing and provide report to Consultant
- .2 Temperature: Maintain ambient temperature of not less than 18°C from 48 hours before installation to at least 48 hours after completion of work.
- .3 Relative humidity: Maintain relative humidity between 10 and 65% RH for 48 hours before, during and 48 hours after installation.
- .4 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.
- .5 Ventilation:
 - .1 Ventilate area of work as directed by Consultant by use of approved portable supply and exhaust fans.
 - .2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities. Provide fans with HEPA filters.
 - .3 Provide continuous ventilation during and after carpet application. Run ventilation system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of carpet installation.
- .6 Test existing floor levelling compound for presence of asbestos contamination. Notify Consultant for additional instructions where asbestos is discovered.
- .7 Do not install carpet until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete.

1.13 EXTRA MATERIALS

- .1 Provide extra materials of carpet, base, and adhesives in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide 20 m² of each colour, pattern and type of carpeting.
- .3 Extra materials to be from same production run as installed materials.
- .4 Identify each package of carpet and each container of adhesive.
- .5 Deliver to Consultant and store where directed by Consultant.

Part 2 Products

2.1 MANUFACTURERS

- .1 Certified to Carpet and Rug Institute's and the Canadian Carpet Institute IAQ requirements.

2.2 CARPET TILE (CPT) – Carpet Tiles

Product shall be suitable for direct glue-down installation as per CGSB-4-SP-156. The consultant may select any of the following styles from one of the manufacturers listed below.

(Note: Pre-glued products are NOT acceptable)

1. Tandus Aftermath
2. Tandus Field Day
3. Tandus City Walk –Street Life
4. Tandus Top Shelf

1.1.1 All carpet supplied for each installation shall be manufactured from yarn of the same dye lot. Carpet will be selected by the Project Manager or Board Designee from Manufacturer's stock colour and pattern range.

1.1.2 WARRANTY

Carpet and installation shall carry a minimum Manufacturer's ten (10) year warranty.

1.1.3 ADHESIVES

Use Manufacturer's recommended adhesive. Provide with bid submission all adhesive products MSDS. Failure to provide MSDS information may result in the rejection of the bid.

1.1.4 INSTALLATION

All carpet to be installed as per Manufacturer's instructions (latest editions/amendments) and in accordance with good installation practices.

2.3 ACCESSORIES

- .1 Adhesive:
 - .1 Multi-purpose adhesive type: recommended by carpet manufacturer for direct glue down installation.
 - .2 Pressure sensitive type: recommended by carpet manufacturer for direct glue down installation of modular carpet or speciality backed carpets.
- .2 Carpet protection: non-staining heavy duty kraft paper.
- .3 Concrete floor sealer: to CAN/CGSB-25.20, Type 1.
- .4 Subfloor patching compound: Portland cement base filler, mix with latex and water to form a cementitious paste.

Part 3 Execution

3.1 SUB-FLOOR TREATMENT

- .1 Concrete shall be inspected to determine special care required to make it a suitable foundation for carpet. Cracks 3 mm wide or protrusions over 0.8 mm will be filled and levelled with appropriate and compatible patching compound.
- .2 Do not exceed manufacturer's recommendations for patch thickness.
- .3 Large patch areas are to primed with a compatible primer.
- .4 Concrete substrates shall be cured, clean and dry.
- .5 Concrete substrates shall be free of paint, dirt, grease, oil, curing or parting agents, and other contaminates, including sealers, that may interfere with the bonding of the adhesive.
- .6 Wherever a powdery or porous concrete surface is encountered, a primer compatible with the adhesive shall be used to provide a suitable surface for glue-down installation.

3.2 PREPARATION

- .1 Prepare floor surfaces in accordance with CRI 104 Standard for Installation of Commercial Carpet.
- .2 Pre-condition carpeting following manufacturer's printed instructions.

3.3 INSTALLATION

- .1 Install in accordance with manufacturer's published instructions and in accordance with Carpet and Rug Institute Standard for Installation of Commercial Carpet, CRI 104.
- .2 Use material from same dye lot. Ensure colour, pattern and texture match within any one visual area. Maintain constant pile direction.

- .3 Fit neatly around architectural, mechanical, electrical and telephone outlets, and furniture fitments, around perimeter of rooms into recesses, and around projections.
- .4 Install carpeting in pan type floor access covers.
- .5 Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- .6 Install carpet smooth and free of bubbles, puckers, and other defects.

3.4 DIRECT GLUE DOWN CARPET

- .1 Apply adhesive and install carpeting in accordance with manufacturer's written instructions, by direct glue-down method.

3.5 BASE INSTALLATION

- .1 Install carpet base in accordance with manufacturers instructions.

3.6 PROTECTION OF FINISHED WORK

- .1 Vacuum carpets clean immediately after completion of installation. Protect traffic areas.
- .2 Prohibit traffic on carpet for a period of 24 hours until adhesive is cured.
- .3 Install carpet protection to satisfaction of Consultant.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 06 40 00 - Architectural Woodwork.
- .3 Section 05 12 23 – Structural Steel for Buildings.
- .4 Section 05 50 00 – Metal Fabrications.
- .5 Section 08 11 14 – Metal Doors and Frames.
- .6 Section 09 91 27 – Finish and Colour Notes.
- .7 Section 09 91 30 – Door and Room Finish Schedule.

1.2 REFERENCES

- .1 Architectural Painting Specifications Manual, Master Painters Institute (MPI).
- .2 Ontario Painting Contractors Association (OPCA) Architectural Specification Manual - referenced as OPCA Manual, latest Edition. Paint formulations and methods referred to herein refer to this Manual. If contractor is unfamiliar with this reference standard, contact the OPCA at (416) 498-1897.

1.3 WARRANTY

- .1 At outset of the contract, contractor to register with the OPCA for the inspection service paid for from Cash Allowances.
- .2 Upon completion of the inspection program, contractor to furnish a 2 Year Guarantee. The Guarantee shall warrant that the work has been performed with respect to the standards and requirements incorporated in the OPCA specification manual-latest edition.

1.4 ENVIRONMENTAL PERFORMANCE REQUIREMENTS

- .1 Do not apply paint finish in areas where dust is being generated.
- .2 Conform to requirements of OPCA Manual.
- .3 Comply with the requirements of Section 01 35 30- Health and Safety.

1.5 JOB MOCK-UP

- .1 Complete a mock-up room to be reviewed and approved by Owner, Consultant, and OPCA Inspector for approval on application of block filler and finish paint coats.

1.6 SCHEDULING OF WORK

- .1 Submit work schedule for various stages of painting to Consultant for approval. Submit schedule minimum of 72 hours in advance of proposed operations.
- .2 Obtain written authorization from Consultant for any changes in work schedule.
- .3 Schedule painting operations to prevent disruption of occupants in and about the building.

1.7 EXTRA MATERIALS

- .1 Submit one - four litre can of each type and colour of [primer] [stain] [finish coating]. Identify colour and paint type in relation to established colour schedule and finish system.
- .2 Deliver to Contractor and store where directed.

1.8 DELIVERY, HANDLING AND STORAGE

- .1 Labels shall clearly indicate:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .2 Remove damaged, opened and rejected materials from site.
- .3 Provide and maintain dry, temperature controlled, secure storage.
- .4 Observe manufacturer's recommendations for storage and handling.
- .5 Store materials and supplies away from heat generating devices.
- .6 Store materials and equipment in a well ventilated area with temperature range 7⁰C to 30⁰C.
- .7 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .8 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Consultant. After completion of operations, return areas to clean condition to approval of Consultant.
- .9 Remove paint materials from storage only in quantities required for same day use.
- .10 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .11 Fire Safety Requirements:

- .1 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
- .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.9 FINISHES AND COLOURS

- .1 Review the requirements outlined in Section 099127, Finish Schedule and Colour Notes. A separate colour schedule will be issued after contract award.
- .2 Allow for 10 colours total from all formulations for this project including room wall accent colours.

1.10 WASTE MANAGEMENT AND DISPOSAL

- .1 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
- .2 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .3 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
- .4 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground the following procedures shall be strictly adhered to:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
 - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
 - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
- .5 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
- .6 Set aside and protect surplus and uncontaminated finish materials: galvanized touch up; wood stain, prefinished metal touch up paint. Deliver to or arrange collection by recycling organization for verifiable re-use or re-manufacturing.
- .7 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

Part 2 Products

2.1 MATERIALS

- .1 Acceptable Manufacturer's: Where OPCA code numbers are not referenced, use Products from one of the following manufacturers:
 - .1 Benjamin Moore & Co. Ltd.
 - .2 Canadian Industries Ltd.
 - .3 ICI (Glidden) Paints.
 - .4 Para Paints.
 - .5 Pratt & Lambert Inc.
 - .6 SICO Coatings.
 - .7 The Sherwin-Williams Company.
- .2 Manufacturers of intumescent coatings having Product considered acceptable for use:
 - .1 A/D Fire Protection Systems Inc.
 - .2 Carboline.
- .3 Paint materials for paint systems shall be products of a single manufacturer.
- .4 Acceptable products: Per Chapter 5 OPCA Manual and as listed.
- .5 Paint materials for each paint system to be products of a single manufacturer.
- .6 Use low-VOC and low-odour paints only.

Part 3 Execution

3.1 GENERAL

- .1 Prepare surfaces to receive paint per Chapter 3 OPCA Manual.

3.2 APPLICATION

- .1 Sand and dust between each coat to remove defects visible from distance up to 1.5 m.
- .2 Finish closets and alcoves as specified for adjoining rooms.
- .3 Apply each coat at the proper consistency. Each coat of finish should be fully dry and hard before applying the next coat, unless the manufacturer's instructions state otherwise.
- .4 Method of application to be as approved by Consultant. Apply paint by [brush] [roller] [air sprayer] [airless sprayer]. Conform to manufacturer's application instructions unless specified otherwise.
- .5 Brush and Roller Application:

- .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
- .2 Work paint into cracks, crevices and corners.
- .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
- .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Consultant.
- .5 Remove runs, sags and brush marks from finished work and repaint.
- .6 Spray application:
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
 - .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
 - .3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.
 - .4 Brush out immediately all runs and sags.
 - .5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.
- .7 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access and only when specifically authorized by Consultant.
- .8 Apply coats of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .9 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .10 Sand and dust between coats to remove visible defects.
- .11 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .12 Finish inside of cupboards and cabinets as specified for outside surfaces.
- .13 Finish closets and alcoves as specified for adjoining rooms.
- .14 Finish top, bottom, edges and cut-outs of doors after fitting as specified for door surfaces.

3.3 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Refer also to Finish Notes in Section 099127- Finish and Colour Notes.
- .2 Paint exposed conduits, pipes, hangers and other mechanical and electrical equipment occurring in finished areas as well as inside cupboards and cabinet work. Colour and texture to match adjacent surfaces, except as noted otherwise. Coordinate with

mechanical trades applying banding and labeling after pipes have been painted. Do not paint white PVC covers on exposed mechanical water, drain and other lines

- .3 Paint gas piping standard yellow where visible on roof or in service spaces. Do not paint gas meter or gas equipment in wall niche yellow—colour to later selection by Architect.
- .4 Paint surfaces inside of ductwork and elsewhere behind grilles where visible using primer and one coat of matte black paint.
- .5 Paint both sides and edges of plywood backboards for equipment before installation.
- .6 Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

3.4 PAINT SYSTEMS

- .1 System references listed are based on Chapters 4A and 4B of OPCA Manual and are OPCA Premium Grade, unless noted otherwise.

3.5 INTERIOR FINISHES

- .1 Wood, where applicable:
 - .1 Miscellaneous trim: INT. 1-A, Alkyd Semi-Gloss Finish, Premium Grade
 - .2 Casework and miscellaneous wood items:
 - .1 Exterior surfaces: INT. 1-A, Alkyd Semi-Gloss Finish, Premium Grade
 - .2 Interior surfaces: INT. 1-A, Alkyd Semi-Gloss Finish, Premium Grade
 - .3 Wood Benches and Upper Shelves: INT. 2-F, Stained Alkyd Satin Finish, Premium Grade.
- .2 Gypsum board: INT.4-B, Latex Eggshell Finish, Premium Grade.
- .3 Acoustical wall panels: INT. 6-A, Latex Flat Finish, Custom Grade.
- .4 Concrete Block: EP - All corridors, stairwells and vestibules - 100 percent zero VOC epoxy.
- .5 Concrete Block: INT.8-C -modified; Areas other than corridors, stairwell and vestibules - Latex Semi-Gloss Finish, Premium Grade. Modified system refers to all work where 2 full coats of block filler shall be applied.
- .6 Concrete Floors; refer to Section 03 35 05 Concrete Floor Hardeners
- .7 Miscellaneous metal:
 - .1 Primed: INT. 12-A, Alkyd Semi-Gloss Finish, Premium Grade
 - .2 Galvanized: INT. 13-A, Alkyd Semi-Gloss Finish, Premium Grade
 - .3 INT. 12-G, Water based Epoxy finish, two coats on a rust inhibitive primer for all exposed steel railings, guards, etc..
- .8 Galvanized metal: INT. 13-A, Alkyd Semi-Gloss Finish, Premium Grade

- .9 Hollow Metal Doors and Frames: Without exception, all wipecoated Galvanized Hollow Metal Doors, Frames and Screens, interior and exterior shall be field cleaned with solvent, galvanized prime paint coated and then finished with INT. 13-A Premium Grade, Gloss Finish. Base coat primer shall be submitted for review in advance or door/frame painting shall be rejected by Consultant. For exterior hollow metal frames, if any, adjacent to aluminum windows, provide finish coat as an exterior premium grade metallic gloss finish to match anodized windows or Aluminum Composite panels. Colour to be confirmed by Architect during construction.
- .10 Other Painting:
- .1 In the any rooms with exposed metal deck including mechanical rooms and storage rooms:
- .1 Allow for single colour for deck and joists.
- .2 Allow for complete painting of all hangers and equipment brackets including but not limited to, electrical and mechanical equipment, etc.
- .3 painting deck/floor slab and structural steel is part of painting contract.

3.6 EXTERIOR PAINTING

- .1 Pavement markings: To CGSB 1-GP-74M, alkyd traffic paint.
- .1 Sandblast existing line painting on asphalt to Owner's satisfaction, prior to application of new markings.
- .2 Colour: to CGSB 1-GP-12C, white 513-301.
- .3 Thinner: to CAN/CGSB-1.5
- .4 All paint to confirm to OPSS #1712 and be supplied by one of the following suppliers.
- | | |
|-------------------------------------|-------------|
| White Paint Code | |
| Niagara Paint and Chemical Co. Ltd. | #87932 |
| Ibis Products Ltd. | #40-2478 |
| CIL | #7612-26992 |
| Sherwin Williams | #C97WG129 |
| Sico Paints | #3007649W |
- .2 Miscellaneous metal:
- .1 Primed: EXT. 11-A-Gloss, Premium Grade
- .2 Galvanized: Touch up any welds, cuts or damage with 'Galvafroid' Paint by W.R. Meadows prior to prime and finish coats.; Finish System EXT. 12-A-Gloss, Premium Grade
- .3 Galvanized Structural Steel: Touch up any welds, cuts or damage with 'Galvafroid' Paint by W.R. Meadows prior to prime and finish coats.; Finish System: EXT. 12-A-Gloss, Premium Grade.
- .4 Steel - high heat: EXT. 15-A
- .5 Paint exterior vents and louvres located in masonry to match adjacent masonry in colour.

3.7 INSPECTIONS

- .1 Provide Architect with all formulations at outset of project.
- .2 Cooperate at all times with the paint inspection agency in the performance of their duties as required as part of the work of this Section.
- .3 Inspection costs to be paid from Cash Allowance.

END OF SECTION

Part 1 General

1.1 GENERAL FINISH NOTES

- .1 The Material and Colour Schedule will be issued by the Consultant after tender. It shall be read in conjunction with the Drawings, Specifications, Room Schedule and Door Schedule. Colour and material references named will be based on one manufacturer, as carried by the Contractor or, in the case that no specific manufacturer is carried, based on the Consultant's choice.
- .2 Approved alternative manufacturers will be acceptable only as indicated in the specifications. However, approved alternate products submitted must match the products named in the Specification to the Consultant's selection. Alternate products other than those named in the specifications will not be allowed unless previously approved by the Consultant.
- .3 Consult Consultant prior to painting any surface not included in the formulae as listed.
- .4 Final colour for exterior painted surfaces and prominent interior areas shall be approved on the job site by the Consultant.
- .5 Paint samples: Contractor to submit paint samples for all areas required to "Match Adjacent Finish".
- .6 All similar paint formulations are to be identical when dry. Variations in tone, texture or sheen shall not be accepted.
- .7 Submit two 300 mm x 300 mm paint samples of each colour required for approval by the Architect.
- .8 Exact locations of accent paint called for in the Material and Colour Schedule, to be issued after Contract award, not specifically identified on the drawings are to be verified on site with the Consultant.

1.2 EXTERIOR FINISH NOTES

- .1 All exposed metal (doors, frames, lintels, stairs, handrails, mechanical equipment, etc.) to be painted except for prefinished metal louvres, stainless steel, and aluminum. Mechanical equipment is to be painted whether delivered to the site pre-painted or not (exhaust fans, goosenecks, exhaust stacks, supports, HVAC units, HRU units, etc.). Colours to match adjacent material-generally either to match brick or tan to match flashing or siding material. Do not paint exposed white PVC pipe covers on interior. Architect will advise on jobsite which other items mentioned above, if any, do not require painting.
- .2 All unfinished metal work provided by landscaping is to be painted by Section 099122-Painting.

1.3 INTERIOR FINISH NOTES

- .1 All heating units, recessed convectors, grilles, pipes, access panels, hangers and miscellaneous exposed metal work (except stainless steel or anodized aluminum) to be painted to match the surfaces on which they occur unless noted otherwise on the colour schedule, prefinished in suitable colour or directed by the Consultant. If prefinished equipment is damaged, it shall be re-painted. Painting to be by formulations specified in Section 09 91 12- Painting.
- .2 All interior fitments, casework, millwork, etc. to be melamine unless otherwise noted. Refer to Sections for specific requirements regarding materials, construction, finishes and hardware. Note that drawer and cupboard interiors are to be considered as exposed surfaces and will therefore be finished.
- .3 Do not paint over nameplates, identification tags, etc.
- .4 Make good all existing surfaces and finishes that are damaged during construction.

END OF SECTION

PART 1 - GENERAL

1.1 General Notes

1. Find the **Room Finish Schedule** on the following page.
2. Refer to interior elevations, plans sections and reflected ceiling plans to coordinate finish notes and extents of materials.
3. Refer to various specifications sections for different types of materials including, but not limited to:
 - .1 flooring materials such as resilient tile
 - .2 ceiling materials such as Lay-In Acoustical panel (LAP)
 - .3 Acoustical wall treatment
4. Abbreviations Legend:

<u>Code</u>	<u>Reference</u>
ASD	Acoustic Steel Deck
CMT	Ceramic Mosaic Tile
CPT	Carpet Tile
CWT	Ceramic Wall Tile
CB	Concrete Block
GWB	Gypsum Board
LAP	Lay-in Acoustic Panel
LVT	Luxury Vinyl Tile
EP	Epoxy Paint
EX	Existing
EXIST	Existing
POR	Porcelain Tile
PT	Paint
RR	Resilient Rubber
RSTR	Rubber Stair Tread & Riser
SF	Resilient Sheet Flooring
S.CONC	Sealed Concrete (refer to Section 03 35 05)
TER	Terazzo
VCT	Vinyl Composite Tile
WRGB	Water-Resistant Gypsum Board

END OF SECTION

**Hespeler P.S. Office Renovation
Room Finish Schedule**

ROOM FINISH SCHEDULE		FLOOR		WALL		CEILING			REMARKS
NO.	NAME	FIN.	BASE	MAT'L	FIN.	MAT'L	FIN.	HEIGHT(mm)	
GROUND FLOOR									
X102	FOYER	EX. CERAMIC TILE	EX. CERAMIC TILE	EX	EP	GWB/EX	PT	EX	PATCH EX. CERAMIC TILE FLOOR AT LOCATION OF DEMOLISHED WALLS.
A103	GENERAL OFFICE	POR/CPT	POR/CPT	EX./CB/GWB	EP	LAP1/ GWB	PT	VARIES	REFER TO FLOOR FINISHES PLAN. REFER TO RCP.
A104	OFFICE	CPT	CPT	EX./CB/GWB	EP	LAP1	-	2800	
A105	OFFICE	CPT	CPT	EX./CB/GWB	EP	LAP1	-	2800	
A106	OFFICE	CPT	CPT	EX./CB/GWB	EP	LAP1	-	2800	
A107	CORRIDOR	POR	POR	CB	EP	LAP1	-	2800	
A108	STORAGE	SF	RR	CB	EP	LAP2	-	2600	
A109	HEALTH	POR	POR	EX./CB	EP	LAP1	-	2600	
A109A	HEALTH WR	POR	POR	CB	EP/CWT	LAP2	-	2600	REFER TO INTERIOR ELEVATIONS FOR WALL TILE LOCATION
A110	VESTIBULE	POR	POR	EX./CB	EP	LAP1	-	2600	
A111	STAFF LOUNGE	LVT	RR	EX./CB/GWB	EP/CWT	LAP1	-	2800	CWT BACKSPLASH AT COUNTER MILLWORK.
A112	STAFF WR	POR	POR	CB	EP/CWT	LAP2	-	2600	REFER TO INTERIOR ELEVATIONS FOR WALL TILE LOCATION
A113	STAFF WR	POR	POR	EX./CB	EP/CWT	LAP2	-	2600	REFER TO INTERIOR ELEVATIONS FOR WALL TILE LOCATION
A114	GENDER NUTRAL WR	POR	POR	EX./CB	CWT	LAP2	-	2600	REFER TO INTERIOR ELEVATIONS FOR WALL TILE LOCATION
A115	STAFF WORKROOM	LVT	RR	EX./CB	EP	LAP2	-	2800	
A116	MEETING ROOM	CPT	CPT	EX./CB	EP	LAP2	-	2600	
A117	LITERACY ROOM	SF	RR	EX./CB	EP	LAP2	-	2600	

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.

1.2 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site packaging materials at appropriate recycling facilities.
- .2 Dispose of recyclable packaging material in appropriate on-site bin for recycling.

Part 2 Products

2.1 MATERIALS

- .1 Tack Boards (TB) - As manufactured by Architectural School Products, Mississauga; natural coloured cork tackboard:
 - .1 **NATURAL CORK TACKBOARDS** 12.7mm (1/2") factory prelaminated consisting of 6mm (1/4") thick a.s.p. natural cork laminated to 6mm (1/4") particle board or masonite substrate under mechanical pressure in maximum panel sizes of 1219mm x 2438mm (4'0" x 8'0"). Bonding of materials by a waterproof adhesive that will not delaminate or rupture at the contact surfaces.
 - .2 All tackboards shall meet the minimum requirements of the applicable building code and/or Ontario Fire Marshall's office.
 - .3 Acceptable alternates: Global School Products Inc.
 - .4 Shop finish rear faces of tackboard units being installed in horizontal sliding trim to a matte black finish.
 - .5 Refer to Construction Drawings for locations & sizes required.

- .2 White Boards (WB) - “Vit-Rite: Rite on, Wipe off” model as manufactured by Architectural School Products, Mississauga.
 - .1 **WHITEBOARD – VITRITE**
by architectural school products Ltd., Mississauga, Ontario, consisting of a sandwich type construction composed of face panel, core and balancing rear sheet, in maximum panel sizes of 1219mm x 2438mm (4’0” x8’0”)
 - .2 Face Panel – 22 gauge high quality enamelling steel base with a porcelain enamel writing surface used to a ground coat of not less than 0.076mm (.003”) nor more than 0.127mm (.005”) after firing at temperatures between 700°C (1300°F) and 800°C (1500°F) in accordance with the Porcelain Enamel Institute Standards PEI S104 as regards to durability, smoothness of texture, colour continuity and a gloss factor of 6 – 8 as measured by 45° glossometer.
 - .3 Core – 11.1mm (7/16”) impregnated sound absorbing fibreboard laminated under heat and pressure to face panel and back sheet utilizing adhesives that ensure rupturing of the component materials before failure of joint contact surfaces.
 - .4 Back up balancing sheet – 28 gauge zinc coated stretcher leveled steel in one unjointed section. Overall thickness of Whiteboard lamination shall be 12.7mm (1/2”).
 - .5 Colour: White
 - .6 Acceptable alternates: Global School Products Inc.
 - .7 Refer to Construction Drawings for locations & sizes required.
 - .8 Manufacturer’s Warranty: warrant White Boards for a period of 10 years against defects due to normal usage and wear.
- .3 White Board, Tack Board and Bulletin Board Fixed Trim: ASP Series 200 to match details and profiles shown on architectural drawings. Aluminum to be 6063-T5 alloy with 0.051 mm thick clear anodized satin finish, free from extruding draw marks and surface scratches; components as follows:
 - .1 Perimeter Trim: extruded aluminum trim for all tackboards and also vertical jambs of chalkboards; e.g. ASP No. 205.
 - .2 Divider Bar: extruded aluminum trim to adjacent chalkboard/tackboard panels and adjacent tackboard panels of elevations greater then 2,440 mm; e.g. ASP No. 207.
 - .3 Map Rail: extruded aluminum trim complete with integral tan cork insert, end stops and two combination roller map hooks for ever 1.83 linear metres of map rail; e.g. ASP No. 206.
 - .4 Marker Tray: extruded aluminum triangular box section for chalkboard elevation only complete with contour fitting end castings; 102 mm projection from finished wall; e.g. ASP No. 212.
 - .5 Marker Tray Over Millwork: extruded aluminum trims section for elevations mounted directly on or above millwork; 70 mm projection from finished wall; e.g. ASP No. 264.
 - .6 Display rail above each chalkboard, tackboard and whiteboard: one of the following products:
 - .1 “Kwikgrip” Display Rail by Architectural School Products Ltd. (Model 200).
 - .2 “Grip-A-Strip” by Global.

- .7 Chalk rail below each chalkboard and markerboard: A.S.P. #212 (no cabinets below) and #264 (cabinets below).
- .8 Refer to Construction Drawings for locations & sizes required.
- .4 Coat Rod and Hooks:
 - .1 Student line Model STL 1001 as manufactured by Architectural School Products, Mississauga. Mounted on masonry wall. Refer to floor plan for location. Mount directly to wall.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 INSTALLATION

- .1 Install where indicated on drawings and as per manufacturer's instructions.

3.3 DEMONSTRATION AND TRAINING

- .1 Provide demonstration of operation to the Owner and his representatives.
- .2 Provide training for operation, maintenance and repairs.

3.4 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean surfaces after installation using manufacturer's recommended cleaning procedures.
- .3 Clean aluminum with damp rag and approved non-abrasive cleaner.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 10 21 14 – Metal Toilet Compartments.
- .3 Section 10 28 10 – Plastic Toilet Compartments.
- .4 Section 08 80 50 – Glazing: Mirrors.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A167-[99], Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM B456-[95], Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
 - .3 ASTM A653/A653M-[99], Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .4 ASTM A924/A924M-[99], Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.81-[M90], Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
 - .2 CAN/CGSB-1.88-[92], Gloss Alkyd Enamel, Air Drying and Baking.
 - .3 CAN/CGSB-12.5-[M86], Mirrors, Silvered.
 - .4 CGSB 31-GP-107Ma-[90], Non-inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover.
- .3 Canadian Standards Association (CSA)
 - .1 CAN/CSA-B651-[95], Barrier-Free Design.
 - .2 CAN/CSA-G164-[M92], Hot Dip Galvanizing of Irregularly Shaped Articles.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures
- .2 Shop drawings of units for use by the handicapped shall be distinctly marked and cross-referenced to the corresponding article in the specifications.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

Part 2 Products

2.1 MATERIALS

- .1 Ferrous Steel: Sheet, cold-rolled furniture steel, double annealed, mill stretched and leveled, and fully pickled. Otherwise, steel shall be hot-rolled or cold-rolled of alloy to suit needs of fabrication, use, and appearance.
- .2 Galvanized Steel: For sheet, Z275 zinc coating designation in accordance with ASTM Specification A525. For irregular sections, hot dip galvanized to comply with CSA G164.
- .3 Stainless steel sheet metal: to ASTM A167, Type 304, with No. 4 finish.
- .4 Anchors and Fastenings: Where exposed, use stainless steel and otherwise to match metal anchored. Where non-exposed, use the same as that specified for exposed, or use galvanized steel. Anchors and fastenings shall be of the type appropriate for the substrate to which accessory unit is secured.

2.2 COMPONENTS

- .1 Fixed Grab Bars (GB): 32 mm outside diameter; 1.2 mm thick stainless steel; pended non-slip finish; round or oval concealed flange attachments, as described below:
 - .1 Straight Profile: e.g. Frost Model 1001-DP-24.
 - .2 L-Shaped Profile: e.g. Frost Model 1003-DP-30x30.
 - .3 All bars to have concealed mounting hardware
 - .4 Quantity: refer to drawings
 - .5 All bars to withstand horizontal and vertical pull of 2.2 Kn
 - .6 Location: Refer to drawings for locations and quantities.
- .2 Toilet Paper Dispenser (TD): Model 150 by Frost
 - .1 Quantity: refer to drawings
 - .2 Location: Refer to drawings for locations and quantities.
- .3 Paper Towel Dispenser (PTD): Model F101-1 by Frost
 - .1 Quantity: refer to drawings
 - .2 Location: Refer to drawings for locations and quantities.
- .4 Soap Dispenser (SD): Model 710A, by Frost
 - .1 Quantity: refer to drawings
 - .2 Location: Refer to drawings for locations and quantities.
- .5 Sanitary Napkin Disposal (SN): Model 620, by Frost
 - .1 Quantity: 1 per washroom
 - .2 Location: Refer to drawings for locations and quantities.
- .6 Convenience Shelves (CS): Model B295x16 by Bobrick
 - .1 Quantity: refer to drawings
 - .2 Location: Staff Washroom and Washrooms where noted, refer to drawings.

- .7 Safety Release Coat Hook (BH):
 - .1 Refer to drawings for locations.
 - .2 High strength polycarbonate coat hook with safety release weight under downward pressure to not exceed 12 kg (26 lbs.)
 - .3 Supply all suitable mounting hardware for a vandal proof, secure installation using stainless steel sleeve bolts on partition doors or panels. Do not supply standard Robertson or Phillips head screws.
 - .4 Colours:
 - .1 Allow for one (1) colour from Manufacturers standard line
 - .5 Acceptable Materials: “HenkelHook” as manufactured/distributed by Henkel Diversified Inc, London ON, tel (519) 641-5872 or “Model 1150 – Safety Coat Hook” with stainless steel base as manufactured/distributed by Frost.
 - .6 Locations: Washrooms
- .8 Mirrors
 - .1 Fixed Mirrors (designation Type M):
 - .1 Best quality, 6 mm thick float glass, with concealed tamperproof clip fasteners.
 - .2 24 ga., Type 302 or 304 No 4 finish stainless steel frames on all edges and galvanized iron backing with concealed mounts.
 - .3 Sizes: each unit 610 mm x 915 mm.
 - .4 Locations: as shown on Drawings.
 - .5 Acceptable Materials: Frost ‘Stock series’ model 941TG Tempered Glass; 24” x 36” each.
 - .6 Acceptable alternate: B-2908 Series, Bobrick Washroom Equipment Co.
 - .9 Acceptable Alternates to those items listed above as manufactured by Bradley Corp. & Supplied by Wentworth Assoc. Ltd., Frost Products Ltd., Watrous (ASI) or Bobrick Washroom Equipment Co. and Saferail meeting or exceeding these specifications.

2.3 FABRICATION

- .1 Construction: Fabricate with materials, component sizes, metal gauges, reinforcing, anchors and fasteners of adequate strength to withstand intended use.
- .2 Where specified as frameless, provide stainless steel accessories with one-piece fronts having 90 degree formed returns at their edges and openings.
- .3 Where accessory fronts are framed, frame edges, both inside and outside, with 90 degree formed returns continuously welded and ground smooth at the corners. Doors shall also have 90 degree formed returns as specified.
- .4 Unless otherwise specified, hinges shall be semi-concealed stainless steel piano hinges extending full-length of hinged element. Provide hinged elements with concealed, mechanically-retained rubber bumpers for silent closing, and shall close flush with faces of fronts or frames.

- .5 Ensure that work will remain free of warping, buckling, opening of joints and seams, distortion and permanent deformation.
- .6 No exposed fixings permitted. Cut edges and openings square and smooth. Chamfer corners of edges and cut-outs 1.6 mm.
- .7 Assembly: Accurately cut, machine and fit joints, corners, copes and mitres so that junctions between components fit together tightly and in true planes.
- .8 Fasten work with concealed methods, unless otherwise indicated on Drawings.
- .9 Weld all connections where possible, bolt where not possible and cut off bolts flush with nuts. Countersunk bolt heads, and provide method to prevent loosening of nuts. Ream holes drilled for fastening.
- .10 Welded joints shall be tight, flush, and in true planes with base metals. Make welds continuous at joints where entry of water into voids of members or assemblies is possible.
- .11 Provide for differential movements within assemblies and at junctions of assemblies with surrounding work.
- .12 Welds in exposed locations shall be ground and polished smooth.
- .13 Finish Work: Provide holes and connections for related work installed under other Sections of this specification, if applicable.
- .14 Cleanly and smoothly finish exposed edges of materials, including holes.

Part 3 Execution

3.1 INSPECTION OF SECTION

- .1 Take site measurements to ensure that work is fabricated to fit surrounding construction around obstructions and projects in place, or as shown on drawings, and to suit service locations.

3.2 INSTALLATION

- .1 Install all accessories in accordance with manufacturers' instructions at their recommended mounting heights unless noted otherwise on drawings.
- .2 Securely fasten accessories plumb, true, square, straight, level, and accurately and tightly fitted together and to surrounding work. Install in locations shown and specified herein. Mounting heights as shown or in accordance with the OBC in the case of barrier-free accessories.
- .3 Work shall include anchor bolts, bolts, washers and nuts, lag screws, expansion shields, toggles, straps, sleeve brackets, clips, and other items necessary for secure installation, as required by loading and by Jurisdictional Authorities.
- .4 Attach work at wood by screws through countersunk holes in metal.

- .5 Attach work to masonry with lead plugs and non-corrosive fastenings, to support load with a safety factor of 3. Perform all drilling necessary to install the work.
- .6 Insulate between dissimilar metals or between metals and masonry or concrete with bituminous paint, to prevent electrolysis.
- .7 Coordinate installation with the work of other trades adjacent to accessories to achieve the reveals or other edge conditions shown, where their front faces are flush with the finished wall surfaces.
- .8 Owner to supply and install remainder of washroom accessories not specified here (toilet paper dispensers, etc.). Cooperate with Owner as required.

3.3 CLEANING UP AND ADJUSTMENT

- .1 Upon completion of the work, or when directed, remove all traces of protective coatings or paper.
- .2 Test mechanisms, hinges, locks and latches, and where necessary, adjust and lubricate and ensure that accessories are in perfect working order.

END OF SECTION

Part 1 General

1.2 RELATED WORK

- .1 Section 08 50 00 – Aluminum Windows
- .2 Section 08 44 13 – Aluminum Curtain Wall

1.3 SUBMITTALS

- .1 Product data:
 - .1 Submit duplicate copies of manufacturer's Product data in accordance with Section 01 33 00 indicating:
 - .1 Performance criteria, compliance with appropriate reference standard(s), characteristics, limitations, and finishes.
 - .2 Product transportation, storage, handling and installation requirements.
 - .2 Shop drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00.
 - .2 Provide layout, details of track and operating hardware, installation details.
 - .3 Samples: Submit 600 mm x 600 mm duplicate samples of Dual Sun Shade material and colour.
 - .4 Closeout submittals:
 - .1 Submit following for each Product for incorporation into Operations and Maintenance Manuals in accordance with Section 01 78 00:
 - .1 Functional description detailing operation and control of components.
 - .2 Performance criteria and maintenance data.
 - .3 Operating instructions and precautions.
 - .4 Safety precautions.
 - .2 Submit maintenance data, wrenches or specialty tools, cleaning and maintenance instructions

1.5 QUALITY ASSURANCE

- .1 Shades and track shall be installed by a qualified specialist with expertise and experience in this type of work.

Part 2 Products

2.1 MATERIALS

- .1 **Manual Roller Shade Window Covering (RS):**
 - .1 Manually controlled, extruded aluminum hanger and closure.
 - .2 Specifications are based on 300 Series Solarblock 1% open, advanced polyester sun control fabric. Colour to be selected later by Consultant.
 - .3 Locations: noted on drawings with 'RS'. (Interior sidelites and Exterior Windows)
 - .4 Recess into windows and curtainwall where possible.

- .5 Manufactured by Solarfective Products Ltd., Mechoshade Systems Inc., as, Silent Gliss Model 4110 by Architectural Products, Mecho/5 Model or 200 Vic roller shades.
- .6 All shades systems specified in this section shall be provided by one manufacturer who shall take full responsibility for the total project.

2.2 Solarfective Shading blackout fabric:

- .1 Shade cloths shall be woven of .018 opaque, vinyl coated polyester yarn consisting of approx. 79% vinyl and 21% 500 denier polyester core yarn. The fabric shall be tensioned in the finishing range prior to heat setting to keep the warp ends straight and minimize or eliminate weave distortion to keep the fabric flat. The fabric shall be dimensional stable. Colour will be selected from standard range. It shall be tear resistant meeting NFPA 701.

- .2 Meet or exceed the following statistics:

Openness Factor		1%+0.0%-0.5%
Weight per sq.yd.		21 oz.
Warp ends per inch		42
Fill ends per inch		31
Stretch % (271lb.wt.):	warp	2%
	fill	3%
Set %	warp	1.5%
	fill	1.5%
Abrasion Resistance (500 Tarber Cycles)	YARN	none
	RAPTURE	none
	WEAR	TRACE
U.V. Deterioration (200 Sun Fade Hours)	Fade	none
Tensile Retention		96%

2.2 FABRICATION

- .1 Fabricate shades in accordance with reviewed shop drawings and manufacturer's written instructions.

Part 3 Execution

3.1 INSTALLATION

- .1 Securely install shades and track adding brackets as required but in no case less than four brackets.
- .2 After installation fabric shall hang flat, without buckling or distortion. The edge when trimmed, shall hang straight without ravelling. An unguided roller shade cloth shall roll true and straight, without shifting sideways more than 3mm in either direction due to warp distortion, or weave design.

3.4 CLEAN UP

- .1 At conclusion of work remove all debris, dirt; clean surfaces like glass, floor, stools, heating units if soiled. Test each re-installed drape, each sunshade numerous times and make adjustments to assure trouble-free installation and operation.
- .2 Brief maintenance staff regarding proper care, cleaning, lubricating, adjusting, etc.

END OF SECTION

Division 20 Common Requirements for Mechanical

- 20 00 01 Mechanical Specification Index
- 20 02 51 **Common Contract Requirements for Mechanical**
Mechanical Contract Requirements
- 20 05 11 **Common Work Results for Mechanical**
Mechanical Work Requirements
- 20 05 21 Demolition and Renovation
- 20 05 34 Bases, Hangers and Supports
- 20 05 53 Identification of Mechanical Services
- 20 06 11 **Testing, Adjusting, and Balancing**
Testing, Adjusting, and Balancing (TAB) of Mechanical Systems

Division 21 Fire Suppression

- 21 13 13 **Fire-Suppression Sprinkler Systems**
Wet Pipe Fire Suppression

Division 22 Plumbing

- 22 07 19 **Plumbing Insulation**
Plumbing Piping Insulation
- 22 11 16 **Facility Water Distribution**
Domestic Water Piping - Copper
- 22 11 31 Potable Water Auxiliary Equipment
- 22 13 13 **Facility Sanitary Sewerage**
Sanitary Drains
- 22 13 16 Sanitary Waste and Vent Piping – Cast Iron and Copper
- 22 13 17 Sanitary Waste and Vent Piping – Plastic
- 22 36 13 **Plumbing Auxiliary Equipment**
Plumbing Auxiliary Equipment
- 22 37 13 **Fire Extinguishers**
Portable Fire Extinguishers
- 22 44 13 **Plumbing Fixtures Combined With Drawing Schedule**
Plumbing Fixtures Combined With Drawing Schedule

Division 23 Heating, Ventilating, and Air Conditioning (HVAC)

- 23 01 31 **Operation and Maintenance of HVAC Systems**
HVAC System Cleaning
- 23 07 13 **HVAC Insulation**
Duct Insulation

	HVAC Ducts and Casings
23 31 13	Metal Ducts
	Air Duct Accessories
23 33 13	Duct Accessories
23 33 13.13	Volume-Control Dampers
23 33 46	Flexible Ducts
23 33 53	Duct Liners
	HVAC Fans
23 34 23	Packaged Exhausters
	Air Outlets and Inlets
23 37 13	Diffusers, Registers, and Grilles
23 37 23	Louvres and Vents for Intake and Exhaust

Division 25 Integrated Automation

	Control Systems
25 40 11	Building Control System

END OF SECTION

Part 1 General

1.1 GENERAL PROVISIONS

- .1 This section covers items common to all sections of Mechanical Division.
- .2 Conform to Division 1 General Conditions.
- .3 Furnish labour, materials, and equipment necessary for completion of work as described in contract documents.
- .4 Unless specifically indicated, all materials and equipment provided under this contract shall be new and shall be manufactured in the project year.

1.2 INTENT

- .1 Mention herein or indication on Drawings of articles, materials, operations or methods requires: supply of each item mentioned or indicated, of quality, or subject to qualifications noted; installation according to conditions stated: and, performance of each operation prescribed with furnishing of necessary labour, equipment, and incidentals for mechanical work.
- .2 Where used, words "Section" and "Division" shall also include other Subcontractors engaged on site to perform work to make building and site complete in all respects.
- .3 Where used, word "supply" shall mean furnishing to site in location required or directed complete with accessory parts.
- .4 Where used, word "install" shall mean secured in place and connected up for operation as noted or directed.
- .5 Where used, word "provide" shall mean supply and install as each is described above.

1.3 TENDERS

- .1 Submit tender based on specified described equipment or Alternates listed.

1.4 REGULATIONS, PERMITS AND FEES

- .1 All materials and quality of work shall meet all current and latest Provincial, Municipal and Fire Marshall requirements, regulations, codes and by-laws in force in the area of the project.
- .2 Each contractor shall give all necessary notices, obtain all necessary permits, and pay all fees in order that the work shown or specified may be carried out. Each contractor shall furnish any certificates necessary as evidence that the work installed conforms with the laws and regulations of all authorities having jurisdiction.
- .3 In the event that changes or alterations are required on completed work by authorized inspectors, these changes shall be made at the contractor's expense.
- .4 Special equipment which does not have a standard CSA label shall be inspected by the local electrical authority having jurisdiction and the Approval Certificate shall be submitted to the Consultant as soon as possible. All costs and fees for inspections shall be borne by this contractor.

- .5 Submit a copy of all final certificates in the maintenance manuals.

1.5 DRAWINGS

- .1 Mechanical Drawings do not show structural and related details. Take information involving accurate measurement of building from building drawings, or at building. Make, without additional charge, any necessary changes or additions to runs of piping, conduits and ducts to accommodate structural conditions. Location of pipes, ducts, conduits and other equipment may be altered by Consultant without extra charge provided change is made before installation and does not necessitate major additional material.
- .2 As work progresses and before installing piping, ductwork, heating units, registers, diffusers, fixtures and any other fittings and equipment which may interfere with interior treatment and use of building, provide detail drawings or obtain directions for exact location of such equipment and fittings.
- .3 Mechanical Drawings indicate general location and route of pipes, ducts and conduits which are to be installed. Where required work is not shown or only shown diagrammatically, install same at maximum height in space to conserve head room (minimum 2200 mm (88") clear) and interfere as little as possible with free use of space through which they can pass. Follow building lines, conceal piping, conduits and ducts in furred spaces, ceilings and walls unless specifically shown otherwise. Install work close to structure so furring will be small as practical.
- .4 Install piping and ductwork to clear structural members and any fireproofing. Locate mechanical work to permit installation of specified insulation. Do not remove or damage structural fireproofing. Leave space to permit fireproofing and insulation to be inspected and repaired.
- .5 Before commencing work, check and verify all sizes, locations, grade and invert elevations, levels and dimensions to ensure proper and correct installation. Verify existing/municipal services.
- .6 Locate all mechanical and electrical equipment in such a manner as to facilitate easy and safe access to and maintenance and replacement of any part.
- .7 In every place where there is indicated space reserved for future or other equipment, leave such space clear, and install piping and other work so that necessary installation and connections can be made for any such apparatus. Obtain instructions whenever necessary for this purpose.
- .8 Relocate equipment and/or material installed but not co-ordinated with work of other Sections and/or installed incorrectly as directed, without extra charge.
- .9 Where drawings are done in metric and product not available in metric, the corresponding imperial trade size shall be utilized.

1.6 INTERFERENCE AND CO-ORDINATION DRAWINGS

- .1 Prepare interference and equipment placing drawings to ensure that all components will be properly accommodated within the constructed spaces provided.

- .2 Prepare drawings to indicate co-ordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment apparatus, and connections are co-ordinated.
- .3 Ensure that clearances required by jurisdictional authorities and clearances for proper maintenance are indicated on drawings.
- .4 Upon consultant's request submit copies of interference drawings to consultant.
- .5 Due to the nature of the building and the complexity of the building systems provide the following:
 - .1 Interference drawings, showing coordination of architectural, structural, mechanical and electrical systems for the consultant's review prior to fabrication.
 - .2 Detailed layout drawings, clearly showing fasteners and hangers.
- .6 Provide CAD drawings (minimum release AutoCAD 2007) in addition to hard copies.

1.7 QUALITY ASSURANCE

- .1 Perform work in accordance with applicable provisions of local Plumbing Code, Gas Ordinances, and adoptions thereof for all mechanical systems. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
- .2 In case of differences between building codes, provincial laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Promptly notify Consultant in writing of such differences.

1.8 ALTERNATES AND SUBSTITUTIONS

- .1 Throughout Mechanical Division are lists of "Alternate Equipment" manufacturers acceptable to Consultant if their product meets characteristics of specified described equipment. Submitted Bids shall be based on the supply of named articles and or products as specified in the Bid Documents.
- .2 Each bidder may elect to use "Alternate Equipment" from lists of Alternates where listed. Include for any additional costs including all costs for revisions to electrical contract to suit Alternate used. Prices are not required in Tender for Alternates listed except where specifically noted as "Separate Price". Complete the Supplementary Tender Form.
- .3 When two or more suppliers/manufacturers are named in the Bid Documents, only one supplier/manufacturer of the products named will be acceptable; however, it is the responsibility of this Division to ensure "Alternate Equipment" fits space allocated and gives performance specified. If an "Alternate Equipment" nor "equal" specified product unit is proposed and does not fit space allotted in Consultant's opinion, supply of specified described equipment will be required without change in Contract amount. Should electrical characteristics for "alternate" or "equal" equipment differ from equipment specified it shall be the responsibility of the equipment manufacturer to pay all costs associated with the revisions to the electrical contract. Only manufacturers listed will be accepted for their product listing. All other manufacturers shall be quoted as substitution stating conditions and credit amount.

- .4 If item of material specified is unobtainable, state in Tender proposed substitute and amount added or deducted for its use. Extra monies will not be paid for substitutions after Contract has been awarded.
- .5 If pipe or item, of size or weight indicated, is unobtainable, supply next larger size or heavier weight without additional charge.

1.9 EXAMINATION

- .1 Site Inspection
 - .1 Examine premises to understand conditions, which may affect performance of work of this Division before submitting proposals for this work.
 - .2 No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.
- .2 Drawings:
 - .1 Mechanical Drawings show general arrangement of piping, ductwork, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
 - .2 Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over Plumbing, Mechanical, and Fire Protection Drawings.
 - .3 Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories, which may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.
- .3 Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.

1.10 SEQUENCING SCHEDULING AND COORDINATION

- .1 It is understood that while Drawings are to be followed as closely as circumstances permit, this Division will be held responsible for installation of systems according to the true intent and meaning of Contract Documents. Anything not clear or in conflict will be explained by making application to Consultant. Should conditions arise where certain changes would be advisable, secure Consultant's approval of these changes before proceeding with work.
- .2 Coordinate work of various trades in installing interrelated work. Before installation of mechanical items, make proper provision to avoid interferences in a manner approved by Consultant. Each Contractor shall refer to all sections of the specification for their responsibilities with other trades. Changes required in work specified in Mechanical Division caused by neglect to do so shall be made at no cost to Owner.

- .3 Arrange pipes, ducts, and equipment to permit ready access to valves, unions, traps, starters, motors, control components, and to clear openings of doors and access panels.
- .4 Furnish and install inserts and supports required by Mechanical Division unless otherwise noted. Furnish sleeves, inserts, supports, and equipment that are an integral part of other Divisions of the Work to Sections involved in sufficient time to be built into construction as the Work proceeds. Locate these items and see that they are properly installed. Expense resulting from improper location or installation of items above shall be borne by Mechanical Division.
- .5 Be responsible for required excavation, backfilling, cutting, and patching incident to work of this Division and make required repairs afterwards to satisfaction of Consultant. Cut carefully to minimize necessity for repairs to existing work. Do not cut beams, columns, or trusses.
 - .1 Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials.
 - .2 Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.
 - .3 Cutting, patching, repairing, and replacing pavements, sidewalks, roads, and curbs to permit installation of work of this Division is responsibility of Section installing work.
- .6 Adjust locations of pipes, ducts, equipment, fixtures, etc, to accommodate work from interferences anticipated and encountered. Determine exact route and location of each pipe and duct prior to fabrication.
 - .1 Make offsets, transitions, and changes in direction of pipes, ducts, and electrical raceways as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
 - .2 Furnish and install traps, air vents, sanitary vents, pull boxes, etc, as required to effect these offsets, transitions, and changes in direction.
- .7 Slots and openings through floors, walls, ceilings, and roofs shall be provided by this contractor but performed by a trade specializing in this type of work. This Division shall see that they are properly located and do any cutting and patching caused by its neglect to do so.

1.11 CONTRACT BREAKDOWN

- .1 Provide breakdown of contract exclusive of HST to acceptance of consultants prior to first draw submission.
- .2 Provide labour and material cost for each item.
- .3 Breakdown shall indicate total contract amount.
- .4 Contract breakdown shall be as follows as a minimum.
 - Mobilization and shop drawings (max. \$2000.00)
 - Demolition
 - Inside buried plumbing and drainage

Above grade rough-in plumbing and drainage
Plumbing Fixtures
Plumbing Equipment
Sprinkler system and heads
Piping Insulation
Ductwork
Duct Insulation
Grilles & Diffusers
Fire Stopping
Fans & Equipment
Building Automation Systems
Testing Adjusting and Balancing
Mechanical contractor closeout requirements (min. of 3% but not less than \$5,000.00)

- .5 Progress claims, when submitted are to be itemized against each item of the contract breakdown, this shall be done in table form showing contract amount, work complete to date, previous draw, amount this draw and balance.

1.12 SHOP DRAWINGS AND PRODUCT DATA

- .1 Furnish complete catalog data for manufactured items of equipment to be used in the Work to Consultant for review within 30 days after award of Contract.
- .2 Provide a complete list of shop drawings to be submitted prior to first submission.
- .3 Before submitting to the Consultant, review all shop drawings to verify that the products illustrated therein conform to the Contract Documents. By this review, the Contractor agrees that it has determined and verified all field dimensions, field construction criteria, materials, catalogue numbers, and similar data and that it has checked and coordinated each shop drawing with the requirements of the work and of the Contract Documents. The Contractor's review of each shop drawings shall be indicated by stamp, date and signature of a qualified and responsible person possessing by the appropriate authorization.
- .4 If material or equipment is not as specified or submittal is not complete, it will be rejected by Consultant.
- .5 Additional shop drawings required by the contractor for maintenance manuals, site copies etc., shall be photocopies of the "reviewed" shop drawings. All costs to provide additional copies of shop drawings shall be borne by the contractor.
- .6 Submit all shop drawings for the project as a package. Partial submittals will not be accepted.**
- .7 Catalog data or shop drawings for equipment, which are noted as being reviewed by Consultant or his Engineer shall not supersede Contract Documents.
- .8 Review comments of Consultant shall not relieve this Division from responsibility for deviations from Contract Documents unless Consultant's attention has been called to such deviations in writing at time of submission, nor shall they relieve this Division from responsibility for errors in items submitted.
- .9 Check work described by catalog data with Contract Documents for deviations and errors.

- .10 Shop drawings and product data shall show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances. e.g. access door swing spaces.
- .11 Shop drawings and product data shall be accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Acoustical sound power data, where applicable.
 - .3 Points of operation on performance curves.
 - .4 Manufacturer to certify as to current model production.
 - .5 Certification of compliance to applicable codes.
- .12 State sizes, capacities, brand names, motor HP, accessories, materials, gauges, dimensions, and other pertinent information. List on catalog covers page numbers of submitted items. Underline applicable data.
- .13 Shop drawings shall be submitted electronically as per the following directions:
 - .1 Electronic Submissions:
 - .1 Electronically submitted shop drawings shall be prepared as follows:
 - .1 Use latest software to generate PDF files of submission sheets.
 - .2 Scanned legible PDF sheets are acceptable. Image files are not acceptable.
 - .3 PDF format shall be of sufficient resolution to clearly show the finest detail.
 - .4 PDF page size shall be standardized for printing to letter size (8.5"x11"), portrait with no additional formatting required by the consultant. Submissions requiring larger detail sheets shall not exceed 11"x17".
 - .5 Submissions shall contain multiple files according to section names as they appear in Specification.
 - .6 File names shall include consultant project number and description of shop drawing section submitted.
 - .7 Each submission shall contain an index sheet listing the products submitted, indexed in the same order as they appear in the Specification. Include associated PDF file name for each section.
 - .8 On the shop drawing use an "electronic mark" to indicate what is being provided.
 - .9 **Each file shall bear an electronic representation of the "company stamp" of the contractor. If not stamped the file submission will not be reviewed.**
 - .2 Email submissions shall include subject line to clearly identify the consultants project number and the description of the shop drawings submitted.

- .3 Electronic attachments via email shall not exceed 10MB. For submissions larger than 10MB, multiple email messages shall be used. Denote related email messages by indicating "1 of 2" and "2 of 2" in email subject line for the case of two messages.
- .4 Electronic attachments via web links (URL) shall directly reference PDF files. Provide necessary access credentials within link or as username/password clearly identified within body of email message.
- .5 On site provide one copy of the "reviewed" shop drawings in a binder as noted above.
- .6 Contractor to print copies of "reviewed" shop drawings and compile into maintenance manuals in accordance with requirements detailed in this section.

1.13 OPERATION AND MAINTENANCE MANUAL

- .1 Provide operation and maintenance data for incorporation into manual as in submittals' requirements.
- .2 Operation and maintenance manual to be approved by, and final copies deposited with, Consultant before final inspection.
- .3 Operation data to include:
 - .1 Control schematics for each system including environmental controls.
 - .2 Description of each system and its controls.
 - .3 Description of operation of each system at various loads together with reset schedules and seasonal variances.
 - .4 Operation instruction for each system and each component.
 - .5 Description of actions to be taken in event of equipment failure.
 - .6 Valves schedule and flow diagram.
 - .7 Colour coding chart.
 - .8 Spare parts equipment list.
 - .9 Manufacturers standard or extended warranty information.
- .4 Maintenance data shall include:
 - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
 - .2 Data to include schedules of tasks, frequency, tools required and task time.
- .5 Performance data to include:
 - .1 Equipment manufacturer's performance data sheets with point of operation as left after commissioning is complete.
 - .2 Equipment performance verification test results.
 - .3 Special performance data as specified elsewhere.
 - .4 Testing, adjusting and balancing reports as specified in Testing, Adjusting and Balancing Section.

- .6 Miscellaneous data to include:
 - .1 Letter of contractors warranty and guarantee.
 - .2 Index sheet.
 - .3 Tabbed format for each section.
 - .4 Manufacturers approved shop drawings.
 - .5 Spare parts list and source.
 - .6 List of Manufacturers and suppliers address for each piece of equipment.
- .7 Approvals:
 - .1 Submit 1 copy of Operation and Maintenance Manual to Consultant for approval. Submission of individual data will not be accepted unless so directed by Consultant.
 - .2 Make changes as required and re-submit as directed by Consultant.
 - .3 Provide three (3) copies of final operation maintenance manuals, as well as a PDF file of the entire approved manual on a USB stick. Only one USB stick is to be provided containing both the approved manual and as-built drawings.
- .8 Additional data:
 - .1 Prepare and insert into operation and maintenance manual when need for same becomes apparent during demonstrations and instructions specified above.

1.14 AS-BUILT DRAWINGS

- .1 Site records:
 - .1 Contractor shall provide 2 sets of reproducible mechanical drawings. Provide sets of white prints as required for each phase of the work. Mark thereon all changes as work progresses and as changes occur. This shall include changes to existing mechanical systems, control systems and low voltage control wiring.
 - .2 On a weekly basis, transfer information to reproducibles, revising reproducibles to show all work as actually installed.
 - .3 Use different colour waterproof ink for each service.
 - .4 Make available for reference purposes and inspection at all times.
- .2 As-Built drawings:
 - .1 Prior to start of Testing, Adjusting and Balancing (TAB), finalize production of as-built drawings.
 - .2 Identify each drawing in lower right hand corner in letters at least 3 mm (1/8") high as follows: - "AS-BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (date).
 - .3 TAB to be performed using as-built drawings.
 - .1 Submit hard copy to Consultant for approval. When returned, make corrections as directed.
 - .2 Once approved, submit completed reproducible paper as-built drawings as well as a scanned pdf file copy on USB stick with Operating and Maintenance Manuals.

1.15 WARRANTIES

- .1 In addition to guarantee specified in General Conditions, guarantee heating, cooling, and plumbing systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.
- .2 Provide certificates of warranty for each piece of equipment made out in favor of Owner. Clearly record "start-up" date of each piece of equipment on certificate. Include certificates as part of Operation & Maintenance Manual.
- .3 If mechanical sub-contractor with offices located more than 80 km (50 miles) from Project site is used, provide service/warranty work agreement for warranty period with local mechanical sub-contractor approved by Consultant. Include copy of service/warranty agreement in warranty section of Operation & Maintenance Manual.
- .4 Warranty period shall start from date of substantial completion.

1.16 SUBSTANTIAL PERFORMANCE

- .1 Complete the following to the satisfaction of the consultant prior to request for submission of substantial performance.
 - .1 As-Built Drawings.
 - .2 Maintenance Manuals
 - .3 System Start up
 - .4 TAB Reports
 - .5 HVAC System Commissioning
 - .6 Instructions to Owners
 - .7 Final Certificates (required prior to consultant's release of conformance letter).
 - .1 NFPA-13 Contractors Material and Test Certificate (sprinkler)
 - .2 Sprinkler/Standpipe Design Engineers' Letter
 - .3 Potable Water Test (Refer to domestic water piping – Copper section – Part 3)

1.17 OCCUPANCY REQUIREMENTS

- .1 The contractor shall provide the following documentation to the consultant prior to receiving occupancy. Failure to provide the proper documentation will result in the occupancy not being granted. List of required documentation:
 - .1 Final Certificates (required prior to consultant's release of conformance letter).
 - .1 NFPA-13 Contractors Material and Test Certificate (sprinkler).
 - .2 Sprinkler/Standpipe Design Engineers' Letter.
 - .3 Potable Water Test (Refer to domestic water piping – Copper section – Part 3).

1.18 REVISION TO CONTRACT

- .1 Provide the following:
 - .1 Itemized list of material with associated costs.
 - .2 Labour rate and itemized list of labour for each item.
 - .3 Copy of manufacturers/suppliers invoice if requested.

1.19 DELIVERY STORAGE & HANDLING

- .1 Follow Manufacturer's directions in delivery, storage, and protection, of equipment and materials.
- .2 Deliver equipment and material to site and tightly cover and protect against dirt, water, and chemical or mechanical injury but have readily accessible for inspection. Store items subject to moisture damage (such as controls) in dry, heated space.

1.20 PHASING OF WORK

- .1 This work for this project shall be constructed in phases. Refer to the architectural drawings for phasing information and details. Misinterpretation of the drawings with respect to the extent of the phasing of the work shall not relieve the contractor of the work required to complete the entire contract.
- .2 Provide all necessary services or temporary services to suit phasing of construction with respect to all mechanical services and fire protection.
- .3 Life safety systems in the building are to remain fully operational in occupied areas for building staff and occupants during renovations.
- .4 Provide all necessary tests and certificates at completion of each phase to suit requirements of local authorities and consultants for occupancy of completed areas.

1.21 TSSA INSPECTION

- .1 Prior to final completion of the project, this contractor shall make application, arrange, and pay for a TSSA inspection of all piping systems and equipment installations, including, but not limited to medical gasses, refrigeration, fuel piping, compressed air, heating plant, cooling plant, and associated equipment installed under the contract.
- .2 Provide a copy of the TSSA report in the maintenance manuals for each system.

1.22 ENERGY EFFICIENCY

- .1 The mechanical systems of this building must achieve the energy efficiency levels by conforming to ANSI/ASHRAE/IESNA 90.1 "Energy Standard for Buildings Except Low-Rise Residential Buildings" and Chapter 2 of Division 3 of SB-10 prescriptive method from the Ontario Building Code.
- .2 All equipment, products, and installations must conform to the Codes and Standards.

END OF SECTION

Part 1 General

1.1 TESTS

- .1 Give 48 hours written notice of date for tests.
- .2 Insulate or conceal work only after testing and approval by Consultant.
- .3 Conduct tests in presence of Consultant.
- .4 Bear costs including retesting and making good.
- .5 Piping:
 - .1 General: maintain test pressure without loss for 4 h unless otherwise specified.
 - .2 Hydraulically test steam and hydronic piping systems at 1-1/2 times system operating pressure or minimum 860 kPa, whichever is greater.
 - .3 Test natural gas systems to CSA-B149.1-00, TSSA requirements and requirements of authorities having jurisdiction.
 - .4 Test fuel oil systems to CSA B139 1976, CSA B139S1-1982 and authorities having jurisdiction.
 - .5 Test drainage, waste and vent piping to Ontario Building Code and authorities having jurisdiction.
 - .6 Test domestic hot, cold and recirculation water piping at 1-1/2 times system operating pressure or minimum 860 kPa (124.8 psi), whichever is greater.
 - .7 Test fire systems in accordance with authorities having jurisdiction and as specified elsewhere.
- .6 Equipment: test as specified in relevant sections.
- .7 Prior to tests, isolate all equipment or other parts which are not designed to withstand test pressures or test medium.

1.2 SYSTEM START UP

- .1 **Provide adjusting testing and start up of all equipment prior to testing and balancing (TAB) specified elsewhere.**
- .2 **Provide consultant with written notice verifying all equipment operation and installation is complete.**
- .3 **Start up shall be in presence of the following: owner or representative, contractor, building automation systems (BAS) contractor, and manufacturer's representative. Each person shall witness and sign off each piece of equipment. Consultant's attendance will be determined by consultant.**
- .4 Simulate system start up and shut down and verify operation of each piece of equipment.
- .5 Arrange with all parties and provide 72 hours notice for start up procedure.
- .6 Arrange with building automation systems contractor to sequence all components and ensure system operation.

1.3 COMMISSIONING

- .1 Co-ordinate and direct each step of the commissioning process and recommend acceptance or non-acceptance to the Owner/Owner's Representative.**
- .2 Prepare, in writing, documentation of any deficiencies discovered during the commissioning process. Submit to consultant and Owner/Owner's Representative.**
- .3 The Commissioning Process is detailed in *ASHRAE Guideline 1-1996 HVAC Commissioning Process*. The commissioning plan may be modified to reflect the actual construction schedule and design.**
- .4 Provide a pre-functional test of all HVAC mechanical system and sub-system elements, including control devices, shall be checked for the following:**
 - .1 Verify that each element has been properly installed, properly identified, and that all connections (including electrical) have been made correctly.**
 - .2 Verify that each element has been checked for proper lubrication, drive rotation, belt tension, control sequence, flow direction, or other conditions which may cause damage or reduce system performance.**
 - .3 Verify that tests, meter readings, and specific mechanical/electrical performance characteristics agree with those required by equipment or system manufacturer.**
 - .4 Controls calibration to be completed in accordance with the specification.**
 - .5 The TAB shall be done in accordance with the specifications.**
- .5 A functional performance testing shall be done during two separate periods – one during the cooling season and one during the heating season. The first (cooling) testing period shall occur as soon after completion of installation as practical. The heating testing period shall occur as soon as weather conditions make it practical to test warm-up, zone heating and economizer functions. These tests ensure that all equipment and systems operate in accordance with design intent. The tests are dynamic tests, and test the systems through all possible modes of operation.**
- .6 Reports:**
 - .1 The contractor shall be responsible for recording, documenting, and maintaining detailed inspection and testing data on the test documentation reports. The data record shall be comprehensive and concise.**
 - .2 All data must be recorded as soon as possible during the course of the inspection and testing.**
 - .3 All documentation shall have the date, time, and names of persons participating in the inspection and testing.**
 - .4 All test instruments shall be documented for valid calibration.**
 - .5 The recording work sheets, inspection check lists, and Performance Testing plans must all be approved by the Engineer and the owner's representative prior to the start of the testing.**
 - .6 Include all commissioning documentation in the maintenance manuals.**

.7 Mechanical System Execution:

- .1 Operate equipment and systems shall be tested in the presence of the owner's representative and the consultant to demonstrate compliance with specified requirements. To minimize the time of Commissioning Team members, testing shall be done in four seasonal single blocks of time insofar as possible.**
 - .2 Notify the consultant, in writing, fourteen (14) days prior to tests scheduled under requirements of this Section.**
 - .3 Testing shall be conducted under specified design operating conditions as recommended or approved by the consultant.**
 - .4 All elements of systems shall be tested to demonstrate that total systems satisfy all requirements of these Specifications. Testing shall be accomplished on hierarchical basis. Test each piece of equipment for proper operation, followed by each sub-system, followed by entire system, followed by any inter-ties of other major systems.**
 - .5 All special testing materials and equipment shall be provided by the appropriate contractor.**
 - .6 Provide three copies of all test reports and records to the consultant.**
- .8 The verification testing procedures shall address all operating characteristics of all mechanical equipment and systems, including:**

Equipment Checklist

Exhaust Fans

Controllers/Valves/Dampers

Relays/Sensors/Transducers

1.4 DEMONSTRATION AND OPERATING AND MAINTENANCE INSTRUCTION

- .1 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.**
- .2 Mechanical contractor to schedule and coordinate the demonstration all on the same day, starting at a pre-approved time and continuing consequently until complete.**
- .3 Where specified elsewhere in Mechanical Division, qualified manufacturers' representatives who are knowledgeable about the project to provide demonstrations and instructions.**
- .4 Use operation and maintenance manual, as-built drawings, audio visual aids, etc. as part of instruction materials.**
- .5 Instruction duration time requirements as specified in appropriate sections.**
- .6 Where deemed necessary, Consultants may record these demonstrations on video tape for future reference.**

1.5 TRIAL USAGE

- .1 Consultant or owner may use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.**

- .2 Trial usage to apply to following equipment and systems:
 - .1 HVAC
 - .2 Exhaust air
 - .3 Domestic water
 - .4 Plumbing and drainage.

1.6 DEFICIENCIES

- .1 During the course of construction, the consultants will monitor construction and provide written reports of work progress, discussions, and instruction to correct work.
- .2 Instruction to correct work shall be done within the work period before the next review.
- .3 The contractor shall not conceal any work until inspected.
- .4 The contractor shall expedite 100% complete rough-in work and have inspected prior to concealing services and equipment especially above ceiling.
- .5 Upon completion of the project the consultant will do a final review. Upon receiving the final inspection report, the contractor must correct and sign back the inspection report indicating the deficiencies are completed. A re-inspection will only be done once consultant receives this in writing.

1.7 EQUIPMENT INSTALLATIONS

- .1 Unions or flanges: provide for ease of maintenance and disassembly.
- .2 Space for servicing, disassembly and removal of equipment and components: provide as recommended by manufacturer or as indicated.
- .3 Equipment drains: pipe to floor drains.
- .4 Install equipment, rectangular cleanouts and similar items parallel to or perpendicular to building lines.

1.8 MOUNTING HEIGHTS

- .1 Mounting height of equipment is from finished floor to equipment unless specified or indicated otherwise. Coordinate with block coursing (if applicable).
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.
- .3 Install mechanical equipment at following heights unless indicated otherwise.
 - .1 Standard water closets 350 (14") to top of bowl
 - .2 Barrier-free water closets 400 (16") to top of bowl
 - .3 Wall hung lavatory 787 (31") to rim
 - .4 Barrier-free wall hung lavatory 840 (33") max to top of rim
737 (29") min underside of rim front
685 (27") clear at 400 (8") from basin front
350 (14") min clear under waste trap
 - .5 Barrier-free drinking fountains 840 mm (33") to rim
Not less than 686 (27") under unit

.6	Fire extinguisher	1350 (4'- 0") to hanger
.7	Fire extinguisher cabinets	1500 (5'- 0") to top of cabinet
.8	Thermostats: Barrier Free (operable)	1200 mm (47.25")
	Non Barrier Free	1500 mm (59")

Also follow direction of architectural drawings and where discrepancies occur clarify prior to rough-in.

1.9 ANCHOR BOLTS AND TEMPLATES

- .1 Supply anchor bolts and templates for installation by other divisions.

1.10 PROTECTION OF OPENINGS

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

1.11 ELECTRICAL

- .1 Electrical work to conform to Electrical Division including the following:
 - .1 Supplier and installer responsibility and related mechanical responsibility is indicated in Equipment Schedule on mechanical and/or electrical drawings
 - .2 Power wiring and conduit is specified in Electrical Division except for conduit, wiring and connections below 50 V which are related to control systems specified in Mechanical Division. Follow Electrical Division for quality of materials and workmanship.
 - .3 Electrically operated equipment shall be C.S.A. approved label. Special Inspection Label of Provincial Authority having jurisdiction will be accepted in lieu of C.S.A. approval. Each motor shall have an approved starter. Starter will be supplied and installed by Electrical Division unless otherwise indicated.

1.12 CONTROL WIRING

- .1 Furnish and install all components, devices, and control wiring for all plumbing, fire protection, HVAC equipment, HVAC systems, lighting, and other electrical loads to make all equipment operable to satisfaction of owner and consultant and to manufacturer's requirements and recommendations.
- .2 All electrical wiring, mechanical wiring and installations shall comply with local and national electrical and mechanical codes.
- .3 Supply and install wiring as required for all devices and systems. Install wiring in EMT conduit and otherwise comply with all requirements of the Electrical Division. Approved plenum wire may be used for sensor and network communication wiring where it complies with appropriate building codes and regulatory authorities.
- .4 All wiring concealed in walls and chases, and all exposed wiring shall be run in conduit.
- .5 Provide recessed conduit and backer boxes where controls are wall mounted. Surface mounted boxes and conduit are acceptable in mechanical or service rooms.

- .6 Free-run plenum rated cable shall be run in cable hangers where provided by electrical division or tied neatly to pipe and duct hangers in the ceiling. Avoid wiring that droops. Follow building lines and do not run wiring "as the crow flies".

1.13 PIPING AND EQUIPMENT SUPPORTS

- .1 Equipment supports supplied by equipment manufacturer: specified elsewhere in Mechanical Division.
- .2 Piping and equipment supports not supplied by equipment manufacturer: fabricate from structural grade steel meeting requirements of - Structural Steel Section. Submit structural calculations with shop drawings.
- .3 Mount base mounted equipment on chamfered edge housekeeping pads, minimum of 100 mm (4") high and 150 mm (6") larger than equipment dimensions all around. Concrete specified elsewhere.
- .4 Where housekeeping pads incorporate existing pads provide 10 mm dowels into existing pads. New pad height shall match existing.

1.14 SLEEVES

- .1 Pipe sleeves: at points where pipes pass through masonry, concrete or fire rated assemblies and as indicated. Grout sleeves in place.
- .2 Schedule 40 steel pipe.
- .3 Sleeves with annular fin continuously welded at midpoint:
 - .1 Through foundation walls.
 - .2 Where sleeve extends above finished floor.
 - .3 Through fire rated walls and floors.
- .4 Sizes: minimum 6 mm (1/4") clearance all around, between sleeve and uninsulated pipe or between sleeve and insulation.
- .5 Terminate sleeves flush with surface of concrete and masonry walls, concrete floors on grade and 25 mm (1") above other floors.
- .6 Fill voids around pipes:
 - .1 Caulk between sleeve and pipe in foundation walls and below grade floors with waterproof fire retardant non-hardening mastic.
 - .2 Where sleeves pass through walls or floors, provide space for firestopping. Where pipes/ducts pass through fire rated walls, floors and partitions, maintain fire rating integrity.
 - .3 Ensure no contact between copper tube or pipe and ferrous sleeve.
 - .4 Fill future-use sleeves with lime plaster or other easily removable filler.
 - .5 Coat exposed exterior surfaces of ferrous sleeves with heavy application of zinc rich paint to CGSB 1-GP-181M+Amdt-Mar-78.
- .7 Provide minimum 20 gauge duct sleeves where ducts pass through masonry concrete or fire rated assemblies. Maintain minimum 25 mm clearance all around or to the requirements of the authority having jurisdiction. Seal at wall as indicated.

1.15 FIRE STOPPING

- .1 This contractor shall work with all other contractors on the project in providing one common method of fire stopping all penetrations made in fire rated assemblies.
- .2 Approved fire stopping and smoke seal material in all fire separations and fire ratings within annular space between pipes, ducts, insulation and adjacent fire separation and/or fire rating.
- .3 Do not use cementious or rigid seals around penetrations for pipe, ductwork, or other mechanical items.
- .4 Insulated pipes and ducts: ensure integrity of insulation and vapour barrier at fire separation.
- .5 Provide materials and systems capable of maintaining effective barrier against flame, smoke and gases. Ensure continuity and integrity of fire separation.
- .6 Comply with the requirements of CAN4-S115-M35, and do not exceed opening sized for which they have been tested.
- .7 Systems to have an F or FT rating (as applicable) not less than the fire protection rating required for closures in a fire separation. Provide "fire wrap" blanket around services penetrating fire walls. Extent of blanket must correspond to ULC recommendations.
- .8 The fire stopping materials are not to shrink, slump or sag and to be free of asbestos, halogens and volatile solvents.
- .9 Firestopping materials are to consist of a component sealant applied with a conventional caulking gun and trowel.
- .10 Fire stop materials are to be capable of receiving finish materials in those areas which are exposed and scheduled to receive finishes. Exposed surfaces are to be acceptable to consultant prior to application of finish.
- .11 Firestopping shall be inspected and approved by local authority prior to concealment or enclosure.
- .12 Install material and components in accordance with ULC certification, manufacturers instructions and local authority.
- .13 Submit product literature and installation material on fire stopping in shop drawing and product data manual. Maintain copies of these on site for viewing by installers and consultant.
- .14 Manufacturer of product shall provide certification of installation. Submit letter to the consultant.
- .15 Acceptable Manufacturer:
Minnesota Mining and Manufacturing

- .16 Acceptable Alternate Manufacturers to approval of local authority:
 - Fryesleeve Industries Inc.
 - General Electric Pensil Firestop Systems
 - International Protective Coatings Corp.
 - Rectorseal Corporation (Metacaulk)
 - Proset Systems
 - 3M
 - AD Systems
 - Hilti
- .17 Ensure firestop manufacturer representative performs on site inspections and certifies installation. Submit inspection reports/certification at time of substantial completion.

1.16 ESCUTCHEONS

- .1 On pipes and ductwork passing through walls, partitions, floors and ceilings in exposed finished areas and on water and drain pipes inside millwork and cabinets.
- .2 Chrome or nickel plated brass or Type 302 stainless steel, one piece type with set screws.
- .3 Outside diameter to cover opening or sleeve.
- .4 Inside diameter to fit around finished pipe.

1.17 PAINTING

- .1 Refer to Section Interior Painting and specified elsewhere.
- .2 Apply at least one coat of corrosion resistant primer paint to ferrous supports and site fabricated work.
- .3 Apply two coats of paint to exposed piping service in mechanical room, base colour as specified in Mechanical Identification Section.
- .4 Prime and touch up marred finished paintwork to match original.
- .5 Restore to new condition, or replace equipment at discretion of consultant, finishes which have been damaged too extensively to be merely primed and touched up.

1.18 SPARE PARTS

- .1 Furnish spare parts in accordance with general requirements and as follows:
 - .1 One set of packing for each pump.
 - .2 One casing joint gasket for each size pump.
 - .3 One head gasket set for each heat exchanger.
 - .4 One glass for each gauge glass.
 - .5 One set of belts for each type or each size of machinery.
 - .6 One filter cartridge or set of filter media for each filter or filter bank in addition to final operating set.
- .2 Provide list of equipment in maintenance manuals indicating corresponding spare parts required. List of spare parts to be signed off by receiving personnel.

1.19 SPECIAL TOOLS

- .1 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Maintenance Materials Special Tools and Spare Parts.

1.20 ACCESS DOORS

- .1 Provide access doors to concealed mechanical equipment for operating, inspecting, adjusting and servicing.
- .2 Flush mounted 600 x 600 mm (24" x 24") for body entry and 300 x 300 mm (12" x 12") for hand entry unless otherwise noted. Doors to open 180°, have rounded safety corners, concealed hinges, screwdriver latches and anchor straps.
- .3 Material:
 - .1 Special areas such as tiled or marble surfaces: use stainless steel with brushed satin or polished finish as directed by Consultant.
 - .2 Remaining areas: use prime coated steel.
 - .3 Fire rated areas: provide ULC listed access doors.
 - .4 Washrooms or high moisture area ceilings: Aluminum with mill finish suitable for painting.
- .4 Installation:
 - .1 Locate so that concealed items are accessible.
 - .2 Locate so that hand or body entry (as applicable) is achieved.
- .5 Acceptable materials:
Le Hage
Zurn
Acudor
Nailor Industries Inc.

1.21 DIELECTRIC COUPLINGS

- .1 General:
 - .1 To be compatible with and to suit pressure rating of piping system.
 - .2 Where pipes of dissimilar metals are joined.
- .2 Pipes NPS 50 mm (2") and under: isolating unions.
- .3 Pipes NPS 65 mm (2 1/2") and over: isolating flanges.

1.22 DRAIN VALVES

- .1 Locate at low points and at section isolating valves unless otherwise specified.
- .2 Minimum NPS 20 mm (3/4") unless otherwise specified: bronze, with hose end male thread and complete with cap and chain.
- .3 Drain valves on potable water systems shall be complete with vacuum breaker.

1.23 REPAIRS, CUTTING, AND RESTORATION

- .1 Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials.
- .2 Each Section of this Division shall bear expense of cutting, patching, and repairing to install their work and/or replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.
- .3 Cutting, patching, repairing, and replacing pavements, sidewalks, roads, and curbs to permit installation of work of this Division is responsibility of Section installing work.
- .4 All patching, painting and making good of the existing walls, floors, ceilings, partitions and roof will be at the expense of this Contractor, but performed by the Contractor specializing in the type of work involved unless otherwise noted.

1.24 EXISTING SYSTEMS

- .1 Connections into existing systems to be made at time approved by Consultant. Request written approval of time when connections can be made.
- .2 Be responsible for damage to existing plant by this work.

1.25 CLEANING

- .1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units prior to turn over to owner.
- .2 In preparation for final acceptance, clean and refurbish all equipment and leave in operating condition including replacement of all filters in all air and piping systems.

1.26 DISCONNECTION AND REMOVAL

- .1 Disconnect and/or remove equipment, piping, ductwork, etc. as indicated.
- .2 Cap and conceal all redundant and obsolete connections.
- .3 Provide a list of equipment to be removed to the owner, for his acceptance of same. Remove all equipment from site, which the owner does not retain.
- .4 Store equipment to be retained by owner on site where directed by consultant.

1.27 OWNER SUPPLIED EQUIPMENT

- .1 Connect to equipment supplied by the owner and make operable.

1.28 DEMOLITION

- .1 The general requirements are indicated on the drawings and on the outline specification in Division 1.
- .2 The general execution of the demolition is to be carried out in a clean and efficient manner.
- .3 Demolition of existing ceiling, walls etc., to facilitate removal of existing services or equipment or installation of new to be kept to a minimum and then restored to match existing.

- .4 All openings or holes created by removal of existing mechanical systems which are not being reused are to be patched with the same material surrounding surfaces.
- .5 All new holes and openings to facilitate mechanical systems are to be patched to match surrounding surfaces.
- .6 Protect all existing furnishings materials and equipment. Any damage occurring as a result of the work of this Division shall be repaired or replaced at the expense of this Division.
- .7 Where work involves breaking into or connecting to existing services, carry out work at times directed by the Owners in an expedient manner with minimum disruption to the facility and systems downtime.
- .8 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.
- .9 Where the location of any services has been shown on the plans, such information is not guaranteed. It is this Division's responsibility to verify locations, invert elevations, etc., immediately after moving on site. Should for any reason the information obtained necessitates changes in procedure or design, advise the Consultant at once. If verification of existing conditions is not done at the outset and any problems arise, the responsibility for same is entirely this Division's.

1.29 LOCATION OF EXISTING UNDERGROUND SERVICES

- .1 This contractor shall locate existing services prior to starting any work in the affected area.
- .2 This contractor shall use a video camera for the existing storm and/or sanitary drainage at the indicated connection point to confirm location, size and invert of the existing piping.

1.30 EXISTING CONCRETE SLAB X-RAY/SCANNING

- .1 This contractor shall retain the services of a qualified company to provide and X-Ray and/or scan of the existing buried services in wall and/or floors prior to starting any work in the affected area.
- .2 Failure to locate existing piping, conduit rebar etc., shall not relieve this contractor of repair of same prior to installing his service.
- .3 This contractor shall be responsible for all repairs and/or replacement of existing services caused by cutting the existing concrete slabs and/or walls.

1.31 EXCAVATING AND BACKFILLING

- .1 Provide all excavating and backfilling inside and outside the building for plumbing pipes, drains and equipment. All backfilling shall be new clean granular 'A' fill brought in specifically for the purpose of backfilling to the underside of floor slab. All backfilling shall be compacted at intervals not more than 150 mm (6") layer to the satisfaction of the Consultant.

- .2 Provide excavating and backfilling outside the building with granular A brought in specifically for backfilling to a minimum of 450 mm (18") over the pipe. Backfilling outside building over and above the 450 mm (18") backfill as previously specified herein shall be by the Mechanical Contractor as specified under Division 2. Where backfilling outside the building is not specified under Division 2 the mechanical contractor shall provide new clean granular 'A' fill to grade level.
- .3 Bottoms of trenches shall be excavated so that the pipe will be supported on a 150 mm (6") compacted bed of clean granular 'A' fill. Provide all necessary pumping to maintain excavation free of water.
- .4 Should water be encountered during excavation, the mechanical contractor shall provide all labour and material, including all equipment required for dewatering the excavation. After the water has been removed, this Contractor shall install a 300 mm (12") base of compacted 50 mm (2") clear stone covered with filter cloth before installing backfill as detailed and/or as specified.
- .5 Be responsible for all weather protection required to install piping and/or equipment to the satisfaction of the Consultant.
- .6 Be responsible for providing all clear stone or granular 'A' material suitable for application to replace existing soil not suitable for backfilling above the 450 mm (18") bedding material.

END OF SECTION

Part 1 General

1.1 GENERAL PROVISIONS

- .1 Conform to the General Provisions of General Requirements Section.
- .2 This project is one of a retrofit nature in part, and which will require some demolition.
- .3 Allow for all remedial work in areas indicated on the drawings and as generally defined in the relevant sections of the specifications.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- .1 Electrical Division.

1.3 SCOPE OF WORK

- .1 The scope of work is essentially the selected disconnection and/or removal of services and/or equipment, piping ductwork etc. as indicated or required to complete the work.

Part 2 Products

2.1 GENERAL

- .1 This Division is to liaise with the Owners or Consultant for equipment being removed that may be suitable for reuse to that specified or handed over to the owner.
- .2 This Division to take full responsibility for any special tools or equipment required to disassemble or remove material from building.

Part 3 Execution

3.1 GENERAL

- .1 The general requirements are indicated on the drawings and on the outline specification in Division 1.
- .2 The general execution of the demolition is to be carried out in a clean and efficient manner.
- .3 Demolition of existing ceiling, walls etc., to facilitate removal of existing services or equipment or installation of new to be kept to a minimum and then restored to match existing.
- .4 All openings or holes created by removal of existing mechanical systems which are not being reused are to be patched with the same material surrounding surfaces.
- .5 All new holes and openings to facilitate mechanical systems are to be patched to match surrounding surfaces.

- .6 Protect all existing furnishings materials and equipment. Any damage occurring as a result of the work of this Division shall be repaired or replaced at the expense of this Division.
- .7 Where work involves breaking into or connecting to existing services, carry out work at times directed by the Owners in an expedient manner with minimum disruption to the facility and systems downtime.
- .8 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.
- .9 Where the location of any services has been shown on the plans, such information is not guaranteed. It is this Division's responsibility to verify locations, invert elevations, etc., immediately after moving on site. Should for any reason the information obtained necessitates changes in procedure or design, advise the Consultant at once. If verification of existing conditions is not done at the outset and any problems arise, the responsibility for same is entirely this Division's.
- .10 Disconnect and/or remove equipment piping, ductwork, etc. as indicated.
- .11 Cap and conceal all redundant and obsolete connections.
- .12 Provide a list of equipment to be removed to the owner, for his acceptance of same. Remove all equipment from site which the owner does not retain.
- .13 Maintain equipment to be retained by owner on site where directed by consultant.
- .14 Demolition of all parts of the work must be completed within the confines of the work area and in such a way as the dust produced and risk to injury of will not adversely affect the building users.
- .15 Demolished areas of the existing building will remain in their current use in some cases. Demolition in these areas must be kept to the minimum required to complete the work.
- .16 Demolition shall take place within areas isolated from all other areas with appropriate hoarding, scaffolding, netting, fencing or other means of security between building users and the work.
- .17 Co-ordinate making safe electrical devices, capping plumbing and removal of fixtures prior to commencement of demolition.
- .18 All piping and equipment to be removed and/or abandoned shall be drained prior to capping and/or abandoning. Disposal of all liquids shall be to the approval of authority of having jurisdiction and/or provincial regulations.

3.2 EXISTING SYSTEM DRAINAGE

- .1 Drain all existing piping and drainage systems including all related equipment as required to facilitate system renovations.
- .2 Disposal of existing system shall be to the requirements of the local and/or provincial regulations.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 American National Standards Institute/ American Society of Mechanical Engineers (ANSI/ASME)
 - .1 ANSI/ASME B31.1, Power Piping, (SI Edition).
- .3 American Society for Testing and Materials (ASTM)
 - .1 ASTM A 125, Specification for Steel Springs, Helical, Heat-Treated.
 - .2 ASTM A 307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .3 ASTM A 563, Specification for Carbon and Alloy Steel Nuts.
- .4 Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS)
 - .1 MSS SP-58, Pipe Hangers and Supports - Materials, Design, Manufacture Selection, Application, and Installation.

1.2 DESIGN REQUIREMENTS

- .1 Construct pipe hanger and support to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.
- .2 Base maximum load ratings on allowable stresses prescribed by ASME B31.1 or MSS SP-58.
- .3 Ensure that supports, guides, anchors do not transmit excessive quantities of heat to building structure.
- .4 Design hangers and supports to support systems under all conditions of operation, allow free expansion and contraction, prevent excessive stresses from being introduced into pipework or connected equipment.
- .5 Provide for vertical adjustments after erection and during commissioning. Amount of adjustment to be in accordance with MSS SP-58.

1.3 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with general requirements.
- .2 Submit shop drawings and product data for following items:
 - .1 All bases, hangers and supports.
 - .2 Connections to equipment and structure.
 - .3 Structural assemblies.

1.4 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

Part 2

Products

2.1

GENERAL

- .1 Fabricate hangers, supports and sway braces in accordance with ANSI B31.1 and MSS-SP-58.
- .2 Use components for intended design purpose only. Do not use for rigging or erection purposes.

2.2

PIPE HANGERS

- .1 Finishes:
 - .1 Pipe hangers and supports: to ANSI & ULC requirements
 - .2 Ensure steel hangers in contact with copper piping are copper plated.
- .2 Upper attachment structural: Suspension from upper flange of I-Beam or joist.
 - .1 Cold piping NPS 50 mm (2") maximum: Ductile iron C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip.
 - .1 Rod: 10 mm (3/8") UL listed
 - .2 Cold piping NPS 65 mm (2 1/2") or greater, all hot piping: Malleable iron beam clamp, eye rod, jaws and extension with carbon steel retaining clip, tie rod, nuts and washers, UL listed & FM approved.
- .3 Upper attachment structural: Suspension from upper flange of I-Beam.
 - .1 Cold piping NPS 50 mm (2") maximum: Ductile iron top-of-beam C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip, UL listed.
 - .2 Cold piping NPS 65 mm (2 1/2") or greater, all hot piping: Malleable iron top-of-beam jaw-clamp with hooked rod, spring washer, plain washer and nuts.
- .4 Upper attachment to concrete.
 - .1 Ceiling: Carbon steel welded eye rod, clevis plate, clevis pin and cotters with weldless forged steel eye nut. Ensure eye 6 mm (1/4") minimum greater than rod diameter.
 - .2 Concrete inserts: wedge shaped body with knockout protector plate ULC listed. Note: Rapidex and Siporex are not considered concrete. Should one of these systems be encountered, piping/ductwork and/or equipment shall be supported from adjacent walls or from supplemental steel provided by this contractor attached to the adjacent walls/structure.
- .5 Shop and field-fabricated assemblies.
 - .1 Trapeze hanger assemblies: ASME B31.1.
 - .2 Steel brackets: ASME B31.1.
- .6 Hanger rods: threaded rod material to MSS SP-58.
 - .1 Ensure that hanger rods are subject to tensile loading only.
 - .2 Provide linkages where lateral or axial movement of pipework is anticipated.

- .7 Pipe attachments: material to MSS SP-58.
 - .1 Attachments for steel piping: carbon steel.
 - .2 Attachments for copper piping: copper plated black steel.
 - .3 Use insulation shields for all piping.
 - .4 Oversize pipe hangers and supports to accommodate thermal insulation. Provide 1.5 mm (16 gauge) saddles.
- .8 Adjustable clevis: material to MSS SP-58 UL listed, clevis bolt with nipple spacer and vertical adjustment nuts above and below clevis.
 - .1 Ensure "U" has hole in bottom for rivetting to insulation shields.

2.3 RISER CLAMPS

- .1 Steel or cast iron pipe: black carbon steel to MSS-SP-58, type 42, UL listed.
- .2 Copper pipe: carbon steel copper plated to MSS-SP-58, type 42.
- .3 Bolts: to ASTM A 307.
- .4 Nuts: to ASTM A 563.

2.4 INSULATION PROTECTION SHIELDS

- .1 Insulated cold piping:
 - .1 64 kg/m² (13.12 lbs/ft²) density insulation plus insulation protection shield to: MSS SP-69, galvanized sheet carbon steel. Length designed for maximum 3 m (10') span.
- .2 Insulated hot piping:
 - .1 Curved plate 300 mm (12") long, with edges turned up, welded-in centre plate for pipe sizes NPS 300 mm (12") and over, carbon steel to comply with MSS SP-58.

2.5 EQUIPMENT SUPPORTS

- .1 Fabricate equipment supports not provided by equipment manufacturer from structural grade steel meeting requirements of miscellaneous metals, specified herein. Submit calculations with shop drawings.

2.6 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

- .1 Provide templates to ensure accurate location of anchor bolts.

2.7 OTHER EQUIPMENT SUPPORTS

- .1 From structural grade steel meeting requirements of structural steel section specified herein.
- .2 Submit structural calculations with shop drawings.

2.8 MANUFACTURER

- .1 Acceptable materials:
 - .1 Grinnell
 - .2 Anvil
 - .3 Myatt
 - .4 Taylor

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with:
 - .1 Manufacturer's instructions and recommendations.
- .2 Vibration Control Devices:
 - .1 Install on piping systems at pumps, boilers, chillers, cooling towers, elsewhere as indicated.
- .3 Clamps on riser piping:
 - .1 Support independent of connected horizontal pipework using riser clamps and riser clamp lugs welded to riser.
 - .2 Bolt-tightening torques to be to industry standards.
 - .3 Steel pipes: Install below coupling or shear lugs welded to pipe.
 - .4 Cast iron pipes: Install below joint.
- .4 Clevis plates:
 - .1 Attach to concrete with 4 minimum concrete inserts at each corner.
- .5 Provide supplementary structural steelwork where structural bearings do not exist or where concrete inserts are not in correct locations.

3.2 HANGER SPACING

- .1 Plumbing piping: most stringent requirements of Canadian Plumbing Code, Provincial Code, or authority having jurisdiction.
- .2 Fire protection: to applicable fire code.
- .3 Gas and fuel oil piping: up to NPS 15 mm (1/2"): every 1.8 m (6').
- .4 Copper piping: up to NPS 15 mm (1/2"): every 1.5 m (5').
- .5 Flexible joint roll groove pipe: in accordance with table below, but not less than one hanger at joints.

- .6 Within 300 mm (12") of each elbow and:

Maximum Pipe Size: NPS	Spacing Steel	Maximum Spacing Copper
up to 32 mm (1 1/4")	2.1 m (7')	1.8 m (6')
40 mm (1 1/2")	2.7 m (9')	2.4 m (8')
50 mm (2")	3.0 m (10')	2.7 m (9')
65 mm (2 1/2")	3.6 m (12')	3.0 m (10')
80 mm (3")	3.6 m (12')	3.0 m (10')
90 mm (3 1/2")	3.9 m (13')	3.3 m (11')
100 mm (4")	4.2 m (14')	3.6 m (12')
125 mm (5")	4.8 m (16')	
150 mm (6")	5.1 m (17')	
200 mm (8")	5.7 m (19')	
250 mm (10")	6.6 m (22')	
300 mm (12")	6.9 m (23')	

- .7 Pipework greater than NPS 300 mm (12"): to MSS SP-69.

3.3 HANGER INSTALLATION

- .1 Install hanger so that rod is vertical under operating conditions.
- .2 Adjust hangers to equalize load.
- .3 Support from structural members. Where structural bearing does not exist or inserts are not in suitable locations, provide supplementary structural steel members.
- .4 Do "NOT" support piping, ductwork and equipment from roof deck, on bottom chord of floor and/or roof joist and/or from OWSJ bridging. Provide structural member between joist.

3.4 HORIZONTAL MOVEMENT

- .1 Angularity of rod hanger resulting from horizontal movement of pipework from cold to hot position not to exceed 4mm (5/32") from vertical.
- .2 Where horizontal pipe movement is less than 15 mm (1/2"), offset pipe hanger and support so that rod hanger is vertical in the hot position.

3.5 FINAL ADJUSTMENT

- .1 Adjust hangers and supports:
 - .1 Ensure that rod is vertical under operating conditions.
 - .2 Equalize loads.
- .2 Adjustable clevis:
 - .1 Tighten hanger load nut securely to ensure proper hanger performance.
 - .2 Tighten upper nut after adjustment.
 - .3

- .3 C-clamps:
 - .1 Follow manufacturer's recommended written instructions and torque values when tightening C-clamps to bottom flange of beam.
- .4 Beam clamps:
 - .1 Hammer jaw firmly against underside of beam.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.60, Interior Alkyd Gloss Enamel.
 - .2 CAN/CGSB-24.3, Identification of Piping Systems.
- .3 Canadian Standards Association (CSA).
 - .1 Natural Gas and Propane Installation Code CSA B149.1.
- .4 National Fire Protection Association
 - .1 NFPA 13, Installation of Sprinkler Systems.
 - .2 NFPA 14, Standpipe and Systems.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with General Requirements.
- .2 Product data to include paint colour chips, all other products specified in this section.

1.3 PRODUCT LITERATURE

- .1 Submit product literature in accordance with General Requirements.
- .2 Product literature to include nameplates, labels, tags, lists of proposed legends.

Part 2 Products

2.1 MANUFACTURER'S EQUIPMENT NAMEPLATES

- .1 Metal or plastic lamicaid nameplate mechanically fastened to each piece of equipment by manufacturer.
- .2 Lettering and numbers to be raised or recessed.
- .3 Information to include, as appropriate:
 - .1 Equipment: Manufacturer's name, model, size, serial number, capacity.
 - .2 Motor: voltage, Hz, phase, power factor, duty, frame size.

2.2 SYSTEM NAMEPLATES

- .1 Colours:
 - .1 Hazardous: red letters, white background.
 - .2 Elsewhere: black letters, white background (except where required otherwise by applicable codes).

- .2 Construction:
 - .1 3 mm (1/8") thick laminated plastic, matte finish, with square corners, letters accurately aligned and machine engraved into core.
- .3 Sizes:
 - .1 Conform to following table:

Size	No. of Sizes mm (")	Height of Line mm (")	Letters mm (")
1	10 x 50 (3/8" x 2")	1 (3/64")	3 (1/8")
2	15 x 75 (1/2" x 3")	1 (3/64")	6 (1/4")
3	15 x 75 (1/2" x 3")	2 (5/64")	3 (1/8")
4	20 x 100 (3/4" x 4")	1 (3/64")	10 (3/8")
5	20 x 100 (3/4" x 4")	2 (6/64")	6 (1/4")
6	20 x 200 (3/4" x 8")	1 (3/64")	10 (3/8")
7	25 x 125 (1" x 5")	1 (3/64")	15 (1/2")
8	25 x 125 (1" x 5")	2 (5/64")	10 (3/8")
9	32 x 200 (1¼" x 8")	1 (3/64")	20 (3/4")
 - .2 Use maximum of 25 letters/numbers per line.
- .4 Locations:
 - .1 Terminal cabinets, control panels: Use size #5.
 - .2 Equipment in Mechanical Rooms: Use size #9.
 - .3 Roof top equipment: use size #9.
 - .4 Equipment above ceiling: use size #1 riveted to ceiling suspension system.

2.3 FIRE DAMPER/FIRE STOP FLAP NAMEPLATES

- .1 Colours:
 - .1 Black letters, yellow background.
- .2 Construction:
 - .1 Self adhesive 50 mm x 25 mm, matte finish, with round corners.
- .3 Locations:
 - .1 Install on adjacent ceiling grid. Where fire stop flap is installed in gypsum ceiling install on diffuser/grille frame. Where fire damper is installed above gypsum ceiling install on adjacent wall.

2.4 EXISTING IDENTIFICATION SYSTEMS

- .1 Apply existing identification system to new work.
- .2 Where existing identification system does not cover for new work, use identification system specified this section.
- .3 Before starting work, obtain written approval of identification system from Consultant.

- .4 Upon completion of this project all references to room names and numbering shall be to the Owner's requirements which may or may 'NOT' be the numbering system used on the drawings. Each contractor shall verify the proper numbering scheme to be used prior to project completion.
- .5 All equipment shall be identified in sequence from the existing equipment and "NOT" duplicate numbering of equipment.

2.5 PIPING SYSTEMS GOVERNED BY CODE

- .1 Identification:
 - .1 Natural and propane gas: To CSA B149.1-00 and authority having jurisdiction and as indicated elsewhere.
 - .2 Sprinklers: To NFPA 13.
 - .3 Standpipe and hose systems: To NFPA 14.

2.6 IDENTIFICATION OF PIPING SYSTEMS

- .1 Identify contents by background colour marking, pictogram (as necessary), legend; direction of flow by arrows. To CAN/CGSB 24.3 except where specified otherwise.
- .2 Legend:
 - .1 Block capitals to sizes and colours listed in CAN/CGSB-24.3.
- .3 Arrows showing direction of flow:
 - .1 Outside diameter of pipe or insulation less than 75 mm (3"): 100 mm (4") long x 50 mm (2") high.
 - .2 Outside diameter of pipe or insulation 75 mm (3") and greater: 150 mm (6") long x 50 mm (2") high.
 - .3 Use double-headed arrows where flow is reversible.
- .4 Extent of background colour marking:
 - .1 To full circumference of pipe or insulation.
 - .2 Length to accommodate pictogram, full length of legend and arrows.
- .5 Materials for background colour marking, legend, arrows:
 - .1 Pipes and tubing 20 mm (3/4") and smaller: Waterproof and heat-resistant pressure sensitive plastic marker tags.
 - .2 All other pipes: Pressure sensitive vinyl with protective overcoating, waterproof contact adhesive undercoating, suitable for ambient of 100% RH and continuous operating temperature of 150°C (300°F) and intermittent temperature of 200°C (395°F).

.6 Colours and Legends:

- .1 Where not listed, obtain direction from Consultant.
- .2 Colours for legends, arrows: To following table:

Background colour:	Legend:	Arrows:
Yellow	White	Black
Green	White	Black
Red	White	Black

.7 Background colour marking and legends for piping systems:

CONTENTS	BACKGROUND COLOUR MARKING	LEGEND
Domestic hot water supply	Green	DOM. HW SUPPLY
Dom. HW recirculation	Green	DOM. HW CIRC
Domestic cold water supply	Green	DOM. CWS
Trap Primer	Green	TRAP PRIMER
Sanitary	Green	SAN
Plumbing vent	Green	SAN. VENT
Sprinklers	Red	SPRINKLERS
Control wiring	White	CONTROL WIRING___VOLTS

2.7 IDENTIFICATION DUCTWORK SYSTEMS

- .1 50 mm (2") high stencilled letters and directional arrows 150 mm (6") long x 50 mm (2") high.
- .2 Colours: Black, or co-ordinated with base colour to ensure strong contrast.

2.8 VALVES, CONTROLLERS

- .1 Brass tags with 15 mm (1/2") stamped identification data filled with black paint.
- .2 Include flow diagrams for each system, of approved size, showing charts and schedules with identification of each tagged item, valve type, service, function, normal position, location of tagged item.
- .3 Provide adhesive coloured tab (max. size 15 mm) indication on ceiling to locate valves/equipment above. Same applies to grid. Colour to be approved by consultant.

2.9 CONTROLS COMPONENTS IDENTIFICATION

- .1 Identify all systems, equipment, components, controls, sensors with system nameplates specified in this section.
- .2 Inscriptions to include function and (where appropriate) fail-safe position.

- .3 Provide equipment identification and/or indication on ceiling to locate devices/equipment above ceiling. Install identification on grid. Colours to be approved by consultant.

2.10 LANGUAGE

- .1 Identification to be in English.

Part 3 Execution

3.1 TIMING

- .1 Provide identification only after all painting specified has been completed.

3.2 INSTALLATION

- .1 Perform work in accordance with CAN/CGSB-24.3 except as specified otherwise.
- .2 Provide ULC and/or CSA registration plates as required by respective agency.

3.3 NAMEPLATES

- .1 Locations:
 - .1 In conspicuous location to facilitate easy reading and identification from operating floor.
- .2 Standoffs:
 - .1 Provide for nameplates on hot and/or insulated surfaces.
- .3 Protection
 - .1 Do not paint, insulate or cover in any way.

3.4 LOCATION OF IDENTIFICATION ON PIPING AND DUCTWORK SYSTEMS

- .1 On long straight runs in open areas in boiler rooms, equipment rooms, galleries, tunnels not more than 1.7 m (5'-8") intervals and more frequently if required to ensure that at least one is visible from any one viewpoint in operating areas and walking aisles.
- .2 Adjacent to each change in direction.
- .3 At least once in each small room through which piping or ductwork passes.
- .4 On both sides of visual obstruction or where run is difficult to follow.
- .5 On both sides of separations such as walls, floors, partitions.
- .6 Where system is installed in pipe chases, ceiling spaces, galleries, other confined spaces, at entry and exit points, and at each access opening.
- .7 At beginning and end points of each run and at each piece of equipment in run.
- .8 At point immediately upstream of major manually operated or automatically controlled valves, dampers, etc. Where this is not possible, place identification as close as possible, preferably on upstream side.

- .9 Identification to be easily and accurately readable from usual operating areas and from access points.
 - .1 Position of identification to be approximately at right angles to most convenient line of sight, considering operating positions, lighting conditions, risk of physical damage or injury and reduced visibility over time due to dust and dirt.

3.5 VALVES, CONTROLLERS

- .1 Valves and operating controllers, except at plumbing fixtures, radiation, or where in plain sight of equipment they serve: Secure tags with non-ferrous chains or closed "S" hooks.
- .2 Install one copy of flow diagrams, valve schedules mounted in frame behind non-glare glass where directed by Consultant. Provide one copy (reduced in size if required) in each operating and maintenance manual.
- .3 Number valves in each system consecutively. Where existing numbering system is installed start new numbering system at 100.

END OF SECTION

Part 1 General

1.1 CONTRACT REQUIREMENTS

- .1 TAB contractor will work under the mechanical contractor.**
- .2 This contractor must co-ordinate their work with that of the TAB contractor.**

1.2 GENERAL

- .1 TAB means to test, adjust and balance to perform in accordance with requirements of Contract Documents and to do all other work as specified in this section including all air handling systems and equipment, all plumbing systems and equipment and all temperature controls system, building automation systems and equipment.
- .2 This contractor must co-ordinate their work with that of the TAB contractor.

1.3 QUALIFICATIONS OF TAB AGENCIES

- .1 Names of all personnel it is proposed to perform TAB to be submitted to and approved by Consultant within 30 days of start of work.
- .2 Provide documentation confirming qualifications, successful experience.
- .3 Only the following NEBB (National Environmental Balancing Bureau) TAB contractors may quote:
 - .1 Air Audit Inc.
110 Turnbull Court, Unit 11
Cambridge, Ontario
N1T 1K6
(519) 740-0871
 - .2 Air Velocities Control Ltd.
100 Premium Way
Mississauga, Ontario
L5B 1A2
(905) 279-4433
 - .3 Flowset Balancing Ltd.
431 Willis Dr.
Oakville, Ontario
L6L 4V6
(416) 410-9793
 - .4 Air Adjustments & Balancing Inc.
P.O. Box 176,
Schomberg, Ontario
LOG 1T0
(416) 254-3004

1.4 PURPOSE OF TAB

- .1 Test to verify proper and safe operation, determine actual point of performance, evaluate qualitative and quantitative performance of equipment, systems and controls at design, average (95% design) and low (75% of design) loads using actual or simulated loads. TAB contractor to perform equipment evaluation upon start up and once during each season in the first year of operation.
- .2 Adjust and regulate equipment and systems so as to meet specified performance requirements and to achieve specified interaction with all other related systems under all normal and emergency loads and operating conditions. Confirm all equipment interlocks and functions of associated systems.
- .3 Balance systems and equipment to regulate flow rates to match load requirements over full operating ranges and temperatures. Refer to BAS for system operating functions.

1.5 EXCEPTIONS

- .1 TAB of systems and equipment regulated by codes, standards to be to satisfaction of authority having jurisdiction.

1.6 CO-ORDINATION

- .1 Schedule time required for TAB (including repairs, re-testing) into project construction and completion schedule so as to ensure completion before acceptance of project.
- .2 Do TAB of each system independently and subsequently, where interlocked with other systems, in unison with those systems. Co-ordinate with other trades to ensure all systems are interlocked as indicated elsewhere prior to TAB.

1.7 PRE-TAB REVIEW

- .1 Review contract documents before project construction is started and confirm in writing to Consultant adequacy of provisions for TAB and all other aspects of design and installation pertinent to success of TAB.
- .2 Review specified standards and report to Consultant in writing all proposed procedures which vary from standard.
- .3 During construction, co-ordinate location and installation of all TAB devices, equipment, accessories, measurement ports and fittings.
- .4 During construction indicate all tolerances of piping, ductwork etc conforms to specifications.

1.8 START-UP

- .1 Follow start-up procedures as recommended by equipment manufacturer unless specified otherwise.
- .2 Follow special start-up procedures specified elsewhere in the Mechanical Division.

1.9 OPERATION OF SYSTEMS DURING TAB

- .1 Operate systems for length of time required for TAB and as required by Consultant for verification of TAB reports.

1.10 START OF TAB

- .1 Notify Consultant in writing 3 days prior to start of TAB.
- .2 Start TAB only when building is essentially completed, including:
 - .1 Installation of ceilings, doors, windows, other construction affecting TAB.
 - .2 Application of weather-stripping, sealing, caulking.
 - .3 All pressure, leakage, other tests specified elsewhere in the Mechanical Division.
 - .4 All provisions for TAB installed and operational.
 - .5 Start-up, verification for proper, normal and safe operation of all mechanical and associated electrical and control systems affecting TAB including but not limited to:
 - .1 Proper thermal overload protection in place for electrical equipment.
 - .2 Air systems:
 - .1 Filters in place, clean.
 - .2 Duct systems clean.
 - .3 Ducts, air shafts, ceiling plenums are airtight to within specified tolerances.
 - .4 Correct fan rotation.
 - .5 Fire, smoke, volume control dampers installed and open.
 - .6 Coil fins combed, clean.
 - .7 Access doors, installed, closed.
 - .8 All outlets installed, volume control dampers open.
 - .3 Liquid systems:
 - .1 Flushed, filled, vented.
 - .2 Correct pump rotation.
 - .3 Strainers in place, baskets clean.
 - .4 Isolating and balancing valves installed, open.
 - .5 Calibrated balancing valves installed, at factory settings.
 - .6 Chemical treatment systems complete, operational.
 - .7 Control valves are properly piped.
 - .8 Coils and radiation are properly piped.
 - .9 BAS in operation.

1.11 APPLICATION TOLERANCES

- .1 Do TAB to following tolerances of design values:
 - .1 HVAC systems: plus 10%, minus 5%.
 - .2 Hydronic systems: plus or minus 10%.

1.12 ACCURACY TOLERANCES

- .1 Measured values to be accurate to within plus or minus 2% of actual values.

1.13 INSTRUMENTS

- .1 Prior to TAB, submit to Consultant list of instruments to be used together with serial numbers.
- .2 Calibrate in accordance with requirements of most stringent of referenced standard for either applicable system or HVAC system.
- .3 Calibrate within 3 months of TAB. Provide certificate of calibration to Consultant.

1.14 SUBMITTALS

- .1 Submit, prior to commencement of TAB:
 - .1 Proposed methodology and procedures for performing TAB if different from referenced standard.

1.15 PRELIMINARY TAB REPORT

- .1 Submit for checking and approval of Consultant, prior to submission of formal TAB report, sample of rough TAB sheets. Include:
 - .1 Details of instruments used.
 - .2 Details of TAB procedures employed.
 - .3 Calculations procedures.
 - .4 Summaries.

1.16 TAB REPORT

- .1 Format to be in accordance with NEBB, AABC, or SMACNA.
- .2 TAB report to show all results in SI or imperial units as indicated on plans and to include:
 - .1 Project as-built drawings.
 - .2 System schematics.

1.17 VERIFICATION

- .1 All reported results subject to verification by Consultant.
- .2 Provide manpower and instrumentation to verify up to 30% of all reported results.
- .3 Number and location of verified results to be at discretion of Consultant.
- .4 Bear costs to repeat TAB as required to satisfaction of Consultant.

1.18 SETTINGS

- .1 After TAB is completed to satisfaction of Consultant, replace drive guards, close all access doors, lock all devices in set positions, ensure sensors are at required settings. Replace all ceiling tile etc.
- .2 Permanently mark all settings to allow restoration at any time during life of facility. Markings not to be eradicated or covered in any way.

1.19 COMPLETION OF TAB

- .1 TAB to be considered complete only when final TAB Report received and approved by Consultant.

1.20 AIR SYSTEMS

- .1 Standard: TAB to be to most stringent of TAB standards of NEBB, AABC, SMACNA, ASHRAE.
- .2 Do TAB of all systems, equipment, components, controls specified in the Mechanical Division including but not limited to following:
 - .1 Air handling systems and equipment
 - .2 Duct testing to SMACNA standards.
- .3 Qualifications: personnel performing TAB to be current member in good standing of NEBB.
- .4 Quality assurance: Perform TAB under direction of qualified supervisor.
- .5 Measurements: to include, but not limited to, following as appropriate for systems, equipment, components, controls: air velocity, static pressure, flow rate, pressure drop (or loss), temperatures (dry bulb, wet bulb, dewpoint), duct cross-sectional area, RPM, electrical power, voltage, noise, vibration.
- .6 Locations of equipment measurements: To include, but not be limited to, following as appropriate:
 - .1 Inlet and outlet of each damper, filter, coil, humidifier, fan, and other equipment causing changes in conditions.
 - .2 At each controller, controlled device.
- .7 Locations of systems measurements to include, but not be limited to, following as appropriate: Each main duct, main branch, sub-branch, grille, register or diffuser.

1.21 DUCT LEAKAGE TESTING

- .1 Co-ordinate leakage testing with the sheet metal contractor. TAB contractor will be responsible for all duct testing.
- .2 Duct to be tested in accordance with SMACNA HVAC Duct Leakage Test Manual and as indicated.

1.22 DOMESTIC HWC SYSTEMS

- .1 Meet all requirements as specified for hydronic systems.
- .2 Locations of equipment measurements: To include, but not be limited to, following as appropriate: Inlet and outlet of each heater, tank, pump, circulator, at each controller, controlled device.
- .3 Locations of systems measurements to include, but not be limited to, following as appropriate: main, main branch, branch, sub-branch.

1.23 OTHER SYSTEMS

- .1 Plumbing systems:
 - .1 TAB procedures:
 - .2 Pressure booster systems: test for capacity and pressures under all conditions and at all times.

- .2 Pumped sanitary and storm water systems: test for proper operation at all possible flow rates.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 NFPA 13 latest edition, Installation of Sprinkler Systems.
- .3 Ontario Fire Code.
- .4 Ontario Building Code.
- .5 Factory Mutual guidelines.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with general requirements in accordance with NFPA 13, working plans and design requirements.
- .2 Shop drawings shall be approved by authority having jurisdiction prior to submission
- .3 Submit to consultant for general review and information only.
- .4 Submitted drawings shall be reproducible. Do not submit marked up prints.
- .5 Drawings shall be in AutoCad format.

1.3 SAMPLES

- .1 Submit samples in accordance with general requirements.
- .2 Submit samples of following:
 - .1 Each type of sprinkler head.
 - .2 Signs.

1.4 ENGINEERING DESIGN CRITERIA

- .1 Design system in accordance with Ontario Fire Marshall, local authority having jurisdiction, owner's underwriters as required, and NFPA 13, NFPA 20, and NFPA 45 using following parameters:
 - .1 To suit occupancy as indicated.
 - .2 Pipe size and layout: Hydraulic design.
 - .3 Conduct flow and pressure test of water supply in vicinity of project to obtain criteria for bases of design in accordance with NFPA 13. Indicate location and flow on shop drawings.
 - .4 System zoning as indicated in accordance with NFPA 13.
 - .5 Provide complete drawings and calculations stamped by a qualified professional engineer registered in the Province of Ontario.
 - .6 Professional Engineer shall provide on site review and certification for local building code review.

- .2 System shall be approved by Ontario Fire Marshall, local authority, and owner's underwriter prior to shop drawing submission.

1.5 COMMISSIONING & INTEGRATED TESTING OF FIRE PROTECTION & LIFE SAFETY SYSTEMS

- .1 Sprinkler contractor to perform services with the Fire Commissioning Agent (FCA) to meet their requirements for administration, verification, and final sign-off.
- .2 The Fire Commissioning Agent (FCA) is being retained by the electrical contractor, however; this contractor's work to satisfy the FCA requirements shall be included in the tender price.
- .3 The sprinkler contractor at a minimum must include for:
 - .1 Providing FCA all documentation of design and shop drawings.
 - .2 Provide documents for sequence of operation and maintenance of system.
 - .3 Movement of all valves and accessories to confirm Alarm/Supervisory/Trouble at the fire panel.
 - .4 Create flow at all initiating devices to verify detection at the fire panel.
 - .5 Testing and operation of any fire pumps.
 - .6 Other items that may be requested by the FCA.
 - .7 Re-commissioning of any items that may have failed.
 - .8 Putting the system back into proper operation after tests are completed.
- .4 All work to be performed in accordance with NFPA 3 2010 Edition. Special consideration to be given to Figure A3.3.16 (b) for Sequence of Operation Form required to be completed in conjunction with the FCA and submitted to the consultant's prior to occupancy.
- .5 The work to be performed by this contractor is also described in NFPA 3 table A.5.1.1 as labelled "Construction Stage" and "Occupancy Stage".

1.6 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

1.7 MAINTENANCE MATERIALS

- .1 Provide maintenance materials in accordance with general requirements.
- .2 Provide spare sprinklers and tools as required by NFPA 13.

1.8 QUALIFICATIONS

- .1 Contractor to be specialist in performing work of this section, and have at least 3 years successful experience in this size and type of project.

1.9 PERMITS AND FEES

- .1 Obtain and pay for all permits, fees, and inspections as required by authority having jurisdiction.

1.10 EQUIPMENT

- .1 ULC listed and labeled.

1.11 STORAGE

- .1 Store in original packaging with manufacturers' labels and seals intact.
- .2 Store in dry secure location.
- .3 Damaged material and/or equipment shall be replaced.

1.12 INSURANCE

- .1 Confirm with owner prior to submitting quote.

Part 2 Products

2.1 PIPE, FITTINGS, AND VALVES

- .1 Pipe and Fittings:
 - .1 25 mm (1"): Schedule 40 steel pipe with screwed fittings.
 - .2 32 mm (1¼") to 50 mm (2"):
 - .1 Schedule 40 steel pipe with screwed fittings or,
 - .2 Schedule 10 steel pipe with roll grooved fittings.
 - .3 65 mm (2½") and larger: Schedule 10 steel pipe with roll grooved fittings.
- .2 Valves:
 - .1 ULC listed for fire protection service.
 - .2 Up to NPS 2: bronze, screwed ends, OS&Y gate.
 - .3 NPS 2 1/2 and over: cast iron, flanged or roll grooved ends, indicating butterfly valve.
 - .4 Swing check valves.
 - .5 Ball drip.
- .3 Pipe hangers:
 - .1 ULC listed for fire protection services.
- .4 End switches:
 - .1 Provide on all isolating valves.
 - .2 Coordinate voltage and location with fire alarm contractor.
- .5 Flow switches:
 - .1 Provide where indicated and required.
 - .2 Coordinate voltage and location with fire alarm contractor.

2.2 SPRINKLER HEADS

- .1 General: to NFPA 13 and ULC listed for fire services.
- .2 Indicate type and location of sprinkler heads on drawings. Co-ordinate sprinkler heads location with other trades.
- .3 Locate sprinkler heads in acoustic tile ceiling in centre of tile.
- .4 Provide sprinkler heads as follows:
 - .1 Upright bronze: exposed with no ceilings.
 - .2 Concealed fusible link type brass pendent with ring and cup in ceiling and brass coverplate. Coverplate finish selected by consultant. Concealed heads installed in unsupervised areas (corridors, washrooms).
 - .3 White semi-recessed fusible link type brass pendent with adjustable, recessed escutcheon ring and cup. Sprinkler and escutcheon cup. Finish selected by consultant. Semi-recessed heads installed in supervised areas (classrooms, offices, seminar rooms etc.).
 - .4 Sprinkler heads with O-ring design shall not be used.
 - .5 Provide guards on upright sprinkler heads in all storage rooms, in the gymnasium and on heads below 1800 mm AFF.
- .5 Provide sprinkler heads under all equipment/ductwork over 1200 mm wide.

2.3 INSPECTORS TEST CONNECTIONS

- .1 Provide where indicated and to requirements of local authority.
- .2 Discharge to building exterior to acceptance of consultant.
- .3 Provide suitable signage to satisfaction of authority having jurisdiction and consultant.

2.4 DOCUMENTATION

- .1 Prepare documentation as indicated.
- .2 Provide documentation based on tender documents. Coordinate sprinkler drawings with all trades.
- .3 Provide one hard copy and one electronic copy of As Built drawings acceptable to consultant prior to final payment.

2.5 UNIT PRICES

- .1 Provide unit prices as follows.
 - .1 Additional sprinkler head including hangers, 3.6 M piping and two elbows.
 - .2 Delete sprinkler head including hangers, 3.6 M piping and two elbows.

Part 3 Execution

3.1 INSTALLATION

- .1 Install, inspect and test to acceptance in accordance with NFPA 13 and FC 403.
- .2 Install excess pressure pump across alarm valve in accordance with manufacturer's instructions.
- .3 Pipe a bypass complete with indicating valve, between Fire department connection and sprinkler main downstream of DCVA. Bypass shall be sized to allow flow test of system demand as per NFPA 13 forward flow test thru the backflow preventor.
- .4 Testing to be witnessed by authority having jurisdiction.
- .5 Space hangers and support of sprinkler piping in accordance with N.F.P.A. regulations.
- .6 Hydrostatically test systems at 350kPa in excess of normal working pressure, but not less than 1.4 MPA for two hours without loss under supervision of authority having jurisdiction and NFPA requirements.
- .7 Provide hydraulic pump, temporary connections and labour required for tests.
- .8 Protect exposed work, in accordance with 'Painting' section.
- .9 Do not cover or conceal piping accessories or work prior to inspection and approval by authorities having jurisdiction.
- .10 Adjust equipment to satisfaction of authority having jurisdiction and consultant.
- .11 Protect equipment during painting. Replace damaged and painted components.
- .12 Co-ordinate the sprinkler piping and equipment with that of other trades on the job. Mains and branches shall be run so as not to interfere with building's structure, mechanical, or electrical installations. Branch piping above ceilings is to run in joist space or minimum 300 mm above ceiling. Provide drops at head locations only. All exposed piping to run in joist space.
- .13 Guarantee that the systems and equipment be installed in accordance with all Local and Provincial by-laws and the rules and regulations of the Insurance Underwriters and the Building Code of Ontario.
- .14 Provide a flow test for each system on the remote inspectors test connection using methods approved by the local fire department and local water commission. Report the test results in writing to the consultant.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 Canadian General Standards Board (CGSB)
 - .1 ASTM C553, Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
 - .2 CGSB 51-GP-52Ma, Vapour Barrier Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
 - .3 CAN/CGSB-51.53, Poly (Vinyl Chloride) Jacketing Sheet, for Insulating Pipes, Vessels and Round Ducts.
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .4 American Society for Testing and Materials (ASTM)
 - .1 ASTM C 335, Test Method for Steady State Heat Transfer Properties of Pipe Insulation.
 - .2 ASTM C 921, Practice for Determining the Properties Jacketing Materials for Thermal Insulation.
 - .3 ASTM B 209M, Specification for Aluminum and Aluminum Alloy Sheet and Plate.
- .5 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE).
 - .1 ASHRAE Standard 90.1.
- .6 Manufacturer's Trade Associations
 - .1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards.

1.2 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with general requirements.
- .2 Submit for approval manufacturer's catalogue literature related to installation, fabrication for pipe, fittings, valves and jointing recommendations.

1.3 INSTALLATION INSTRUCTIONS

- .1 Submit manufacturer's installation instructions in accordance with general requirements.
- .2 Installation instructions to include procedures to be used, installation standards to be achieved.

1.4 QUALIFICATIONS

- .1 Installer to be specialist in performing work of this section, and have at least 3 years successful experience in this size and type of project, qualified to standards of TIAC.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .2 Protect from weather, construction traffic.
- .3 Protect against damage from any source.
- .4 Store at temperatures and conditions required by manufacturer.

1.6 DEFINITIONS

- .1 For purposes of this section:
 - .1 "CONCEALED" - insulated mechanical services in suspended ceilings and non-accessible chases and furred-in spaces.
 - .2 "EXPOSED" - will mean "not concealed" as defined herein.

Part 2 Products

2.1 FIRE AND SMOKE RATING

- .1 In accordance with CAN/ULC-S102:
 - .1 Maximum flame spread rating: 25.
 - .2 Maximum smoke developed rating: 50.

2.2 INSULATION

- .1 Mineral fibre as specified herein includes glass fibre, rock wool, slag wool.
- .2 Thermal conductivity ("k" factor) not to exceed specified values at 24°C (75°F) mean temperature when tested in accordance with ASTM C 335.
- .3 Type A-1: Rigid moulded mineral fibre with factory applied vapour retarder jacket.
 - .1 Mineral fibre: to ASTM C553.
 - .2 Jacket: to CGSB 51-GP-52 Ma.
 - .3 Maximum "k" factor: to ASTM C553.
- .4 Materials:
 - .1 All materials must be supplied by the same manufacturer.
 - .2 Acceptable Materials:
 Fibreglass Canada
 Knauf
 Manson
 Pittsburgh Corning

2.3 INSULATION SECUREMENT

- .1 Tape: Self-adhesive, aluminum, reinforced, 50 mm (2") wide minimum.
- .2 Contact adhesive: Quick setting.
- .3 Canvas adhesive: Washable.

2.4 CEMENT

- .1 Thermal insulating and finishing cement:
 - .1 To ASTM C553.
 - .2 Hydraulic setting or Air drying on mineral wool, to ASTM C 449M.

2.5 VAPOUR RETARDER LAP ADHESIVE

- .1 Water based, fire retardant type, compatible with insulation.

2.6 INDOOR VAPOUR RETARDER FINISH

- .1 Vinyl emulsion type acrylic, compatible with insulation.

2.7 JACKETS

- .1 Polyvinyl Chloride (PVC):
 - .1 One-piece moulded type [and sheet] to CAN/CGSB-51.53 with pre-formed shapes as required.
 - .2 Colours: white.
 - .3 Minimum service temperatures: -20°C (-4°F).
 - .4 Maximum service temperature: 65°C (150°F).
 - .5 Moisture vapour transmission: 0.02 perm.
 - .6 Fastenings:
 - .1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
 - .2 Tacks.
 - .3 Pressure sensitive vinyl tape of matching colour.

2.8 CAULKING FOR JACKETS

- .1 Caulking: Silicone clear caulking.

Part 3 Execution

3.1 PRE-INSTALLATION REQUIREMENT

- .1 Pressure testing of piping systems and adjacent equipment to be complete, witnessed and certified.
- .2 Surfaces to be clean, dry, free from foreign material.

3.2 INSTALLATION

- .1 Install in accordance with TIAC National Standards.
- .2 Apply materials in accordance with manufacturers' instructions and this specification.
- .3 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
 - .1 Hangers, supports to be outside vapour retarder jacket.
- .4 Supports, Hangers:
 - .1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

3.3 REMOVABLE, PRE-FABRICATED, INSULATION AND ENCLOSURES

- .1 Application: At expansion joints, valves, primary flow measuring elements, flanges, and unions at equipment.
- .2 Design: To permit movement of expansion joint and to permit periodic removal and replacement without damage to adjacent insulation.
- .3 Insulation:
 - .1 Insulation, fastenings and finishes: same as system.
 - .2 Jacket: As per adjacent insulation.

3.4 PIPING INSULATION SCHEDULES

- .1 Includes valves, valve bonnets, strainers, flanges and fittings unless otherwise specified.
- .2 Install insulator and jackets to applicable TIAC codes.
- .3 Insulate ends of capped piping with type and thickness indicated for capped service.
- .4 Thickness of insulation to be as listed in following table.
 - .1 Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, fittings.
 - .2 All storm piping including all vertical and horizontal piping shall be insulated.

Application	Type	Pipe sizes through (NPS) and insulation thickness mm (")				
		to 25 (1")	32 (1¼") 40 (1½")	50 (2") 80 (3")	105 (4") 150 (6")	200 (8") & over
Domestic Water Piping	A-1	25 (1")	25 (1")	40 (1½")	40 (1½")	40 (1½")
Horizontal Cast Iron	A-1	N/A	N/A	25 (1")	25 (1")	25 (1")
Sanitary Piping						
Trap Primer Piping	A-1	15 (½")	15 (½")	25 (1")		

.5 Finishes: Conform to the following table:

<u>Application</u>	<u>Piping</u>	<u>Valves & Fittings</u>
Exposed indoors	PVC	PVC
Exposed in mech. rooms	PVC	PVC
Concealed indoors	N/A	PVC
Exposed		

.6 Connection: To appropriate TIAC code.

.7 Finish attachments: SS bands, @ 150 mm (6") oc. seals: closed.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ANSI/ASME B16.15, Cast Copper Alloy Threaded Fittings, Classes 125 and 250.
- .3 ANSI B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
- .4 ANSI/ASME B16.22, Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.
- .5 ANSI B16.24, Cast Copper Alloy, Pipe Flanges and Flanged Fittings: Classes 150, 300, 600, 900, 1500, and 2500.
- .6 ASTM B88M, Specification for Seamless Copper Water Tube (Metric).
- .7 MSS-SP-70, Cast Iron Gate Valves, Flanged and Threaded Ends.
- .8 MSS-SP-71, Cast Iron Swing Check Valves, Flanged and Threaded Ends.
- .9 MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.

1.2 SHOP DRAWINGS

- .1 Submit shop drawing data in accordance with general requirements.

1.3 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

Part 2 Products

2.1 PIPING

- .1 Domestic hot, cold and recirculation systems, within building.
 - .1 Above ground: copper tube, hard drawn, type L: to ASTM B88M.

2.2 FITTINGS

- .1 Bronze pipe flanges and flanged fittings, Class 150 and 300: to ANSI B16.24.
- .2 Cast bronze threaded fittings, Class 125 and 250: to ANSI/ASME B16.15.
- .3 Cast copper, solder type: to ANSI B16.18.
- .4 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22.
- .5 Tee drill NPS 25 mm (1") and larger.

2.3 JOINTS

- .1 Solder: 95/5.
- .2 Teflon tape: for threaded joints.

- .3 Dielectric connections between dissimilar metals: dielectric fitting to ASTM F1545, complete with thermoplastic liner.
- .4 Tee drill fittings shall be brazed with silver solder, 45% Ag - 15% Cu or copper phosphorous, 95% Cu, 5% P and non-corrosive flux.

2.4 VALVES

- .1 All valves shall be of commercial grade and of same manufacturer, Lead-Free.
- .2 Acceptable materials:
Milwaukee
Crane
Kitz

2.5 BALL VALVES

- .1 All valves shall be of commercial grade and of same manufacturer.
- .2 NPS 80 mm (3") and under, soldered:
 - .1 To ANSI B16.18, Class 150.
 - .2 Bronze body, full port stainless steel ball, PTFE Teflon adjustable packing, brass gland and PTFE Teflon seat, steel lever handle, with NPT to copper adaptors.

2.6 SWING CHECK VALVES

- .1 NPS 50 mm (2") and under, soldered:
 - .1 To MSS SP-80, Class 125, 860 kPa (125 psi), bronze body, bronze swing disc, screw in cap, regrindable seat.
- .2 NPS 50 mm (2") and under, screwed:
 - .1 To MSS SP-80, Class 125, 860 kPa (125 psi), bronze body, bronze swing disc, screw in cap, regrindable seat.
- .3 NPS 65 mm (2 1/2") and over, flanged:
 - .1 To MSS SP-71, Class 125, 860 kPa (125 psi), cast iron body, flat flange faces, [regrind] [renewable] seat, bronze disc, bolted cap.

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with Provincial Plumbing Code and local authority having jurisdiction.
- .2 Cut square, ream and clean tubing and tube ends, clean recesses of fittings and assemble without binding.
- .3 Assemble all piping using fittings manufactured to ANSI standards.
- .4 Install tubing close to building structure to minimize furring, conserve headroom and space. Group exposed piping and run parallel to walls.

- .5 Install CWS piping below and away from HWS and HWC and all other hot piping so as to maintain temperature of cold water as low as possible.
- .6 Connect to fixtures and equipment in accordance with manufacturers instructions unless otherwise indicated.
- .7 Bent tubing is not acceptable.

3.2 VALVES

- .1 Isolate equipment, fixtures and branches with ball valves.
- .2 Balance recirculation system using lockshield globe valves. Mark settings and record on as-built drawings on completion.

3.3 PRESSURE TESTS

- .1 Conform to requirements of general requirements.
- .2 Test pressure: greater of 1½ times maximum system operating pressure or 860 kPa (125 psi).

3.4 FLUSHING AND DISINFECTING

- .1 Maintain testable RP backflow preventor between municipal water and new plumbing system.
- .2 Ensure a minimum of 90% of plumbing fixtures are installed.
- .3 Flush water mains through available outlets with a sufficient flow of potable water to produce a velocity of 1.5 m/s, within pipe for 10 min, or until foreign materials have been removed and flushed water is clear with backflow protection.
- .4 Provide connections and pumps for flushing as required.
- .5 Open and close valves, and operate fixtures to ensure thorough flushing.
- .6 When flushing has been complete to satisfaction of Consultant introduce a strong solution of Chlorine into water system and ensure that it is distributed throughout entire system.
- .7 Rate of chlorine application to be proportional to rate of water entering pipe.
- .8 Chlorine injection to be close to point of filling water main or at building water service and to occur simultaneously.
- .9 Confirm adequate chlorine residual not less than 50 ppm has been obtained, leave system charged with chlorine solution for 24 h. After 24 h, further samples shall be taken to ensure that there is still not less than 10 ppm of chlorine residual remaining throughout system.
- .10 Upon 10 ppm confirmation and 24 hr elapsed time flush line to remove chlorine solution.
- .11 Measure chlorine residuals at extreme end of pipe-line being tested.

- .12 Perform bacteriological tests on water main, after chlorine solution has been flushed out. Take samples daily for minimum of two days. Should contamination remain or reoccur during this period, repeat disinfecting procedure. Specialist contractor shall submit certified copy of test results.
- .13 Take water samples at remote fixtures and service connections.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ASTM A126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
- .3 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
- .4 PDI-WH201, Water Hammer Arresters.
- .5 CAN/CSA-B64 Series, Backflow Preventers and Vacuum Breakers.

1.2 SUBMITTALS

- .1 Submit shop drawings and product data in accordance with general requirements.
- .2 For shop drawings, indicate dimensions, construction details and materials.
- .3 For product data, indicate dimensions, construction details and materials for all items specified herein.

1.3 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.
- .2 Data to include:
 - .1 Description of plumbing specialties and accessories, giving manufacturers name, type, model, year and capacity.
 - .2 Details of operation, servicing and maintenance.
 - .3 Recommended spare parts list.

Part 2 Products

2.1 VACUUM BREAKERS

- .1 To CAN/CSA-B64 Series.
- .2 Atmospheric vacuum breaker (A-VB):
 - .1 Acceptable materials:
Watts 288A
Conbraco 38-103 Series
Wilkins 35
- .3 Hose connection vacuum breaker (HCVB):
 - .1 Acceptable materials:
Watts Series 8
Conbraco 38-304-AS
Wilkins BFP-8

- .4 Laboratory faucet intermediate vacuum breaker (LFVB):
 - .1 Acceptable materials:
 Watts N-LF9
 Conbraco 38-502-01

2.2 PRESSURE REGULATORS

- .1 Capacity: as indicated.
 - .1 Inlet pressure: 1034 kPa (150 psi).
 - .2 Outlet pressure: 41 kPa (5.9 psi).
- .2 Up to NPS 40 mm (1 1/2") bronze bodies, screwed: to ASTM B62.
 - .1 Acceptable material:
 Watts Series 25AUB (1/2" - 2")
- .3 NPS 50 mm (2") and over, semi-steel bodies, Class 125, flanged: to ASTM A126, Class [B].
 - .1 Acceptable materials:
 Watts PV-10
 Conbraco 36 Series
- .4 Semi-steel spring chambers with bronze trim.
 - .1 Acceptable materials:
 Watts PV-10
 Conbraco 36 Series

2.3 STRAINERS

- .1 860 kPa (125 psi), Y type with 20 mm (3/4") mesh, bronze or stainless steel removable screen.
- .2 NPS 50 mm (2") and under, bronze body, screwed ends, with brass cap.
 - .1 Acceptable materials:
 Watts Series 777SI
 Crane/Powers
 Colton 125 YTB
 Wilkins S Series
- .3 NPS 65 mm (2½") and over, cast iron body, flanged ends, with bolted cap.
 - .1 Acceptable materials:
 Watts 77F-D (77F-D-FDA for water service)
 Crane/Powers
 Colton 125 YTB
 Wilkins FS Series

2.4 WATER FILTERS

- .1 Five (5) micron filter assembly for taste/odour and dirt/rust.
- .2 The unit shall be constructed of molded transparent plastic housing and a bottom pressure relief for cartridge change.

- .3 Install as per manufacturer's recommendations
- .4 Supply a spare set of cartridges.
- .5 Acceptable material:
Aqua Puro AP11B

2.5 SOLENOID VALVES

- .1 Two (2) way normally closed all bronze construction.
- .2 Voltage shall be suitable for controlling function.
- .3 Acceptable material:
Asco

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with provincial codes, and local authority having jurisdiction.
- .2 Install in accordance with manufacturer's instructions and as specified.

3.2 STRAINERS

- .1 Install with sufficient room to remove basket.
- .2 Strainer size to match pipe size.

3.3 COMMISSIONING

- .1 In context of this paragraph, "verify" to include "demonstrate" to Consultant.
- .2 Timing: commission only after start-up deficiencies rectified.
- .3 Access doors: verify size and location relative to items to be services.
- .4 Adjust to suit site conditions, including, but not necessarily limited to, following:
 - .1 Non-freeze wall, ground hydrants:
 - .1 Verify complete drainage.
 - .2 Verify operation of vacuum breaker.
 - .2 Water hammer arrestors:
 - .1 Verify accessibility.
 - .3 Backflow preventors, vacuum breakers:
 - .1 Verify installation of correct type to suit application.
 - .2 Adjust as necessary to ensure proper operation.
 - .3 Verify visibility of discharge.
 - .4 Pressure regulators:
 - .1 Adjust settings to suit installed locations, required flow rates.
 - .5 Hose bibbs, sediment faucets:
 - .1 Verify operation.

- .6 Water make-up assembly:
 - .1 Verify operation.
- .7 Water meters:
 - .1 Verify operation.
- .8 Pipeline strainers:
 - .1 Verify accessibility of basket.
 - .2 Clean out during commissioning until system clean.
- .5 Commissioning reports:
 - .1 Record all results on approved report forms.
 - .2 Include signature of tester and supervisor.
 - .3 To be countersigned by Consultant.
- .6 Verification:
 - .1 Notify Consultant 48 h before commencing tests.
 - .2 All tests and procedures to be witnessed by Consultant.
 - .3 All reported results subject to verification by consultant.
- .7 Training:
 - .1 Train O&M personnel in start-up, operation, monitoring, servicing, maintenance and shut-down procedures.
- .8 Demonstrations:
 - .1 Demonstrate full compliance with Design Criteria.
 - .2 Demonstrations also to show completeness of O&M personnel training.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ASTM A126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
- .3 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
- .4 CAN/CSA-B79, Commercial and Residential Drains and Cleanouts.

1.2 SUBMITTALS

- .1 Submit shop drawings and product data in accordance with general requirements.
- .2 For shop drawings, indicate dimensions, construction details and materials.
- .3 For product data, indicate dimensions, construction details and materials for all items specified herein.

1.3 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.
- .2 Data to include:
 - .1 Description of plumbing specialties and accessories, giving manufacturers name, type, model, year and capacity.
 - .2 Details of operation, servicing and maintenance.
 - .3 Recommended spare parts list.

Part 2 Products

2.1 FLOOR DRAINS

- .1 Floor drains and trench drains: to CAN/CSA-B79.
- .2 Refer to schedule on drawing.

2.2 CLEANOUTS

- .1 Cleanout plugs: heavy cast iron male ferrule with brass screws and threaded brass or bronze plug. Sealing-caulked lead seat or neoprene gasket.
- .2 Wall access: face or wall type, stainless steel round cover with flush head securing screws, bevelled edge frame complete with anchoring lugs.
 - .1 Acceptable material:
 - Zurn ZSS-1469
 - Mifab C1400-RD
 - Watts CO-480-RD-3
 - Jay R. Smith 4710

- .3 Floor access: rectangular, round, as indicated, cast iron body and frame with adjustable secured 15 mm (½") thick flush mounted heavy duty nickel bronze top and:
Plugs: bolted bronze with neoprene gasket.
 - .1 Cover for unfinished concrete floors: nickel bronze round, gasket, vandal-proof screws.
 - .1 Acceptable material:
Zurn ZN-1400 – HD or Zurn ZNX-1612
Mifab C1100-XR-6
Watts CO-200-RX-1-6
Jay R. Smith SQ-4-1753-XNBCO-SP-U
 - .2 Cover for VCT tile and linoleum floors: square polished nickel bronze with 15 mm (1/2") thick flush mounted heavy duty nickel bronze cover, complete with vandal-proof locking screws.
 - .1 Acceptable materials:
Zurn ZN-1400-T – HD
Mifab C1100-TS-6
Watts CO-200-TS-1-6
Jay R. Smith 4200-U
 - .3 Cover for ceramic tile floors: 15 mm (½") thick heavy duty nickel bronze square, cover complete with gasket, vandal-proof screws, for flush finish.
 - .1 Acceptable material:
Zurn ZN-1400 – T-HD or Zurn ZNX-1612
Mifab C1100-S-6
Watts CO-200-S-1-6
Jay R. Smith SQ-4-1753-NBCO-SP-U-Y
 - .4 Cover for carpeted floors: round polished nickel bronze with flush cover, complete with stainless steel carpet marker, vandal-proof locking screws.
 - .1 Acceptable materials:
Zurn ZN-1400-HD-CM or ZN-1612-CM
Mifab C1100C-S-1-6
Ancon CO-200-RC-1-6
Smith
Contour C3000RMNB

2.3 TRAP SEAL PRIMERS

- .1 All brass, with integral vacuum breaker, NPS 15 mm (1/2") solder ends, NPS 15 mm (1/2") drip line connection.
- .2 Acceptable materials:
Zurn Z-1022
Mifab
Watts MS-810
Jay R. Smith 2699

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with provincial codes, and local authority having jurisdiction.
- .2 Install in accordance with manufacturer's instructions and as specified.

3.2 CLEANOUTS

- .1 In addition to those required by code, and as indicated, install at base of all soil and waste stacks.
- .2 Bring cleanouts to wall or finished floor unless serviceable from below floor.
- .3 Building drain cleanout and stack base cleanouts: line size to maximum NPS 100 mm (4").

3.3 TRAP SEAL PRIMERS

- .1 Install for all floor, hub and trench drains and elsewhere, as indicated.
- .2 Install on cold water supply to nearest frequently used plumbing fixture, in concealed space, to approval of Consultant.
- .3 Install soft copper tubing to floor drains above grade and polyethylene piping to floor drains below grade.

3.4 COMMISSIONING

- .1 In context of this paragraph, "verify" to include "demonstrate" to Consultant.
- .2 Timing: commission only after start-up deficiencies rectified.
- .3 Access doors: verify size and location relative to items to be services.
- .4 Adjust to suit site conditions, including, but not necessarily limited to, following:
 - .1 Floor, hub and trench drains:
 - .1 Verify proper operation of trap primer, flushing features.
 - .2 Verify security and removability of strainers.
 - .2 Cleanouts:
 - .1 Verify covers are gastight, secure and easily removable.
 - .2 Verify that cleanout rods can probe as far as next cleanout.
 - .3 Backwater valves:
 - .1 Verify accessibility of cover, valve.
 - .4 Trap seal primers:
 - .1 Verify operation.
 - .2 Adjust flow rate to suit site conditions.
 - .5 Acid dilution devices:
 - .1 Verify operation.

- .5 Commissioning reports:
 - .1 Record all results on approved report forms.
 - .2 Include signature of tester and supervisor.
 - .3 To be countersigned by Consultant.

- .6 Verification:
 - .1 Notify Consultant 48 h before commencing tests.
 - .2 All tests and procedures to be witnessed by Consultant.
 - .3 All reported results subject to verification by consultant.

- .7 Training:
 - .1 Train O&M personnel in start-up, operation, monitoring, servicing, maintenance and shut-down procedures.

- .8 Demonstrations:
 - .1 Demonstrate full compliance with Design Criteria.
 - .2 Demonstrations also to show completeness of O&M personnel training.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ASTM B32, Specification for Solder Metal.
- .3 ASTM B306, Specification for Copper Drainage Tube (DWV).
- .4 ASTM C564, Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- .5 CAN/CSA-B70, Cast Iron Soil Pipe, Fittings and Means of Joining.
- .6 CAN/CSA-B125.3, Plumbing Fittings.

Part 2 Products

2.1 COPPER TUBE AND FITTINGS

- .1 Above ground sanitary, and vent, maximum 65 mm (2½") Type DWV copper to: ASTM B306.
 - .1 Fittings.
 - .1 Cast brass: to CAN/CSA B125.3.
 - .2 Wrought copper: to CAN/CSA B125.3.
 - .2 Solder: tin-lead, 50:50, to ASTM B32, type 50A.

2.2 CAST IRON PIPING AND FITTINGS

- .1 Above ground sanitary, and vent, minimum NPS 80 mm (3"), cast iron to: CAN/CSA-B70.
 - .1 Mechanical joints (vents)
 - .1 Neoprene or butyl rubber compression gaskets: to ASTM C564 or CAN/CSA-B70.
 - .2 Stainless steel clamps (2 band).
 - .2 Mechanical joints (sanitary)
 - .1 Heavy duty neoprene or butyl rubber compression gaskets to: ASTM C1540.
 - .2 Stainless steel clamps (4 band min).

2.3 VENT FLASHINGS

- .1 Thaler or equal spun aluminum complete with insulation, cap, and rubber gasket.

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with Provincial Plumbing Code and local authority having jurisdiction.
- .2 Install above ground piping parallel and close to walls and ceilings to conserve headroom and space, and to grade as indicated.
- .3 Place Cleanouts
 - .1 Where shown on Drawings and near bottom of each stack and riser.
 - .2 At every 90 degree change of direction for horizontal lines.
 - .3 Every 15 m (50') of horizontal run.
 - .4 Extend clean out to accessible surface. Do not place cleanouts in carpeted floors. In such locations, use wall type cleanouts.
- .4 Each fixture and appliance discharging water into sanitary sewer or building sewer lines shall have a seal trap in connection with a complete venting system so gases pass freely to atmosphere with no pressure or syphon condition on water seal.
- .5 Vent entire waste system to atmosphere.
 - .1 Discharge 500 mm (20") above roof. Join lines together in fewest practicable number before projecting above roof.
 - .2 Set back vent lines so they will not pierce roof near an edge or valley.
 - .3 Do not terminate vents within 3600 mm of any building intake and/or exhaust opening.
 - .4 Provide copper vent piping through roof as per detail.
- .6 Use torque wrench to obtain proper tension in cinch bands when using hubless cast iron pipe. Butt ends of pipe against centering flange of coupling.
- .7 Flash pipes passing through roof with 453 g (16 oz) sheet copper flashing fitted snugly around pipes and caulk between flashing and pipe with flexible waterproof compound.
 - .1 Flashing base shall be at least 600 mm (24") square.
 - .2 Flashing may be a 24 kg/m² (5 lb/ft²) lead flashing fitted around pipes and turned down into pipe 15 mm (½") with turned edge hammered against pipe wall.
- .8 Before piping is covered, conduct tests in presence of Consultant and correct leaks or defective work. Conduct test prior to placing floor slab but after backfill is placed.
 - .1 Do not caulk threaded work.
 - .2 Fill waste and vent system to roof level [a minimum of 3,100 mm - (10')] with water and show no leaks for 2 hours.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ASTM D2235, Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
- .3 ASTM D2564, Specification for Solvent Cements for Poly(Vinyl-Chloride) (PVC) Plastic Piping Systems.
- .4 CAN/CSA-B181.1, ABS Drain, Waste and Vent Pipe and Pipe Fittings.
- .5 CAN/CSA-B181.2, PVC and CPVC Drain, Waste and Vent Pipe and Pipe Fittings.
- .6 CAN/CSA-B182.1, Plastic Drain and Sewer Pipe and Pipe Fittings.

Part 2 Products

2.1 PIPING AND FITTINGS

- .1 Buried sanitary, and vent piping to:
 - .1 80 mm (3") and smaller: ABS drain waste and vent pipe to CAN/CSA-B181.1.
 - .2 100 mm (4") and larger: SDR-35 PVC drain waste and vent pipe to CAN/CSA-B181.2.
 - .3 Vent piping: any size, PVC-DWV plastic drain and sewer pipe and fittings CAN/CSA-B181.2.
- .2 Above grade sanitary and vent piping:
 - .1 80 mm (3") and smaller: IPEX: PVC-XFR drain waste and vent pipe to CAN/CSA-B181.2.
 - .2 100 mm (4") and larger: IPEX: PVC-XFR drain waste and vent pipe to CAN/CSA-B181.2.
 - .3 Vent piping: any size, IPEX: PVC-XFR plastic drain and sewer pipe and fittings CAN/CSA-B181.2.
- .3 Use plastic XFR – DWV in pipe chase for urinal piping to 1.5 M (5' –0") above finished floor.
- .4 Where piping pierces a fire separation an approved fire stop system to the approval of authority having jurisdiction shall be used.

2.2 JOINTS

- .1 Solvent weld for PVC: to ASTM D2564.
- .2 Solvent weld for ABS: to ASTM D2235.

2.3 EXPANSION

- .1 Provide solvent welded expansion joints as required by manufacturer's recommendations.

2.4 VENT FLASHINGS

- .1 Thaler Stack Jack spun aluminum complete with insulation, cap, and rubber gasket.

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with Provincial Plumbing Code and local authority having jurisdiction.
Install in accordance with manufacturer's instructions.
- .2 Installation of underground pipe
 - .1 Provide all excavation, bedding, backfill, and compaction.
 - .2 Install materials in accordance with Manufacturer's instructions.
 - .3 Use jacks to make-up gasketed joints.
 - .4 Stabilize unstable trench bottoms.
 - .5 Bed pipe true to line and grade with continuous support from firm base.
 - .1 Bedding depth - 100 mm to 150 mm (4" to 6").
 - .2 Material and compaction to meet ASTM standard noted above.
 - .6 Excavate bell holes into bedding material so pipe is uniformly supported along its entire length. Blocking to grade pipe is forbidden.
 - .7 Trench width at top of pipe -
 - .1 Minimum 450 mm (18") or diameter of pipe plus 300 mm (12"), whichever is greater.
 - .2 Maximum - Outside diameter of pipe plus 600 mm (24").
 - .8 Piping and joints shall be clean and installed according to manufacturer's recommendations. Break down contaminated joints, clean seats and gaskets and reinstall.
 - .9 Do not use back hoe or power equipment to assemble pipe.
 - .10 Initial backfill shall be 300 mm (12") above top of pipe with material specified in referenced ASTM standard.
- .3 Place Cleanouts
 - .1 Where shown on Drawings and near bottom of each stack and riser.
 - .2 At every 90 degree change of direction for horizontal lines.
 - .3 Every 15 m (50 ft) of horizontal run.
 - .4 Extend clean out to accessible surface. Do not place cleanouts in carpeted floors. In such locations, use wall type cleanouts
- .4 Each fixture and appliance discharging water into sanitary sewer or building sewer lines shall have a seal trap in connection with a complete venting system so gases pass freely to atmosphere with no pressure or syphon condition on water seal.

-
- .5 Before piping is covered, conduct tests in presence of Consultant and correct leaks or defective work. Conduct test prior to placing floor slab but after backfill is placed.
 - .1 Fill waste and vent system a minimum of 1.8 m (6 ft) above finished floor with water and show no leaks for 2 hours.
 - .2 Conduct ball test in presence of consultant to ensure proper grade and clear of obstructions.
 - .6 Install solvent welded expansion joints as per manufacturer's recommendation. Care is to taken to accommodate ambient temperatures at time of install.
 - .7 Vent entire waste system to atmosphere.
 - .1 Discharge 350 mm (14") above roof. Join lines together in fewest practicable number before projecting above roof.
 - .2 Set back vent lines so they will not pierce roof near an edge or valley.
 - .8 Flash pipes passing through roof with Thaler insulated Stack Jack flashing.
 - .1 Flashing base shall be at least 600 mm (24") square.
 - .9 Install above ground piping parallel and close to walls and ceilings to conserve headroom and space, and to grade as indicated.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 CSA B51, Boiler, Pressure Vessel, and Pressure Piping Code.

1.2 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with general requirements.
- .2 Indicate:
 - .1 Equipment, including connections, fittings, control assemblies and ancillaries, identifying factory and field assembled.
 - .2 Wiring and schematic diagrams.
 - .3 Dimensions and recommended installation.
 - .4 Pump performance and efficiency curves.

1.3 CLOSEOUT SUBMITTALS

- .1 Provide maintenance and engineering data for incorporation into manual specified in general requirements
- .2 Data to include:
 - .1 Manufacturer's name, type, model year, capacity, and serial number.
 - .2 Details of operation, servicing, and maintenance.
- .3 Recommended spare parts list with names and addresses.

Part 2 Products

2.1 DOMESTIC HOT WATER CIRCULATING PUMPS

- .1 Capacity: 0.6 l/s (3.0 gpm) against total differential head of 10 kPa (1.45 psi or 3.35 ft. wc.) as indicated.
- .2 Construction: closed-coupled, in-line centrifugal, all bronze construction, stainless steel shaft, stainless steel or bronze shaft sleeve, two oil lubricated bronze sleeves or ball bearings. Design for 105°C (220°F) continuous service.
- .3 Motor: 124 W (1/6 hp), drip-proof, with thermal overload protection.
- .4 Supports: provide as recommended by manufacturer.
- .5 Acceptable materials:
 - Bell & Gossett
 - Armstrong
 - Taco

Part 3 Execution

3.1 RECIRCULATING PUMP

- .1 Make piping and electrical connections to pump and motor assembly and controls as indicated.
- .2 Ensure pump and motor assembly do not support piping.

3.2 FIELD QUALITY CONTROL

- .1 Manufacturer's factory trained, certified Engineer to start up and commission DHW heaters.
- .2 Check power supply.
- .3 Check starter protective devices.
- .4 Start up, check for proper and safe operation.
- .5 Check settings and operation of all hand-off-auto selector switch, operating, safety and limit controls, audible and visual alarms, over-temperature and other protective devices.
- .6 Adjust flow from water-cooled bearings.
- .7 Adjust impeller shaft stuffing boxes, packing glands.
- .8 Demonstrate equipment operation as directed by consultant.
- .9 Demonstrate water softener regeneration controls.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

- .1 Conform to Sections of Division 1 and to General Mechanical Requirements Section.

1.2 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 Perform work in accordance with the recommendations of and the requirements of:
 - .1 Local and district bylaws and regulations.
 - .2 N.F.P.A.14 "Installation of Standpipe and Hose Systems".
 - .3 The Ontario Building Code.
 - .4 U.L.C. or Factory Mutual approval for hose, valve and extinguisher requirements.
 - .5 N.F.P.A.10 "Standard for Portable Fire Extinguishers".
 - .6 The Ontario Fire Code.

1.3 SUBMITTALS

- .1 Submit shop drawings and maintenance data in accordance with general requirements.

1.4 COORDINATION

- .1 Confirm fire extinguisher cabinet locations and quantities from both architectural and mechanical drawings and report any discrepancies to consultant prior to bid close.
- .2 Coordinate location of cabinet with other trades and provide protection against damage during construction.

Part 2 Products

2.1 MULTI-PURPOSE DRY CHEMICAL EXTINGUISHERS (CLASS ABC)

- .1 Stored pressure rechargeable type with hose and shut off nozzle, ULC labelled for A, B and C class protection as indicated. Size of extinguishers shall be as follows:
 - .1 Kitchen Type 'K' 10 lb 20BC rating
 - .2 Served Areas Type 'K' 10 lb 20 BC rating
 - .3 Mechanical Rooms 10 lb ABC rating
 - .4 Storage Rooms 10 lb ABC rating

- .5 Corridor/Gym/Finished Areas 5 lb ABC rating complete with cabinet
- .6 Acceptable materials:
 - .1 Wilson & Cousins
 - .2 National

2.2 CABINETS

- .1 Recessed mounted type of a size sufficient to contain all necessary components. Tub to be constructed of 1.5 mm (16 gauge) steel and finished with Wilco "Pro-Tech" Premier white painted finish. Adjustable frame comprising of 180° opening door and trim to be separate assembly adaptable to any type of finished wall. Trim to have 6 mm (1/4") return on outer edges with full length semi-concealed piano hinge, and Corbin style latching device.
- .2 Doors and trim to be 1.5 mm (16 gauge) white painted finish. Door glass to be 6 mm (1/4") Duo Lite Safety Glass.
- .3 Cabinet to maintain fire resistive rating of construction in which they occur.
- .4 Do not provide cabinets for mechanical room and service area fire extinguishers unless indicated.
- .5 Acceptable material:
 - .1 Wilson & Cousins Model IE - 105R (5 and 10 lb. Class)
 - .2 National

2.3 IDENTIFICATION

- .1 Identify extinguishers in accordance with recommendations of NFPA 10.
- .2 Attach tag or label to extinguishers indicating month and year of installation and provide space for the addition of recording service dates.

2.4 FIRE BLANKET

- .1 100% non-combustible fire retardant glass fibre, non-toxic, non-conductor, cleanable complete with straps.
- .2 Size: 1 m x 1 m (40" x 40").
- .3 Cabinet to be surface mounted, 400 mm x 300 mm (16" x 12").
- .4 Mount on wall in kitchen area where indicated or directed on site by consultant.
- .5 Manufacturer:
 - .1 National FB 4040 blanket, FB 6078 MC cabinet.
 - .2 Wilson & Cousins.

Part 3 Execution

3.1 INSTALLATION

- .1 Provide portable fire extinguisher cabinets and mount in wall during construction. Cabinet to be surface or recessed mounted as indicated on the drawings. Install cabinets so that the door will not obstruct normal traffic when open.
- .2 Hang extinguishers in cabinets with wall mounting bracket.
- .3 Prior to installing the extinguisher cabinets, confirm the mounting height and exact location with the Consultant. Mount extinguisher so top of unit is not more than 1.5 m (5').
- .4 Install wall mounted fire extinguishers complete with wall mounting bracket where indicated and/or directed on site by consultant.
- .5 Caulk perimeter of fire extinguisher cabinets after acceptance.

3.2 TESTS

- .1 Fire protection equipment shall be tested to the requirements of NFPA10, NFPA13, NFPA14 and comply with the requirements of the authorities having jurisdiction.

3.3 FIRE BLANKET

- .1 Hang blanket on wall in cabinet as indicated, to manufacturers' recommendations.
- .2 Fire blanket next to each NFPA 96 hood mounted on wall.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 CAN/CSA B45S1, Supplement #1 to CAN/CSA B-45 Series Plumbing Fixtures.
- .3 CAN/CSA-B45 Series, CSA Standards on Plumbing Fixtures.
- .4 CAN/CSA-B125.3, Plumbing Fittings.
- .5 CAN/CSA-B651, Accessible Design for the Built Environment.

1.2 SHOP DRAWINGS

- .1 Submit shop drawings and product data in accordance with general requirements.
- .2 Indicate, for all fixtures and trim:
 - .1 Dimensions, construction details, roughing-in dimensions.
 - .2 Factory-set water consumption per flush at recommended pressure.
 - .3 For water closets, urinals: minimum pressure required for flushing.

1.3 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data including monitoring requirements for incorporation into manual specified in general requirements.
- .2 Include:
 - .1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.
 - .2 Details of operation, servicing, maintenance.
 - .3 List of recommended spare parts.

1.4 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION

- .1 Install rough-in for equipment supplied by others, complete with valves on hot and cold water supplies, waste and vent.
- .2 Equipment installed by others.
 - .1 Connect with unions.
- .3 Equipment not installed.
 - .1 Capped with valves for future connection by others.

Part 2 Products

2.1 MANUFACTURED UNITS

- .1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.
- .2 Trim, fittings: manufacture in accordance with CAN/CSA-B125.3.
- .3 Exposed plumbing brass to be chrome plated.
- .4 Number, locations: Architectural drawings to govern.
- .5 Fixtures in any one location to be product of one manufacturer and of same type.
- .6 Trim in any one location to be product of one manufacturer and of same type.

2.2 FIXTURE CARRIERS

- .1 Provide factory manufactured floor-mounted carrier systems for all wall-mounted fixtures.
- .2 Acceptable materials:
 - .1 Zurn
 - .2 Smith
 - .3 Ancon

2.3 PLUMBING FIXTURES

- .1 Refer to plumbing fixture schedule on the drawings for fixture type, manufacturer, trim, drainage supply, and accessories.

2.4 FIXTURE PIPING

- .1 Hot and cold water supplies to each fixture/faucet:

 Chrome plated flexible supply pipes each with screwdriver stop, reducers, escutcheon and chrome plated nipple.
 - .1 Acceptable materials:
 - .1 Delta 47T900 Series
 - .2 McGuire
 - .2 Waste:

 Open grid strainer, or pop up as indicated, offset open grid strainer on Barrier-Free fixtures, cast brass fittings with tubular piping, chrome plated, rubber gasket compression fitting, and overflow flange.
 - .1 Acceptable materials:
 - .1 Delta 33T200 Series
 - .2 McGuire

- .3 'P' Traps:
 - Cast brass P trap with cleanout on each fixture not having integral trap.
 - Chrome plated in all exposed places.
 - .1 Acceptable materials:
 - .1 Delta 33T300 Series
 - .2 McQuire

Part 3 Execution

3.1 INSTALLATION

- .1 Mounting heights:
 - .1 Standard: to comply with manufacturer's recommendations unless otherwise indicated or specified. Confirm mounting height(s) with consultant prior to rough-in.
 - .2 Wall-hung fixtures: measured from finished floor.
 - .3 Physically Barrier-Free: to comply with most stringent of either NBCC or CAN/CSA B651.
- .2 Drinking fountains:
 - .1 In accordance with CAN/CSA B45S1.

3.2 ADJUSTING

- .1 Conform to water conservation requirements specified this section.
- .2 Adjustments.
 - .1 Adjust water flow rate to design flow rates.
 - .2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
 - .3 Adjust flush valves to suit actual site conditions.
 - .4 Adjust urinal flush timing mechanisms.
 - .5 Adjust water cooler, drinking fountain flow stream to ensure no spillage.
 - .6 Automatic flush valves for water closets and urinals: set controls to prevent unnecessary flush cycles during silent hours.
- .3 Checks.
 - .1 Water closets, urinals: flushing action.
 - .2 Aerators: operation, cleanliness.
 - .3 Vacuum breakers, backflow preventors: operation under all conditions.
 - .4 Wash fountains: operation of flow-actuating devices.
 - .5 Refrigerated water coolers: operation, temperature settings.
- .4 Thermostatic controls.
 - .1 Verify temperature settings, operation of control, limit and safety controls.

- .5 Floor and wall mounted fixtures: caulk to floor or wall using silicone caulking to make water tight, colour to match fixture.
- .6 Counter mounted fixtures: lay fixtures into bead of caulking to ensure excess moisture does not reach the cut edge of the countertop. Clean excess caulking off outside the sink.

END OF SECTION

Part 1 General

1.1 REFERENCE

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 National Air Duct Cleaners Association (NADCA): "Assessment, Cleaning & Restoration of HVAC Systems (ACR).
- .3 National Air Duct Cleaners Association (NADCA): "Understanding Microbial Contamination in HVAC Systems".
- .4 National Air Duct Cleaners Association (NADCA): "Introduction to HVAC System Cleaning Services".
- .5 National Air Duct Cleaners Association (NADCA): Standard 05 "Requirements for the Installation of Service Openings in HVAC Systems".
- .6 Underwriters' Laboratories (UL): UL Standard 181.
- .7 American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE): Standard 62, "Ventilation for Acceptable Indoor Air Quality".
- .8 Environmental Protection Agency (EPA): "Building Air Quality".
- .9 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA): "HVAC Duct Construction Standards - Metal and Flexible".
- .10 North American Insulation Manufacturers Association (NAIMA): "Cleaning Fibrous Glass Insulated Air Duct Systems".

1.2 SPECIAL PROVISIONS

- .1 Qualification of the HVAC System Cleaning Contractor
 - .1 Membership: The HVAC system cleaning contractor shall be a certified member of the National Air Duct Cleaners Association (NADCA), or shall maintain membership in a nationally recognized non-profit industry organization dedicated to the cleaning of HVAC systems.
 - .2 Certification: The HVAC system cleaning contractor shall have a minimum of one (1) Air System Cleaning Specialist (ASCS) certified by NADCA on a full time basis, or shall have staff certified by a nationally recognized certification program and organization dedicated to the cleaning of HVAC systems.
 - .3 Supervisor Qualifications: A person certified as an ASCS by NADCA, or maintaining an equivalent certification by a nationally recognized program and organization, shall be responsible for the total work herein specified.
 - .4 Experience: The HVAC system cleaning contractor shall submit records of experience in the field of HVAC system cleaning as requested by the owner. Bids shall only be considered from firms, which are regularly engaged in HVAC system maintenance with an emphasis on HVAC system cleaning and decontamination.

- .5 Equipment, Materials and Labor: The HVAC system cleaning contractor shall possess and furnish all necessary equipment, materials and labour to adequately perform the specified services.
 - .1 The contractor shall assure that its employees have received safety equipment training, medical surveillance programs, individual health protection measures, and manufacturer's product and material safety data sheets (MSDS) as required for the work by the U.S. Occupational Safety and Health Administration, and as described by this specification. For work performed in countries outside of the U.S.A., contractors should comply with applicable national safety codes and standards.
 - .2 The contractor shall maintain a copy of all current MSDS documentation and safety certifications at the site at all times, as well as comply with all other site documentation requirements of applicable OSHA programs and this specification
 - .3 Contractor shall submit to the owner all Material Safety Data Sheets (MSDS) for all chemical products proposed to be used in the cleaning process.
- .6 Licensing: The HVAC system cleaning contractor shall provide proof of maintaining the proper license(s), if any, as required to do work in this state. Contractor shall comply with all Federal, state and local rules, regulations, and licensing requirements.

1.3 STANDARDS

- .1 NADCA Standards: The HVAC system cleaning contractor shall perform the services specified here in accordance with the current published standards of the National Air Duct Cleaners Association (NADCA).
 - .1 All terms in this specification shall have their meaning defined as stated in the NADCA Standards.
 - .2 NADCA Standards must be followed with no modifications or deviations being allowed.

1.4 DOCUMENTS

- .1 Mechanical Drawings: The owner shall provide the HVAC system cleaning contractor with one copy of the following documents:
 - .1 Project drawings and specifications.
 - .2 Approved construction revisions pertaining to the HVAC system.
 - .3 Any existing indoor air quality (IAQ) assessments or environmental reports prepared for the facility.

Part 2 Products

2.1 SCOPE OF WORK

- .1 This section defines the minimum requirements necessary to render HVAC components clean, and to verify the cleanliness through inspection and/or testing in accordance with items specified herein and applicable NADCA Standards.
- .2 The Contractor shall be responsible for the removal of visible surface contaminants and deposits from within the HVAC system in strict accordance with these specifications.
- .3 The HVAC system includes any interior surface of the facility's existing air distribution system for conditioned spaces and/or occupied zones. This includes the entire heating, air-conditioning and ventilation system from the points where the air enters the system to the points where the air is discharged from the system. The return air grilles, return air ducts to the air handling units (AHU), the interior surfaces of the AHU, mixing box, coil compartment, condensate drain pans, humidifiers and dehumidifiers, supply air ducts, fans, fan housing, fan blades, air wash systems, spray eliminators, turning vanes, filters, filter housings, reheat coils, and supply diffusers are all considered part of the HVAC system. The HVAC system may also include other components such as dedicated exhaust and ventilation components and make-up air systems. Clean entire duct system from AHU serving office area and Literacy Room A117/Meeting Room A116.

Note: Users of this specification must modify the above paragraph to succinctly and specifically define those systems and components requiring cleaning.

2.2 HVAC SYSTEM COMPONENT INSPECTIONS AND SITE PREPARATIONS

- .1 HVAC System Component Inspections: Prior to the commencement of any cleaning work, the HVAC system cleaning contractor shall perform a visual inspection of the HVAC system to determine appropriate methods, tools, and equipment required to satisfactorily complete this project. The cleanliness inspection should include air handling units and representative areas of the HVAC system components and ductwork. In HVAC systems that include multiple air-handling units, a representative sample of the units should be inspected.
- .2 The cleanliness inspection shall be conducted without negatively impacting the indoor environment through excessive disruption of settled dust, microbial amplification or other debris. In cases where contamination is suspected, and/or in sensitive environments where even small amounts of contaminant may be of concern, environmental engineering control measures should be implemented
 - .1 Damaged system components found during the inspection shall be documented and brought to the attention of the consultant.
- .3 Site Evaluation and Preparations: Contractor shall conduct a site evaluation, and establish a specific, coordinated plan which details how each area of the building will be protected during the various phases of the project.

- .4 Inspector Qualifications: Qualified personnel should perform the HVAC cleanliness inspection to determine the need for cleaning. At minimum, such personnel should have an understanding of HVAC system design, and experience in utilizing accepted indoor environmental sampling practices, current industry HVAC cleaning procedures, and applicable industry standards.

2.3 GENERAL HVAC SYSTEM CLEANING REQUIREMENTS

- .1 Containment: Debris removed during cleaning shall be collected and precautions must be taken to ensure that Debris is not otherwise dispersed outside the HVAC system during the cleaning process.
- .2 Particulate Collection: Where the Particulate Collection Equipment is exhausting inside the building, HEPA filtration with 99.97% collection efficiency for 0.3-micron size (or greater) particles shall be used. When the Particulate Collection Equipment is exhausting outside the building, Mechanical Cleaning operations shall be undertaken only with Particulate Collection Equipment in place, including adequate filtration to contain Debris removed from the HVAC system. When the Particulate Collection Equipment is exhausting outside the building, precautions shall be taken to locate the equipment down wind and away from all air intakes and other points of entry into the building.
- .3 Controlling Odors: Measures shall be employed to control odors and/or mist vapors during the cleaning process.
- .4 Component Cleaning: Cleaning methods shall be employed such that all HVAC system components must be Visibly Clean as defined in applicable standards (see NADCA Standards). Upon completion, all components must be returned to those settings recorded just prior to cleaning operations.
- .5 Air-Volume Control Devices: Dampers and any air-directional mechanical devices inside the HVAC system must have their position marked prior to cleaning and, upon completion, must be restored to their marked position.
- .6 Service Openings: The contractor shall utilize service openings, as required for proper cleaning, at various points of the HVAC system for physical and mechanical entry, and inspection.
 - .1 Contractor shall utilize the existing service openings already installed in the HVAC system where possible.
 - .2 Other openings shall be created by this contractor where needed and they must be created so they can be sealed by this contractor in accordance with industry codes and standards.
 - .3 Closures must not significantly hinder, restrict, or alter the airflow within the system.
 - .4 Closures must be properly insulated to prevent heat loss/gain or condensation on surfaces within the system.
 - .5 Openings must not compromise the structural integrity of the system.
 - .6 Construction techniques used in the creation of openings should conform to requirements of applicable building and fire codes, and applicable NFPA, SMACNA and NADCA Standards.

- .7 Cutting service openings into flexible duct is not permitted. Flexible duct shall be disconnected at the ends as needed for proper cleaning and inspection.
- .8 Rigid fiberglass duct systems shall be resealed in accordance with NAIMA recommended practices. Only closure techniques that comply with UL Standard 181 or UL Standard 181a are suitable for fiberglass duct system closures.
- .9 All service openings capable of being re-opened for future inspection or remediation shall be clearly marked and shall have their location reported to the consultant in project report documents.
- .7 Ceiling sections (tile): The contractor may remove and reinstall ceiling sections to gain access to HVAC systems during the cleaning process.
- .8 Air distribution devices (registers, grilles & diffusers): The contractor shall clean all air distribution devices.
- .9 Air handling units, terminal units (VAV, Dual duct boxes, etc.), blowers and exhaust fan: The contractor shall ensure that supply, return, and exhaust fans and blowers are thoroughly cleaned. Areas to be cleaned include blowers, fan housings, plenums (except ceiling supply and return plenums), scrolls, blades, or vanes, shafts, baffles, dampers and drive assemblies. All visible surface contamination deposits shall be removed in accordance with NADCA Standards. Contractor shall:
 - .1 Clean all air handling units (AHU) internal surfaces, components and condensate collectors and drains.
 - .2 Assume that a suitable operative drainage system is in place prior to beginning wash down procedures.
 - .3 Clean all coils and related components, including evaporator fins.
- .10 Duct Systems: This Contractor shall:
 - .1 Create service openings in the system as necessary in order to accommodate cleaning of otherwise inaccessible areas. Provide access doors specified in duct accessories to replace openings.
 - .2 Mechanically clean all duct systems to remove all visible contaminants, such that the systems are capable of passing Cleaning Verification Tests (see NADCA Standards).

2.4 HEALTH AND SAFETY

- .1 Safety Standards: Cleaning contractors shall comply with applicable federal, state, and local requirements for protecting the safety of the contractor's employees, building occupants, and the environment. In particular, all applicable standards of the Occupational Safety and Health Administration (OSHA) shall be followed when working in accordance with this specification.
- .2 Occupant Safety: No processes or materials shall be employed in such a manner that they will introduce additional hazards into occupied spaces.
- .3 Disposal of Debris: All Debris removed from the HVAC System shall be disposed of in accordance with applicable federal, state and local requirements.

2.5 **MECHANICAL CLEANING METHODOLOGY**

.1 Source Removal Cleaning Methods:

.1 The HVAC system shall be cleaned using Source Removal mechanical cleaning methods designed to extract contaminants from within the HVAC system and safely remove contaminants from the facility. It is the contractor's responsibility to select Source Removal methods that will render the HVAC system Visibly Clean and capable of passing cleaning verification methods (See applicable NADCA Standards) and other specified tests, in accordance with all general requirements. No cleaning method, or combination of methods, shall be used which could potentially damage components of the HVAC system or negatively alter the integrity of the system.

.1 All methods used shall incorporate the use of vacuum collection devices that are operated continuously during cleaning. A vacuum device shall be connected to the downstream end of the section being cleaned through a predetermined opening. The vacuum collection device must be of sufficient power to render all areas being cleaned under negative pressure, such that containment of debris and the protection of the indoor environment are assured.

.2 All vacuum devices exhausting air inside the building shall be equipped with HEPA filters (minimum efficiency), including hand-held vacuums and wet-vacuums.

.3 All vacuum devices exhausting air outside the facility shall be equipped with Particulate Collection including adequate filtration to contain Debris removed from the HVAC system. Such devices shall exhaust in a manner that will not allow contaminants to re-enter the facility. Release of debris outdoors must not violate any outdoor environmental standards, codes or regulations.

.4 All methods require mechanical agitation devices to dislodge debris adhered to interior HVAC system surfaces, such that debris may be safely conveyed to vacuum collection devices. Acceptable methods will include those, which will not potentially damage the integrity of the ductwork, nor damage porous surface materials such as liners inside the ductwork or system components.

.2 Methods of Cleaning Fibrous Glass Insulated Components:

.1 Fibrous glass thermal or acoustical insulation elements present in any equipment or ductwork shall be thoroughly cleaned with HEPA vacuuming equipment, while the HVAC system is under constant negative pressure, and not permitted to get wet in accordance with applicable NADCA and NAIMA standards and recommendations.

.2 Cleaning methods used shall not cause damage to fibrous glass components and will render the system capable of passing Cleaning Verification Tests (see NADCA Standards)

- .3 Damaged Fibrous Glass Material:
 - .1 Evidence of damage: If there is any evidence of damage, deterioration, delaminating, friable material, mold or fungus growth, or moisture such that fibrous glass materials cannot be restored by cleaning or resurfacing with an acceptable insulation repair coating, they shall be identified for replacement.
 - .2 Replacement: When requested or specified, Contractor must be capable of remediating exposed damaged insulation in air handlers and/or ductwork requiring replacement.
 - .3 Replacement material: In the event fiber glass materials must be replaced, all materials shall conform to applicable industry codes and standards, including those of UL and SMACNA.
 - .4 Replacement of damaged insulation is not covered by this specification.
- .4 Cleaning of Coils:
 - .1 Any cleaning method may be used which will render the Coil Visibly Clean and capable of passing Coil Cleaning Verification (see applicable NADCA Standards). Coil drain pans shall be subject to Non-Porous Surfaces Cleaning Verification. The drain for the condensate drain pan shall be operational. Cleaning methods shall not cause any appreciable damage to, displacement of, inhibit heat transfer, or erosion of the coil surface or fins, and shall conform to coil manufacturer recommendations when available. Coils shall be thoroughly rinsed with clean water to remove any latent residues.
- .5 Antimicrobial Agents and Coatings:
 - .1 Antimicrobial agents shall only be applied if active fungal growth is reasonably suspected, or where unacceptable levels of fungal contamination have been verified through testing.
 - .2 Application of any antimicrobial agents used to control the growth of fungal or bacteriological contaminants shall be performed after the removal of surface deposits and debris.
 - .3 When used, antimicrobial treatments and coatings shall be applied in strict accordance with the manufacturer's written recommendations and EPA registration listing.
 - .4 Antimicrobial coatings shall be applied according to the manufacturer's written instructions. Coatings shall be sprayed directly onto interior ductwork surfaces, rather than "fogged" downstream onto surfaces.

2.6 CLEANLINESS VERIFICATION

- .1 General:
 - .1 Verification of HVAC System cleanliness will be determined after mechanical cleaning and before the application of any treatment or introduction of any treatment-related substance to the HVAC system, including biocidal agents and coatings.

- .2 Visual Inspection:
 - .1 The HVAC system shall be inspected visually to ensure that no visible contaminants are present.
 - .1 If no contaminants are evident through visual inspection, the HVAC system shall be considered clean; however, the consultant reserves the right to further verify system cleanliness through Surface Comparison Testing or the NADCA vacuum test specified in the NADCA standards.
 - .2 If visible contaminants are evident through visual inspection, those portions of the system where contaminants are visible shall be re-cleaned and subjected to re-inspection for cleanliness.
 - .3 NADCA vacuum test analysis shall be performed by a qualified third party experienced in testing of this nature through the HVAC commissioning contract.
- .3 Verification of Coil Cleaning:
 - .1 Cleaning must restore the coil pressure drop to within 10 percent of the pressure drop measured when the coil was first installed. If the original pressure drop is not known, the coil will be considered clean only if the coil is free of foreign matter and chemical residue, based on a thorough visual inspection (see NADCA Standards).

2.7 PRE-EXISTING SYSTEM DAMAGE

- .1 Contractor is not responsible for problems resulting from prior inappropriate or careless cleaning techniques of others.

2.8 POST-PROJECT REPORT

- .1 At the conclusion of the project, the Contractor shall provide a report to the consultant indicating the following:
 - .1 Success of the cleaning project, as verified through visual inspection and/or gravimetric analysis.
 - .2 Areas of the system found to be damaged and/or in need of repair.

Part 3 Execution

- .1 Not Applicable

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 Canadian General Standards Board (CGSB)
 - .1 ASTM C553, Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
 - .2 CAN/ULC-S702, Mineral Fiber Thermal Insulation for Buildings.
 - .3 ASTM C612, Mineral Fiber Block and Board Thermal Insulation.
 - .4 CGSB 51-GP-52Ma-[89], Vapour Barrier Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
- .3 Underwriters Laboratories of Canada (ULC).
 - .1 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.
- .4 American Society for Testing and Materials (ASTM).
 - .1 ASTM C 335, Test Method for Steady State Heat Transfer Properties of Pipe Insulation.
 - .2 ASTM C 449M, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.
 - .3 ASTM B 209M, Specification for Aluminum and Aluminum Alloy Sheet and Plate.
- .5 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE).
 - .1 ASHRAE Standard 90.1.
- .6 Manufacturer's Trade Associations.
 - .1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards.

1.2 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with general requirements.
- .2 Submit for approval manufacturer's catalogue literature related to installation, fabrication for duct jointing recommendations.

1.3 INSTALLATION INSTRUCTIONS

- .1 Submit manufacturer's installation instructions in accordance with general requirements.
- .2 Installation instructions to include procedures to be used, installation standards to be achieved.

1.4 QUALIFICATIONS

- .1 Installer to be specialist in performing work of this section, and have at least 3 years successful experience in this size and type of project, qualified to standards of TIAC.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to site in original factory packaging, labeled with manufacturer's name, address.
- .2 Protect from weather and construction traffic.
- .3 Protect against damage from any source.
- .4 Store at temperatures and conditions required by manufacturer.

1.6 DEFINITIONS

- .1 For purposes of this section:
 - .1 "CONCEALED" - insulated mechanical services and equipment in suspended ceilings and non-accessible chases and furred-in spaces.
 - .2 "EXPOSED" - will mean "not concealed" as defined herein.
- .2 Insulation systems - insulation material, fasteners, jackets, and other accessories.

Part 2 Products

2.1 FIRE AND SMOKE RATING

- .1 In accordance with CAN/ULC S102:
 - .1 Maximum flame spread rating: 25.
 - .2 Maximum smoke developed rating: 50.

2.2 INSULATION

- .1 Mineral fibre as specified herein includes glass fibre, rock wool, slag wool.
- .2 Thermal conductivity ("k" factor) not to exceed specified values at 24°C (75°F) mean temperature when tested in accordance with ASTM C 335.
- .3 Type C-1: Rigid mineral fibre board to ASTM C612, with factory applied vapour retarder jacket to CGSB 51-GP-52Ma:
 - .1 Mineral fibre: to ASTM C553.
 - .2 Jacket: to CGSB 51-GP-52 Ma.
 - .3 Maximum "k" factor: to ASTM C553.
- .4 Type C-2: Mineral fibre blanket to ASTM C553 faced with factory applied vapour retarder jacket to CGSB 51-GP-52Ma:
 - .1 Mineral fibre: to ASTM C553.
 - .2 Jacket: to CGSB 51-GP-52 Ma.
 - .3 Maximum "k" factor: to ASTM C553.

- .5 Manufacturers:
 - .1 All materials must be supplied by the same manufacturer.
 - .2 Acceptable Materials:
 - .1 Johns Manville
 - .2 Fibreglass Canada
 - .3 Knauf
 - .4 Manson
 - .5 Roxul

2.3 JACKETS

- .1 Canvas:
 - .1 220 g/m² (0.0451 lb/ft²) cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C 921.
 - .2 Lagging adhesive: Compatible with insulation.

2.4 ACCESSORIES

- .1 Vapour retarder lap adhesive:
 - .1 Water based, fire retardant type, compatible with insulation.
- .2 Indoor Vapour Retarder Finish:
 - .1 Vinyl emulsion type acrylic, compatible with insulation.
- .3 Insulating Cement: hydraulic setting on mineral wool, to ASTM C 449.
- .4 ULC Listed Canvas Jacket:
 - .1 220 g/m² (0.0451 lb/ft²) cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C 921.
- .5 Tape: self-adhesive, aluminum, reinforced, 75 mm (3") wide minimum.
- .6 Contact adhesive: quick-setting Duro Dyne 1A-22 or equal.
- .7 Canvas adhesive: washable.
- .8 Tie wire: 1.5 mm (16 gauge) stainless steel.
- .9 Facing: 25 mm (1") stainless steel hexagonal wire mesh stitched on one face of insulation
- .10 Fasteners: weld pins, length to suit insulation, with 40 mm (1½") diameter clips.

Part 3 Execution

3.1 PRE-INSTALLATION REQUIREMENTS

- .1 Pressure testing of ductwork systems to be complete, witnessed and certified.
- .2 Surfaces to be clean, dry, free from foreign material.

3.2 **INSTALLATION**

- .1 Install in accordance with TIAC National Standards.
- .2 Apply materials in accordance with manufacturers instructions and this specification.
- .3 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
 - .1 Hangers, supports to be outside vapour retarder jacket.
- .4 Supports, Hangers in accordance with general requirements.
 - .1 Apply high compressive strength insulation where insulation may be compressed by weight of ductwork.
- .5 Fasteners: At 300 mm (12") oc. in horizontal and vertical directions, minimum two rows each side.
- .6 Provide rigid insulation for exposed ductwork.

3.3 **DUCTWORK INSULATION SCHEDULE**

- .1 Insulation types and thickness' conform to following table:

<u>Application</u>	<u>Type</u>	<u>Thickness</u>
Rectangular supply air ducts	C-1	25 mm (1")
Round supply air ducts	C-2	25 mm (1")
Supply, return and exhaust ducts exposed (visible) in space being served	none	
Exhaust plenums dampers and louvres	C-1	25 mm (1")
Interior acoustically lined ducts	none	
Last 1.5m of Exhaust duct	C-1	25 mm (1")

- .2 Exposed round ducts 600 mm (24") and larger, smaller sizes where subject to abuse:
 - .1 Use TIAC code C-1 insulation, scored to suit diameter of duct.
- .3 Finishes: Conform to following table:

<u>Application</u>	<u>Rectangular</u>	<u>Round</u>
Indoor, concealed	none	none
Indoor, exposed	Canvas	Canvas

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 SMACNA HVAC Duct Construction Standards, Metal and Flexible.
- .3 SMACNA HVAC Duct Leakage Test Manual.
- .4 ASTM A480/A480M, Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
- .5 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process. (Metric).
- .6 ANSI/NFPA 90A, Installation of Air Conditioning and Ventilating Systems.
- .7 ANSI/NFPA 90B, Installation of Warm Air Heating and Air Conditioning Systems.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section general requirements.
- .2 Indicate following:
 - .1 Sealants
 - .2 Tape
 - .3 Proprietary Joints
 - .4 Fittings

1.3 CERTIFICATION OF RATINGS

- .1 Catalogue or published ratings shall be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.

Part 2 Products

2.1 DUCTWORK

- .1 Galvanized Steel:
 - .1 Galvanized steel with Z90 designation zinc coating lock forming quality: to ASTM A653/A653M.

.2 Thickness:

Size Type	Class A Gauge	Class B Gauge	Class C Gauge
Square and Rectangular			
Up to 600 mm (24")	22	24	24
625 mm to 1000 mm (25" to 40")	20	22	24
1025 mm to 1800 mm (41" to 72")	18	20	22
1825 mm to 2400 mm (73" to 96")	16	18	20
2450 mm and over (97")	16	16	16
Round and Oval			
Up to 300 mm (12")	24	24	24
325 mm to 600 mm (13" to 24")	22	24	24
625 mm to 900 mm (25" to 36")	20	22	24
925 mm to 1200 mm (37" to 48")	18	20	22
1225 mm (49") and over	18	18	20

.3 All ductwork between HVAC unit connections and 3.0 m (10'-0") downstream or to silencers shall be 1.4 mm (18 gauge).

2.2 DUCT CONSTRUCTION

.1 Round and oval:

- .1 Ducts: factory fabricated, spiral wound, with matching fittings and specials to SMACNA.
- .2 Transverse joints up to 900 mm (36"): slip type with tape and sealants.
- .3 Transverse joints over 900 mm (36"): Ductmate or Exanno Nexus Duct System.

.2 Square and rectangular:

- .1 Ducts: to SMACNA.
- .2 Transverse joints, longest side:
up to and including 750 mm (30"): SMACNA proprietary duct joints.

.3 Ducts with sides over 750 mm (30") to 1200 mm (48"), transverse duct joint system by Ductmate/25, Nexus, or WDCI (Lite) (SMACNA "E" or "G" Type connection). Weld all corners.

- .1 Acceptable materials:
 - .1 Ductmate Canada Ltd.
 - .2 Nexus, Exanno Corp.
 - .3 WDCI

- .4 Ducts 1200 mm (48") and larger, Ductmate/35, Nexus, or WDCI (heavy) (SMACNA "J" Type connection). Weld all corners.
 - .1 Acceptable materials:
 - .1 Ductmate Canada Ltd.
 - .2 Nexus, Exanno Corp.
 - .3 WDCII.

2.3 FITTINGS

- .1 Fabrication: to SMACNA.
- .2 Radiused elbows:
 - .1 Rectangular: standard radius and or short radius with single thickness turning vanes Centreline radius: 1.5 times width of duct.
 - .2 Round:
 - .1 In exposed areas one-piece smooth radius, 1.5 times diameter.
 - .2 In concealed areas 3-piece adjustable, 1.5 times diameter.
- .3 Mitred elbows, rectangular:
 - .1 To 400 mm (16"): with double thickness turning vanes.
 - .2 Over 400 mm (16"): with double thickness turning vanes.
- .4 Branches:
 - .1 Rectangular main and branch: with 45° entry on branch.
 - .2 Round main and branch: enter main duct at 45° with conical connection.
 - .3 Provide volume control damper in branch duct near connection to main duct.
 - .4 Main duct branches: with splitter damper.
- .5 Diffuser connection to main:
 - .1 90° round spin in collars with balancing damper and locking quadrant.
- .6 Transitions:
 - .1 Diverging: 20° maximum included angle.
 - .2 Converging: 30° maximum included angle.
- .7 Offsets:
 - .1 Full short radiused elbows.
- .8 Obstruction deflectors: maintain full cross-sectional area.

2.4 SEAL CLASSIFICATION

- .1 Classification as follows:

Maximum Pressure Pa (" w.c.)	SMACNA Seal Class
2500 (10")	A
1500 (6")	A
1000 (4")	A
750 (3")	A
500 (2")	B
250 (1")	B
125 (0.5")	C

- .2 Seal classification:

- .1 Class A: longitudinal seams, transverse joints, duct wall penetrations and connections made airtight with sealant and tape.
- .2 Class B: longitudinal seams, transverse joints and connections made airtight with sealant.
- .3 Class C: transverse joints and connections made air tight with gaskets, or sealant or combination thereof. Longitudinal seams sealed with foil tape or sealant.

2.5 SEALANT

- .1 Sealant: oil resistant, polymer type flame resistant duct sealant. Temperature range of -30°C (-22°F) to plus 93°C (199°F).
- .1 Acceptable materials:
 - .1 Duro Dyne S-2
 - .2 Foster

2.6 TAPE

- .1 Tape: polyvinyl treated, open weave fiberglass tape, 50 mm (2") wide.
- .1 Acceptable material:
 - .1 Duro Dyne FT-2

2.7 DUCT LEAKAGE

- .1 In accordance with SMACNA HVAC Duct Leakage Test Manual.

2.8 FIRESTOPPING

- .1 40 mm x 40 mm x 3 mm (1½" x 1½" x 16ga) retaining angles all around duct, on both sides of fire separation.
- .2 Firestopping material and installation must not distort duct.
- .3 All ductwork passing through partition walls shall be firestopped.

2.9 HANGERS AND SUPPORTS

- .1 Band hangers: use on round and oval ducts only up to 500 mm (20") diameter, of same material as duct but next sheet metal thickness heavier than duct.
- .2 Trapeze hangers: ducts over 500 mm (20") diameter or longest side, to ASHRAE and SMACNA.
- .3 Hangers: galvanized steel angle with black steel rods to ASHRAE and SMACNA following table:

Duct Size mm (")	Angle Size mm (")	Rod Size mm (")
up to 750 (30)	25 x 25 x 3 (1 x 1 x 1/8)	6 (1/4)
>750 to 1050 (>30 to 42)	40 x 40 x 3 (1½ x 1½ x 1/8)	6 (1/4)
>1050 to 1500 (>42 to 60)	40 x 40 x 3 (1½ x 1½ x 1/8)	10 (3/8)
>1500 to 2100 (>60 x 84)	50 x 50 x 3 (2 x 2 x 1/8)	10 (3/8)
>2100 to 2400 (>84 x 96)	50 x 50 x 5 (2 x 2 x 1/8)	10 (3/8)
>2400 (96) and over	50 x 50 x 6 (2 x 2 x ¼)	10 (3/8)

- .4 Upper hanger attachments:
 - .1 For concrete: manufactured concrete inserts.
 - .1 Acceptable material:
 - .1 Myatt fig. 485
 - .2 For steel joist: manufactured joist clamp or steel plate washer.
 - .1 Acceptable material:
 - .1 Grinnell fig. 61 or 60
 - .3 For steel beams: manufactured beam clamps:
 - .1 Acceptable material:
 - .1 Grinnell Fig. 60

Part 3 Execution

3.1 GENERAL

- .1 The following systems shall conform to these requirements:

System	Class	Material
HVAC Supply and Return	B	Galvanized steel
General Exhaust	B	Galvanized steel
Exhaust Plenum	B	Galvanized steel
Individual Exhaust	C	Galvanized steel

- .2 Do work in accordance with ASHRAE and SMACNA.
- .3 Do not break continuity of insulation vapour barrier with hangers or rods.
- .4 Support risers in accordance with ASHRAE and SMACNA.

- .5 Install breakaway joints in ductwork on each side of fire separation.
- .6 Install proprietary manufactured flanged duct joints in accordance with manufacturer's instructions.
- .7 Manufacture duct in lengths to accommodate installation of acoustic duct lining.

3.2 HANGERS

- .1 Strap hangers: install in accordance with SMACNA.
- .2 Angle hangers: complete with locking nuts and washers.
- .3 Hanger spacing: in accordance with ASHRAE, SMACNA and as follows:

Duct Size	Spacing
mm (")	mm (")
to 1500 (60")	3000 (120")
over 1500 (60")	2500 (100")

- .4 Do not support ductwork over 250 mm x 250 mm (10" x 10") from roof deck.

3.3 SEALING

- .1 Apply sealant to outside of joint to manufacturer's recommendations.
- .2 Bed tape in sealant and recoat with minimum of 1 coat of sealant to manufacturers recommendations.

3.4 LEAKAGE TESTS

- .1 Co-ordinate leakage testing with TAB contractor **and commissioning agent**. TAB contractor will be responsible for all duct testing.
- .2 Duct to be tested in accordance with SMACNA HVAC Duct Leakage Test Manual.
- .3 Leakage tests to be done in sections.
- .4 Trial leakage tests to be performed as instructed to demonstrate workmanship.
- .5 Install no additional ductwork until trial test has been passed.
- .6 Test section to be minimum of 15 m (50'-0") long with not less than 3 branch takeoffs and two 90° elbows. Maximum test length and area to be determined by BAS testing equipment. Allow for twelve (12) tests.
- .7 Complete test before insulation or concealment.
- .8 Provide all necessary end caps and fittings as required for the TAB contractor. Remove same after successful completion of duct test.
- .9 Pressure test ductwork to 1½ times operating pressure (minimum pressure 500 Pa (2" wc) all systems).

3.5 CLEANING

- .1 Keep ducts clear from dust and debris
- .2 Keep duct liner clean from dust, debris, and moisture.

- .3 At completion of project vacuum ducts if dirt or dust is present.
- .4 Where new systems connect into existing systems the existing systems shall be cleaned and vacuumed prior to reconnection.
- .5 Ensure all systems are clean prior to start up.

3.6 INSTALLATION REQUIREMENTS

- .1 All ductwork is to be protected from the weather and precipitation. The top and sides of all ductwork are to be completely covered with 6mil poly to the satisfaction of the consultant. Maintain protection of the ductwork until the building is made watertight and hollow cores drained. Tape all joints.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 SMACNA HVAC Duct Construction Standards, Metal and Flexible.
- .3 ANSI/NFPA 90B, Installation of Warm Air Heating and Air Conditioning Systems.
- .4 ANSI/NFPA 96, Ventilation Control and Fire Protection of Commercial Cooking Operations.
- .5 CSA B228.1, Pipes, Ducts and Fittings for Residential Type Air Conditioning.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with general requirements.
- .2 Indicate the following:
 - .1 Flexible connections.
 - .2 Duct access doors.
 - .3 Turning vanes.
 - .4 Instrument test ports.

1.3 CERTIFICATION OF RATINGS

- .1 Catalogue or published ratings shall be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.

Part 2 Products

2.1 GENERAL

- .1 Manufacture in accordance with CSA B228.1.

2.2 FLEXIBLE CONNECTIONS

- .1 Frame: galvanized sheet metal frame with fabric clenched by means of double locked seams.
- .2 Material:
 - .1 Fire resistant, self extinguishing, neoprene coated glass fabric, temperature rated at -40°C (-40°F) to plus 90°C (194°F), density of 1.3 kg/m.

2.3 ACCESS DOORS IN DUCTS

- .1 Non-insulated ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.6 mm (25 gauge) thick complete with sheet metal angle frame.
- .2 Insulated ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.6 mm (24 gauge) thick complete with sheet metal angle frame and 25 mm (1") thick rigid glass fibre insulation.
- .3 Gaskets: neoprene
- .4 Hardware:
 - .1 Up to 300 mm (12"): 2 sash locks
 - .2 301 mm to 450 mm (13" to 18"): 4 sash locks Complete with safety chain.
 - .3 451 mm to 1000 mm (19" to 40"): piano hinge and minimum 2 sash locks.
 - .4 Doors over 1000 mm (40"): piano hinge and 2 handles operable from both sides.
 - .5 Hold open devices.
- .5 Acceptable materials:
 - Nailor
 - E. H. Price
 - Titus

2.4 TURNING VANES

- .1 Factory or shop fabricated double thickness, to recommendations of SMACNA and as indicated.
- .2 Acceptable materials:
 - Duro Dyne
 - Ductmate

2.5 INSTRUMENT TEST PORTS

- .1 1.6 mm (16 gauge) thick steel zinc plated after manufacture.
- .2 Cam lock handles with neoprene expansion plug and handle chain.
- .3 28 mm (1 1/8") minimum inside diameter. Length to suit insulation thickness.
- .4 Neoprene mounting gasket.
- .5 Acceptable material:
 - Duro Dyne IP1 or IP2
 - Duct mate

2.6 SPIN-IN COLLAR

- .1 Construction: galvanized straight or conical spin-in collar complete with spin-in bead and crimped collar connection.
- .2 Provide balancing damper where indicated.

- .3 Acceptable materials:
 - .1 Ecco Manufacturing
 - .2 Flex Master

Part 3 Execution

3.1 INSTALLATION

- .1 Flexible connections:
 - .1 Install in following locations:
 - .1 Inlets and outlets to supply air units and fans. (Unless internally isolated)
 - .2 Inlets and outlets of exhaust and return air fans.
 - .3 As indicated.
 - .2 Length of connection: 100 mm (4").
 - .3 Minimum distance between metal parts when system in operation: 75 mm (3").
 - .4 Install in accordance with recommendations of SMACNA.
 - .5 When fan is running:
 - .1 Ducting on each side of flexible connection to be in alignment.
 - .2 Ensure slack material in flexible connection.
- .2 Access doors and viewing panels:
 - .1 Size:
 - .1 600 mm x 600 mm (24" x 24") for person size entry.
 - .2 600 mm x 1000 mm (24" x 40") for servicing entry.
 - .3 300 mm x 300 mm (12" x 12") for viewing.
 - .4 As indicated.
 - .2 Location:
 - .1 At fire and smoke dampers.
 - .2 At control dampers.
 - .3 At devices requiring maintenance.
 - .4 At locations required by code.
 - .5 At inlet and outlet of reheat coils.
 - .6 Elsewhere as indicated.
 - .7 Inlet and outlet of duct mounted coils.
- .3 Instrument test ports.
 - .1 General:
 - .1 Install in accordance with recommendations of SMACNA and in accordance with manufacturer's instructions.
 - .2 Locate to permit easy manipulation of instruments
 - .3 Install insulation port extensions as required.

- .4 Locations.
 - .1 For traverse readings:
 - .1 At ducted inlets to roof and wall exhausters.
 - .2 At inlets and outlets of other fan systems.
 - .3 At main and sub-main ducts.
 - .4 And as indicated.
 - .2 For temperature readings:
 - .1 At outside air intakes.
 - .2 In mixed air applications in locations as approved by Consultant.
 - .3 At inlet and outlet of coils.
 - .4 Downstream of junctions of two converging air streams of different temperatures.
 - .5 And as indicated.
- .4 Turning vanes:
 - .1 Install in accordance with recommendations of SMACNA and as indicated.
 - .2 Install on supply ducts only.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 SMACNA HVAC Duct Construction Standards, Metal and Flexible.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with general requirements
- .2 Indicate the following: performance data.

Part 2 Products

2.1 GENERAL

- .1 Manufacture to SMACNA standards.

2.2 SINGLE BLADE DAMPERS

- .1 Of same material as duct, but one sheet metal thickness heavier. V-groove stiffened, minimum 1.6 mm (16 gauge).
- .2 Size and configuration to recommendations of SMACNA, except maximum height 100 mm (4").
- .3 Shaft extension to accommodate insulation thickness and locking quadrant.
- .4 Inside and outside nylon end bearings.
- .5 Channel frame of same material as adjacent duct, complete with angle stop.

2.3 MULTI-BLADED DAMPERS

- .1 Factory manufactured of material compatible with duct.
- .2 Opposed blade: configuration, metal thickness and construction to recommendations of SMACNA.
- .3 Maximum blade height:
 - .1 50 mm (2") up to 375 mm (15") high duct.
 - .2 100 mm (4") max 400 mm (16") high duct and over.
- .4 Bearings: self-lubricating nylon.
- .5 Linkage: shaft extension with locking quadrant.
- .6 Channel frame of same material as adjacent duct, complete with angle stop.
- .7 Shaft extension to accommodate insulation thickness and locking quadrants.

- .8 Acceptable materials:
 - .1 Duro Dyne
 - .2 E.H. Price
 - .3 Nailor
 - .4 T.A. Morrison
 - .5 Tamco
 - .6 Ruskin
 - .7 Ventex/Alumavent
 - .8 United Enertech

2.4 LOCKING QUADRANTS

- .1 6 mm (1/4") dial regulator with square bearing shaft.
 - .1 18 gauge oval frame, cadmium plated, clearly shows damper position.
 - .2 18 gauge formed handle for easy adjustment.
 - .3 Bolt and wing nut lock damper securely.
 - .4 Offset mounting holes avoid interference with damper movement and mechanical fastening to duct.
- .2 9 mm (3/8") and larger: clamp quadrant with square bearing shaft.
 - .1 Accommodates and securely locks square rod, bearing fitting and adaptor pins.
 - .2 Heavily ribbed 16 gauge steel frame, 3 mm (1/8") thick formed steel handle, cadmium-plated.
 - .3 By tightening nut, bearing is securely locked in handle, preventing slippage and rattle.
 - .4 Neoprene and steel washer assembly seals bearing opening to eliminate air-leakage.
 - .5 Screw holes for mechanically fastening to ductwork.
- .3 High pressure system locking quadrant:
 - .1 Airtight, rattle-proof regulator, designed for ZERO leakage at high pressure. Use for applications up to 500°F constant temperature.
 - .2 Handle design for easy recognition of damper position.
 - .3 Heavy-gauge, zinc-plated steel, 2 high temperature rubber seals and washers, end bearing support, and 2 end bearings. Pressure loss and damper rattle in ductwork has been a constant annoyance for as long as HVAC ductwork has been installed. Now, a truly air-tight, rattle-proof regulator is available. The SPEC-SEAL regulator utilizes a special high-temperature rubber seal to eliminate leakage and rattle even at many times the pressure found in high pressure.

- .4 Soft, comfortable grip handle with a highly-visible, plastic cover which indicates the damper position.
- .5 Handle to accommodate 9 mm (3/8") or 12 mm (1/2") to match damper shaft size, square and round bearing shafts.
- .4 Acceptable manufacturers:
Duro Dyne
Ductmate

Part 3 Execution

3.1 INSTALLATION

- .1 Install where indicated.
- .2 Install in accordance with recommendations of SMACNA and in accordance with manufacturer's instructions.
- .3 For supply, return and exhaust systems, locate balancing dampers in each branch duct.
 - .1 Single blade dampers up to 200 mm (8").
 - .2 Multi-blade dampers over 200 mm (8").
- .4 Runouts to registers and diffusers: install single blade damper located as close as possible to main ducts.
- .5 All dampers to be vibration free.
- .6 Leave all dampers in open position for T.A.B.
- .7 Fasten locking quadrants to ductwork and shaft.
- .8 Place locking quadrants on standoffs where ductwork insulated.
- .9 Lock down quadrant arm in the open position.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 CAN/ULC-S110, Standard Methods of Test for Air Ducts.
- .3 UL 181, Factory Made Air Ducts and Air Connectors.
- .4 ANSI/NFPA 90A, Installation of Air Conditioning and Ventilating Systems.
- .5 ANSI/NFPA 90B, Installation of Warm Air Heating and Air Conditioning Systems.
- .6 SMACNA HVAC Duct Construction Standards - Metal and Flexible.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with general requirements.
- .2 Indicate the following:
 - .1 Thermal properties.
 - .2 Friction loss.
 - .3 Acoustical loss.
 - .4 Leakage.
 - .5 Fire rating.

1.3 CERTIFICATION OF RATINGS

- .1 Catalogue or published ratings shall be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.

Part 2 Products

2.1 GENERAL

- .1 Factory fabricated to CAN/ULC S110.
- .2 Pressure drop coefficients listed below are based on relative sheet metal duct pressure drop coefficient of 1.00.
- .3 Flame spread rating not to exceed 25. Smoke developed rating not to exceed 50.

2.2 METALLIC – UNINSULATED

- .1 Spiral wound flexible aluminum, Class 1 duct material.
- .2 Performance:
 - .1 Factory tested to 2.5 kPa (10" w.c.) without leakage.
 - .2 Maximum relative pressure drop coefficient: 3.
 - .3 Operating pressure: 300 mm (12").

- .3 Acceptable materials:
 - .1 Flexmaster T/L
 - .2 Ductmate

2.3 METALLIC –INSULATED

- .1 Spiral wound flexible aluminum with factory applied, 25 mm (1") thick flexible glass fibre thermal insulation with vapour barrier and vinyl jacket, Class 1 duct material.
- .2 Performance:
 - .1 Factory tested to 2.5 kPa (10" w.c.) without leakage.
 - .2 Maximum relative pressure drop coefficient: 3.
 - .3 Operating pressure: 300 mm (12").
- .3 Acceptable materials:
 - .1 Flexmaster T/L – VT
 - .2 Ductmate

Part 3 Execution

3.1 DUCT INSTALLATION

- .1 Install in accordance with: SMACNA.
- .2 Maximum length of flexible duct: 1.8 m (6' 0").
- .3 Minimum length of acoustical ductwork; 1.5 m (5' 0") with minimum of 1 bend.
- .4 Provide support at centre of flexible duct with 25 mm (1") wide galvanized hanger.
- .5 Insulated flexible ductwork in areas where ceilings are not utilized as return air plenums.
- .6 Uninsulated flexible ductwork in areas where ceilings are utilized as return air plenums.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 SMACNA HVAC Duct Construction Standards, Metal and Flexible.
- .3 ASTM C553, Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
- .4 ANSI/NFPA 90A, Installation of Air Conditioning and Ventilating Systems.
- .5 ANSI/NFPA 90B, Installation of Warm Air Heating and Air Conditioning Systems.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with general requirements.

Part 2 Products

2.1 DUCT LINER

- .1 General:
 - .1 Rigid fibrous glass duct liner: air stream side faced with mat facing.
 - .2 Flame spread rating shall not exceed 25. Smoke development rating shall not exceed 50 when tested in accordance with CAN/ULC-S102.
 - .3 Acceptable material:
 - .1 Johns Manville, Permacote Linacoustic R-300
 - .2 Owen Corning
- .2 Rigid:
 - .1 Use on flat surfaces.
 - .2 25 mm (1") thick, to CGSB 51-GP-10M, fibrous glass rigid board duct liner.
 - .3 Density: 36 kg/m² (7.4 lb/ft²).
 - .4 Thermal resistance to be minimum 750 mm (30") C/W for 25 mm (1") thickness
1150 mm (45") C/W for 40 mm (1½") thickness when tested in accordance with ASTM C177, at 24°C (75°F) mean temperature.

2.2 ADHESIVE

- .1 Meet requirements of ANSI/NFPA 90A and ANSI/NFPA 90B.
- .2 Flame spread rating shall not exceed 25. Smoke development rating shall not exceed 50. Temperature range -29°C (-20°F) to 93°C (200°F).
- .3 Acceptable material:
 - .1 Duro Dyne 1A-22
 - .2 Ductmate

2.3 FASTENERS

- .1 Weld pins 2.0 mm (14 gauge) diameter, length to suit thickness of insulation. Metal retaining clips, 32 mm (1¼") square.
- .2 Acceptable material:
 - .1 Duro Dyne
 - .2 Ductmate

2.4 JOINT TAPE

- .1 Poly-Vinyl treated open weave fiberglass membrane 50 mm (2") wide.
- .2 Acceptable materials:
 - .1 Duro Dyne FT2
 - .2 Ductmate

2.5 SEALER

- .1 Meet requirements of ANSI/NFPA 90A and ANSI/NFPA 90B.
- .2 Flame spread rating shall not exceed 25. Smoke development rating shall not exceed 50. Temperature range -68°C (-90F) to 93°C (200°F).
- .3 Acceptable materials:
 - .1 Duro Dyne 1A-94
 - .2 Ductmate

Part 3 Execution

3.1 GENERAL

- .1 Do work in accordance with recommendations of SMACNA duct liner standards as indicated in SMACNA HVAC Duct Construction Standards, Metal and Flexible, except as specified otherwise.
- .2 Line inside of ducts where indicated.
- .3 Duct dimensions, as indicated, are clear inside duct lining.
- .4 Provide an interior of ductwork from fans from minimum distance of 3 m (10'-0").

3.2 DUCT LINER

- .1 Install in accordance with manufacturer's recommendations, and as follows:
 - .1 Fasten to interior sheet metal surface with 100% coverage of adhesive.
 - .2 In addition to adhesive, install weld pins not less than 2 rows per surface and not more than 300 mm (12") on centres.
- .2 Weld pins are to have cupped or beveled heads to prevent damage to lining surface.
- .3 Store foam liners away from sunlight.

3.3 JOINTS

- .1 Seal all butt joints, exposed edges, weld pin and clip penetrations and all damaged areas of liner with joint tape and sealer. Install joint tape in accordance with manufacturer's recommendations, and as follows:
 - .1 Bed tape in sealer.
 - .2 Apply 2 coats of sealer over tape.
- .2 Replace damaged areas of liner at discretion of Consultant.
- .3 Protect leading and trailing edges of each duct section with sheet metal nosing having 15 mm (1/2") overlap and fastened to duct.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 AMCA 99, Standards Handbook.
- .3 ANSI/AMCA 210, Laboratory Methods of Testing Fans for Certified Aerodynamics Performance Rating.
- .4 AMCA 300, Revised 1987, Reverberant Room Method for Sound Testing of Fans.
- .5 AMCA 301, Methods for Calculating Fan Sound Ratings from Laboratory Test Data.
- .6 ANSI/ASHRAE 51, Laboratory Methods of Testing Fans for Certified Aerodynamics Performance Rating.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with general requirements.
- .2 Product data to include fan curves and sound rating data.

1.3 OPERATION AND MAINTENANCE DATA

- .1 Provide operation and maintenance data for incorporation into manual specified in general requirements.

1.4 CERTIFICATION OF RATINGS

- .1 Catalogued or published ratings shall be those obtained from tests carried out by manufacturer or those ordered from independent testing agency signifying adherence to codes and standards in force.
- .2 Provide confirmation of testing.

Part 2 Products

2.1 FANS GENERAL

- .1 Capacity: flow rate, total static pressure Pa, r/min, W (" w.c., r/min, bhp) model and size and sound ratings as indicated on schedule.
- .2 Statically and dynamically balanced. Constructed in conformity with AMCA 99.
- .3 Sound ratings: comply with AMCA 301, tested to AMCA 300.
- .4 Performance ratings: based on tests performed in accordance with ANSI/AMCA 210, and ANSI/ASHRAE 51.
- .5 Bearings: sealed lifetime of self aligning type with oil retaining, dust excluding seals and a certified minimum rated life of 80,000 100,000 h in accordance with AFBMA L10 life standard. Bearings to be rated and selected in accordance with AFBMA 9 and AFBMA 11.

- .6 Acceptable materials:
 - .1 Greenheck
 - .2 Penn-Barry
 - .3 Cook
 - .4 Carnes
 - .5 Acme
 - .6 Nutone (Range hood)
 - .7 Broan (Range hood)
- .7 Provide factory mounted speed control for all direct drive motors.

2.2 CEILING DISCHARGE FANS

- .1 Centrifugal direct drive, with plug in type electric motor suitable for ceiling installation, zinc coated rectangular metal housing.
- .2 Sizes and capacity: as indicated.
- .3 Toggle switch operated complete with integral electrical outlet box with plug-in type receptacle.
- .4 Side duct outlet with integral backdraft damper, size as indicated.
- .5 Wall cap complete with spring loaded backdraft damper with neoprene gasket.
- .6 Silver anodized aluminum grille paint finish.

2.3 RANGE HOOD EXHAUST FANS

- .1 Centrifugal direct drive 750 mm (30") wide, suitable for under cabinet installation, enamel steel metal housing complete with halogen lights, colour selected by consultant.
- .2 Sizes and capacity: as indicated.
- .3 Internal Toggle switch operated fan and light.
- .4 Top or rear side 80 mm x 250 mm (3" x 10") rectangular duct outlet with integral backdraft damper.
- .5 Wall cap complete with spring loaded backdraft damper with neoprene gasket.
- .6 Aluminum mesh cleanable grease filter.

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with manufacturer's instructions.
- .2 Provide flexible duct connection at roofline.
- .3 Provide backdraft damper at building exterior penetration.

END OF SECTION

Part 1 General

1.1 PRODUCT DATA

- .1 Submit product data in accordance with general requirements.
- .2 Indicate the following:
 - .1 Capacity.
 - .2 Throw and terminal velocity.
 - .3 Noise criteria.
 - .4 Pressure drop.
 - .5 Neck velocity.

1.2 MAINTENANCE MATERIALS

- .1 Include:
 - .1 Keys for volume control adjustment.
 - .2 Keys for air flow pattern adjustment.

1.3 MANUFACTURED ITEMS

- .1 Grilles, registers and diffusers of same generic type to be product of one manufacturer.

1.4 CERTIFICATION OF RATINGS

- .1 Catalogued or published ratings shall be those obtained from tests carried out by manufacturer or those ordered by him from independent testing agency signifying adherence to codes and standards.

Part 2 Products

2.1 GENERAL

- .1 To meet capacity, pressure drop, terminal velocity, throw, noise level, neck velocity as indicated.
- .2 Frames:
 - .1 Full perimeter gaskets.
 - .2 Plaster frames where set into plaster or gypsum board and as specified.
 - .3 Concealed fasteners.
- .3 Concealed operators.
- .4 Colour and Finish: standard as directed by Consultant.
- .5 Acceptable materials: refer to schedule on drawings

2.2 SUPPLY GRILLES AND REGISTERS

- .1 General: with opposed blade dampers as indicated, concealed manual operator and gaskets.
- .2 Type, size, and capacity: as indicated.

2.3 RETURN AND EXHAUST GRILLES

- .1 General: with opposed blade dampers as indicated, concealed manual operator and gaskets.
- .2 Type, size, and capacity: as indicated.

2.4 DIFFUSERS

- .1 General: volume control dampers with flow straightening devices and blank-off quadrants, as indicated and gaskets.
- .2 Type, size, and capacity: as indicated.

2.5 OPEN MESH SCREEN

- .1 15 mm x 15 mm (½"x ½") open mesh screen fastened on 25 mm (1") border, screw fasten.
- .2 On all open ends of ductwork and where indicated.
- .3 Size: To match ductwork size.

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with manufacturer's instructions.
- .2 Install with flat head screws in countersunk holes where fastenings are visible.
- .3 Bolt grilles, registers and diffusers, in place
- .4 Provide concealed safety chain on each grille, register and diffuser in gymnasium, similar game rooms, and on exposed diffusers, and elsewhere as indicated.
- .5 Clean grilles upon completion.
- .6 Paint ductwork beyond grilles, matte black where visible.
- .7 Ensure all grilles, diffusers, etc. match opening sizes as indicated on the drawings and as fabricated on site by the contractor.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ASTM E90, Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions, and Elements.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with general requirements.
- .2 Indicate the following:
 - .1 Pressure drop.
 - .2 Face area.
 - .3 Free area.
 - .4 Colour and finish.

1.3 CERTIFICATION OF RATINGS

- .1 Catalogued or published ratings shall be those obtained from tests carried out by manufacturer or those ordered by him from independent testing agency signifying adherence to codes and standards.

1.4 TEST REPORTS

- .1 Submit certified data from independent laboratory substantiating acoustic and aerodynamic performance to ASTM E90.

Part 2 Products

2.1 THIN LINE FIXED LOUVRES – ALUMINUM

- .1 Construction: welded with exposed joints ground flush and smooth.
- .2 Material: extruded aluminum alloy 6063-T5.
- .3 Blade: stormproof pattern with centre watershed in blade, reinforcing bosses and maximum blade length of 1500 mm (60").
- .4 Perimeter flange frame, head, sill and jamb: 50 mm (2") deep one piece extruded aluminum, minimum 3 mm (1/8") thick with approved caulking slot, integral to unit
- .5 Fastenings: stainless steel (Society of Automotive Engineers) SAE-194-8F with SAE-194-SFB nuts and resilient neoprene washers between aluminum and head of bolt, or between nut, ss washer and aluminum body.
- .6 Screen: 20 mm (3/4"), 2 mm (5/64") diameter wire aluminum birdscreen on inside face of louvres in formed U-frame.

- .7 Finish: Kynar 500
 Colour: to Consultants approval.

 Acceptable materials:
 E.H. Price
 Krueger
 Ruskin
 Nailor
 Ventex

Part 3 Execution

3.1 INSTALLATION

- .1 In accordance with manufacturers and SMACNA recommendations.
- .2 Reinforce and brace air vents, intakes and goosenecks as indicated.
- .3 Anchor securely into opening.
- .4 Seal with caulking all around to ensure weather tightness.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

- .1 Conform to General Conditions for Mechanical Trades.
- .2 Related Work Specified Elsewhere.
 - .1 General Conditions for Mechanical Trades
 - .2 Plumbing & Drainage
 - .3 Heating, Ventilation & Air Conditioning
 - .4 Heating, Ventilation & Air Conditioning Equipment
 - .5 Electrical

1.2 DESCRIPTION OF SYSTEM

- .1 Furnish and install all components, devices and control wiring for a fully integrated Energy Management and Environmental Control System incorporating Direct Digital Control (DDC), and equipment monitoring. The system shall control/monitor HVAC and plumbing equipment and systems as specified in this section. The work shall include but is not limited to the following:
 - .1 All necessary hardware, software, control panels, control wiring, field devices, installation, documentation and owner training as specified.
 - .2 The installed system shall incorporate electronic and digital control devices to perform the control sequences and monitoring outlined herein. Specific control sequence requirements are as detailed elsewhere in this Section of the specification.
 - .3 Control and monitoring of the equipment and systems shown on the drawings (refer also to 'Sequence of Operation' for additional details).
 - .4 The bypass dampers shall be supplied by this trade and installed by the sheet metal trade but VVT zones with VAV boxes shall be supplied by and installed in the duct system by the sheet metal trade complete with necessary duct transitions, access doors, etc. The temperature control contractor shall be responsible for coordination with the HVAC contractor and the installation of the actuators.
 - .5 Control valves shall be supplied by this Trade but installed in the piping system by the Mechanical Trade complete with transitions and unions as required.
 - .6 Testing, debugging, calibrating, adjustment, programming and confirmation of total system operation.
 - .7 Electrical power for controls items from local electrical panel. Coordinate with electrician. All work to be done in accordance with electrical division.

1.3 MANUFACTURER AND INSTALLING CONTRACTOR

- .1 The temperature control manufacturer shall be Tour Andover (TAC).
- .2 All controls shall be supplied, installed and wired by Energy Controls (phone 519-893-2638).
- .3 Any new building must be a seamless extension of the current Energy Management and Building Control System.
 - .1 The existing TAC Vista software is, and shall continue to be, the only head-end BAS server for the entire School Board.
 - .2 The head-end server contains the secure Energy Management Settings (i.e. Master Setpoints & Schedules) that are sent to all schools in real-time. The control system must be an extension of the head-end server and be able to be managed exclusively through the Vista head-end server.
 - .3 Monitoring of all school board control systems are done in real-time and must be presented at the exclusive Vista head-end server as first-priority data.
 - .4 The Vista head-end server has all the required controller databases and software to be able to centrally maintain and modify network configuration and controller software for the entire School Board. The Vista head-end server is the only system that can access the LacNet programming variables inside the controllers for real-time configuration of setpoint and time scheduling parameters.
 - .5 The graphics and controller database must be presented inside the Vista head-end server in its native format in order to preserve the real-time speed, integrity and multi-site administration of the entire system.

1.4 QUALITY ASSURANCE

- .1 The system components shall be listed by Underwriters Laboratories Inc. and Canadian Standards Association.
- .2 The system control products shall be stored and handled according to manufacturer' recommendations.
- .3 The work shall be performed by skilled technicians all of whom shall be properly trained and qualified for this work.

1.5 SUBMITTALS

- .1 Prior to the installation of any equipment, the Contractor shall provide the Consultant with shop drawings and specifications for all devices and equipment used for the complete system installation. Shop drawings shall include the following:
 - .1 Identified schematic control diagrams for all systems, each diagram indicating or referencing input / output connection points, control components, component catalogue numbers, operation sequence, interlocking and RPU's to which they are connected.
 - .2 Complete network schematic indicating all programmable controllers and data connections.
 - .3 Detailed listing of inputs and outputs of each programmable controller.

- .4 Control damper schedule indicating damper size, required torque and blade type.
- .5 Technical data sheets / manufacturer application manuals of each system component.
- .2 Upon completion of the installation and prior to acceptance and Owner training, the Contractor shall furnish the Consultant with three copies of installation and operation manuals for the system. Each manual shall include:
 - .1 Record drawings, including plan layout indicating major device locations and wiring diagrams as finally installed.
 - .2 All shop drawings, incorporating all required revisions to reflect as-built conditions.
 - .3 The Contractor shall also keep one copy of backup programs for the system archived in a software storage vault at their business location.

Part 2 Products

2.1 GENERAL

- .1 The control system shall be a Tour Andover (TAC) Xenta building automation system (BAS).
- .2 The system shall integrate the operation of intelligent building management controllers distributed into the network.
- .3 The DDC System shall be generally comprised of the following devices to achieve the control functions described in this section:
 - .1 Input/ output programmable controllers.
 - .2 Control relays.
 - .3 Control dampers and valves.
 - .4 Sensors, actuators and other input/output devices.
- .4 Controllers shall execute the application programs, calculations, and commands to provide the control function specified for that unit. Each controller shall include its own micro-computer controller, power supply, input/output modules, termination modules and real time clock.
- .5 Controllers shall be capable of full control functionality and alarm reporting independently or as a part of the DDC network.
- .6 The system shall be stored in flash ram so no batteries are required.
- .7 Each control device shall be modular and expandable to provide additional inputs and outputs and control functionality for that device
- .8 Each controller shall be able to transfer and receive data via the network for performance of control functions.
- .9 The system shall be modular, permitting expansion by adding hardware and software without changes in communication or processing equipment.

-
- .10 The complete system shall be capable of communication over a LonWorks network.
 - .11 The controllers shall monitor the status of all overrides and include this information in logs and summaries to inform the operator that automatic control has been inhibited.
 - .12 Controllers shall continuously perform self-diagnostics, communication diagnosis and diagnosis of all subsidiary equipment and provide both local and remote annunciation of any component failures.
 - .13 Controllers shall activate an orderly shutdown of their operation in the event of loss of normal electrical power. Non-volatile memory shall be incorporated for all controller configuration data. The controllers shall automatically resume full operation without manual intervention.
 - .14 The controllers shall have sufficient memory to support their own operating system and data bases including:
 - .1 control processes
 - .2 energy management applications
 - .3 alarm management
 - .4 trend data
 - .5 operator input/output
 - .6 remote communications
 - .7 manual override monitoring
 - .15 Controllers shall incorporate the following software features:
 - .1 Energy management:
 - .1 Time of Day Scheduling
 - .2 Calendar Based Scheduling
 - .3 Holiday Scheduling
 - .4 Optimal Start and Stop
 - .5 Demand Limiting
 - .6 Heating/Cooling Interlock
 - .2 Alarm Management:
 - .1 Alarm Management shall be provided to monitor, buffer and direct alarm reports to operator devices and memory files. The controllers shall perform alarm analysis and filtering to minimize operator interruptions due to non-critical alarms, minimize network traffic and prevent alarms from being lost.
 - .2 All alarm or point change report shall include the points English language description and the time and date of occurrence.
 - .3 The user shall be able to define the specific reaction for each point, the priority level (3 in total) and ability to inhibit alarm reporting for each point.
 - .4 The user shall be able to define conditions under which point changes need to be acknowledged by an operator and logged for analysis at a later date.

- .5 The user shall be able to print, display or store a unique 60 character alarm message to more fully describe the alarm condition or direct operator response. The message shall be customizable to describe each individual alarm.
- .6 In web access applications only critical alarms shall initiate a call to a remote operator device, otherwise call activity shall be minimized by time stamping and saving reports until a manual request is received or until the buffer space (minimum 50 alarms) is full.
- .3 Trend Logs:
 - .1 Controllers shall provide an automatic roll-over trend log, which stores records up to an operator-selected number at an operator-selected sampling rate and then overwrites the oldest record with each new record.
 - .2 Sample intervals shall be from 1 minute to 24 hours.
 - .3 Provide graphical and tabular displays.
- .4 Runtime Totalization:
 - .1 The controllers shall automatically accumulate and store runtime hours for binary points with a sampling resolution of 1 minute. The user shall have the ability to define a warning limit to trigger maintenance or user-defined messages.
- .5 Custom Programming:
 - .1 The controllers shall permit user defined custom control processes based on:
 - .1 any system measured data or status
 - .2 any calculated data
 - .3 any results from other processes
 - .4 Boolean logic
 - .2 The custom processes may be triggered by:
 - .1 Time-of-day
 - .2 calendar date
 - .3 events (point alarm etc.)
- .16 The control strategy for each control loop shall be performed by software within the controller. The sequence of events required for each control loop is described for each system in the control sequence.
- .17 Outdoor air temperature indication shall be available at each controller as an integral part of the control strategies for that controller. Should the network transmission of the common outdoor air temperature (or any other common value) fail, then each controller shall use the last good value received.
- .18 Controls and Requirements for VVT Systems
- .19 Where VVT controls are specified, units are to operate as part of a Variable Volume/Variable Temperature System complete with all necessary controls including zone dampers, temperature sensors, static pressure sensor probes and bypass damper.

2.2 NETWORK ARCHITECTURE

- .1 The controllers on the local network shall communicate via a two wire LonTalk TP/FT-10 network.
- .2 The control network shall be able to expand to match the requirements of the facility, including any future building additions.
- .3 The control network shall be able to support a total developed length of 305 meters without using a network repeater.

2.3 CONTROL PANELS

- .1 Control panels shall be fully enclosed cabinets with all steel construction. Cabinets shall have a hinged door with locking latch or bolt-on cover plate. All cabinet locks shall be common keyed. Cabinets shall be finished with two coats of paint.

2.4 TEMPERATURE SENSORS

- .1 Provide thermistor temperature sensors, not requiring transmitters, to measure temperature.
- .2 Accuracy shall be +/-0.2°C from 0 to 70°C.
- .3 Temperature sensors shall be Greystone EC200 series.
- .4 Space sensors in occupied areas shall be type AE having an integral push button for unoccupied override and an integral slider to adjust set point (LED display not required).
- .5 In corridors and where noted on the drawings, provide stainless steel plate type sensors (push button override and LED display not required), type AS.
- .6 Duct temperature sensors shall be type B having a stainless steel probe length to suit application and ABS enclosure. Duct averaging temperature sensors shall be type FD having an element length to suit application, copper probe and ABS enclosure.
- .7 Immersion temperature sensors shall be type C having a ¼" OD stainless steel probe, 4" long and ABS enclosure. Immersion sensors shall be complete with thermowells. Thermal conductive compound shall be added inside the thermowell to provide optimum thermal transfer from the fluid to sensor. Stainless steel thermowells shall be used for steel pipe and brass thermowells shall be used in copper pipe.
- .8 Outdoor temperature sensors shall be type F having an ABS gasketed cover. A thermal radiation cover shall limit the sensor to solar radiation exposure.

2.5 CARBON DIOXIDE SENSORS

- .1 Sensors shall Greystone CDD series having the following features:
 - .1 0-2000 ppm factory default detection range, field adjustable.
 - .2 Non-dispersive infrared sensing element with self-calibration algorithm.
 - .3 Guaranteed 5 year calibration interval.
 - .4 Powered by either AC or DC source.
 - .5 Accuracy: within 50 ppm or 3% of reading (whichever is greater).

- .6 Operating humidity range: 0-95% RH.
- .7 Operating temperature range: 0 to 50°C or greater.
- .8 Stability: less than 2% full scale in 15 years
- .9 Response time: less than 2 minutes for 90% step change.
- .2 Duct mounted sensors shall be complete with ABS enclosure complete with sampling tube.
- .3 Space mounted sensors shall be executive space type without LCD display.

2.6 VVT SYSTEM DAMPERS AND OPERATORS

- .1 Rectangular dampers shall be Nailor 1010, parallel blade type complete with blade and edge seals. Use low profile dampers for heights less than 12" (300 mm). Dampers with heights less than 10" (250 mm) shall be single blade.
- .2 Round dampers shall be Nailor 1090 complete with blade gaskets and mounting bracket.
- .3 Actuators shall be Belimo LMB24-SR-T proportional control, non-spring return, direct coupled, 24 V for 2-10 VDC or 4-20 mA, 45 in-lb torque, suitable for a maximum damper size of 6 square feet.

2.7 WATER CONTROL VALVES

- .1 Heating and cooling control valves shall be Belimo CCV series characterized ball valves, complete with chrome plated brass trim and NPT female pipe connections. Radiation valves shall be complete with non-spring return modulating actuators. Control valves for coils heating a portion of outdoor air shall have spring return modulating actuators.
- .2 Control valves shall be sized to provide approximately one half the circuit branch pressure drop to obtain good modulation control but they shall be no smaller than two pipe sizes less than the pipe they are installed in.
- .3 Control valves in contact with domestic water (domestic flush valve) shall be Belimo HTCCV high temperature characterized ball valve with stainless steel ball and stem, NPT female pipe connections and TFX24 spring return to closed position actuator.

2.8 DIFFERENTIAL PRESSURE SENSORS

- .1 Differential pressure sensors shall be provided for liquid or air differential pressure applications. The differential pressure range shall be selected to match the application. Select materials suitable for the measured variable, i.e.: water or air, and to withstand a minimum of two times the maximum pressure of the highest pressure range.
- .2 Each sensor shall be provided with an industry standard, 0 to 10 Vdc output signal mounted at the sensor. The transmitter and sensor shall have a combined accuracy and repeatability of 1.0% of the differential pressure range. A pushbutton zero adjustment shall be provided.

2.9 FREEZESTATS

- .1 Freezestats shall be complete with a vapour filled 20 foot bulb and 4 foot capillary. Wire freezestats to shut down the respective fans should temperature over any 12 in. of sensor length drop below the adjustable setpoint (2°C). Freezestats shall have manual reset.

Part 3 Execution

3.1 INSTALLATION

- .1 Installation
 - .1 All controllers and components in the system and on the network shall be installed according to manufacturer recommendations, general installation standards for digital controls and in accordance with the approved shop drawings.
 - .2 Locate room sensors in the locations shown on the mechanical drawings. All sensors shall be mounted at barrier free height (3'-11" (1175 mm) above finished floor).
 - .3 Provide serial data communication ports in the rooftop units where noted on the drawings, or at least one on each roof level, for operator interface. Also provide communication ports in the Custodian Office. Note that these shall be in addition to the associated rooftop unit controller with its built-in network port.
 - .4 All programmable controllers, web access components, relays and other control components shall be located within control panels. Control Panels shall be wall mounted and shall be located within suspended ceiling spaces or other locations approved by the Consultant.
 - .5 The Electrical Contractor will provide hand-off-auto switches in all starters controlled by the BAS.
- .2 Generally duct mount carbon dioxide sensors shall be used where specified for air handling units; but, for gyms and single zone libraries, a wall mount carbon dioxide sensor shall be mounted next to the room temperature sensor.
- .3 All carbon dioxide levels which are measured by the carbon dioxide sensors shall be made available to the Owner in the form of trend logs. Record readings at 10 minute intervals and keep them for at least 30 days.
- .4 Freeze-stats shall be installed so that their sensing element runs horizontally across the coil face (not diagonally) with no more than 12" vertical drops at the outside coil frame. The full face of the coil shall be covered with no horizontal runs being more than 12" apart. The top and bottom horizontal run shall be within 6" of the coil frame. If more than one freezestat is required they shall be wired in series in order to detect a low temperature in portion of the coil. The sensing elements shall be firmly secured in place to avoid vibration without added air restriction.

3.2 SYSTEM START-UP AND ACCEPTANCE

- .1 Upon completion of installation, test, adjust and calibrate controls provided under this Section.
- .2 On system completion, a demonstration of complete system operation shall be made to the Owner's authorized representative and Consultant.
- .3 The Consultant shall verify through the Owners representatives that the entire system is complete and operating to the satisfaction of the Owner before final acceptance is approved.

3.3 TRAINING

- .1 The Contractor shall provide competent instructors to give full instruction to designated personnel in the adjustment, operation and maintenance of the system installed rather than a general training course. Instructors shall be thoroughly familiar with all aspects of the subject matter they are to teach. All training shall be held during normal work hours of 8:00 a.m. to 4:30 p.m. weekdays as follows:
- .2 Provide 4 hours of training for Owner's operating personnel. Training shall include:
 - .1 Explanation of drawings, operations and maintenance manuals
 - .2 Explanation of web access program
 - .3 Explanation of adjustment procedures
 - .4 Trend Analysis

3.4 WARRANTY

- .1 Equipment, material and software shall be unconditionally guaranteed for a period of two years form the date of substantial completion.
- .2 Provide warranty service at no cost to the Owner for the warranty period, which shall include but not be limited to the following:
 - .1 Emergency repair service on regular working hour basis.
 - .2 Replacing defective parts and components as required.
 - .3 System software support.

3.5 IDENTIFICATION

- .1 Provide system identification and provide nameplates identifying the following (nameplates shall be keyed to the wiring diagrams):
 - .1 Duct mounted sensors.
 - .2 Control panels (identify as to equipment / systems controlled). Each panel shall include an as-built drawing showing all the connected control points.

3.6 TESTING AND BALANCING

- .1 During the system testing and balancing by the Testing and Balancing Agency, demonstrate the operation of all controls. During balancing procedures, set controls to a fixed mode (bypass damper locked fully closed and all zone dampers locked fully open) to prevent any changes during the balancing procedure.

3.7 ELECTRICAL WIRING

- .1 All wiring shall be installed to the standards specified in the Electrical Division.
- .2 Use Echelon recommended orange jacket cable for all network wiring.
- .3 Run all wiring in EMT conduit where exposed, where running within concrete block walls and where required by the Ontario Electrical Code. Plenum rated cable shall be used in return air ceiling plenums.
- .4 Control relays necessary for BAS operation shall be provided by the Temperature Control Contractor but all contactors and their power supplies handling power wiring to the equipment shall be by the Electrical Contractor.
- .5 Controls contractor will coordinate with electrician for location of thermostat rough-ins with light switches and other devices.
- .6 Where low voltage wire is run in corridor ceiling, it shall be installed/run in wall hooks (provided by electrical division).

3.8 GENERAL REQUIREMENTS FOR VVT SYSTEMS

- .1 Each VVT system shall be capable of maintaining an independent setback schedule. If any over-ride pushbutton in the associated system is activated, the complete VVT system shall reset to occupied mode for a pre-set time period. At the end of the override time period, setback mode will resume.
- .2 Each zone thermostat shall be capable of maintaining independent comfort setpoints, adjustable by the zone occupants. The upper and lower limits of the permissible setpoint range shall be adjustable by the operator.
- .3 When the HVAC unit is not in the heating or the cooling mode, the system shall go to ventilation mode. Ventilation mode is automatically sequenced every 20 minutes to avoid stale air in the space. The duration of ventilation mode is 5 minutes, after which the system resumes heating / cooling mode as required.
- .4 Zone damper control shall be proportional modulation, not two- position control. Each zone thermostat shall be capable of initiating a heating or cooling mode. Averaging zone systems are not acceptable.
- .5 There shall be an adjustable deadband between heating and cooling setpoints.
- .6 The pressure control system must display duct static pressure and modulate the bypass damper or supply fan speed to maintain the desired system static pressure. During changeover from heating to cooling or cooling to heating the bypass controller will take control of all dampers in order to purge the duct system of extreme temperature air. Systems that use a time delay during system mode changeover are not acceptable.

Part 4 Sequence of Operation

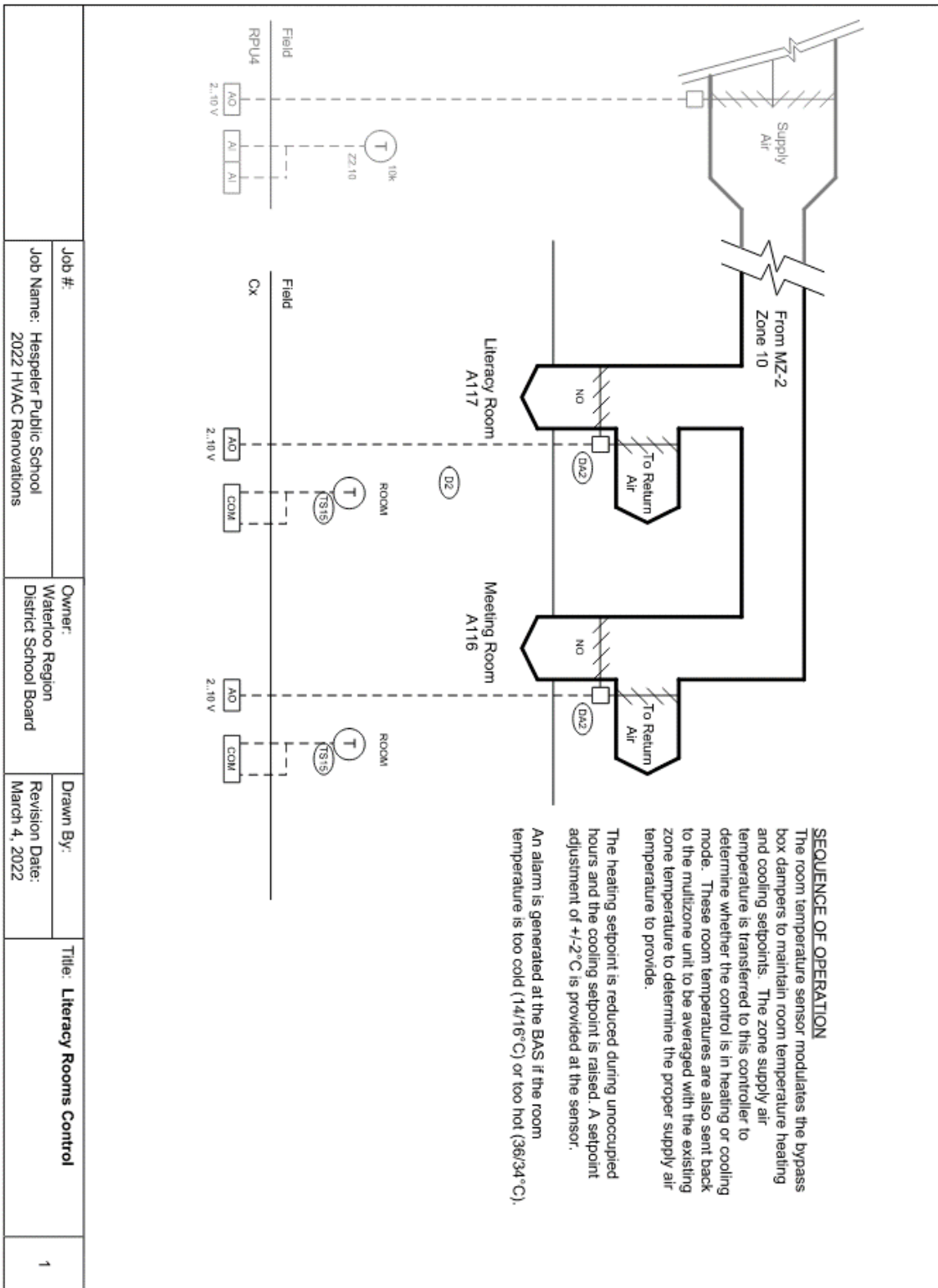
4.1 GENERAL

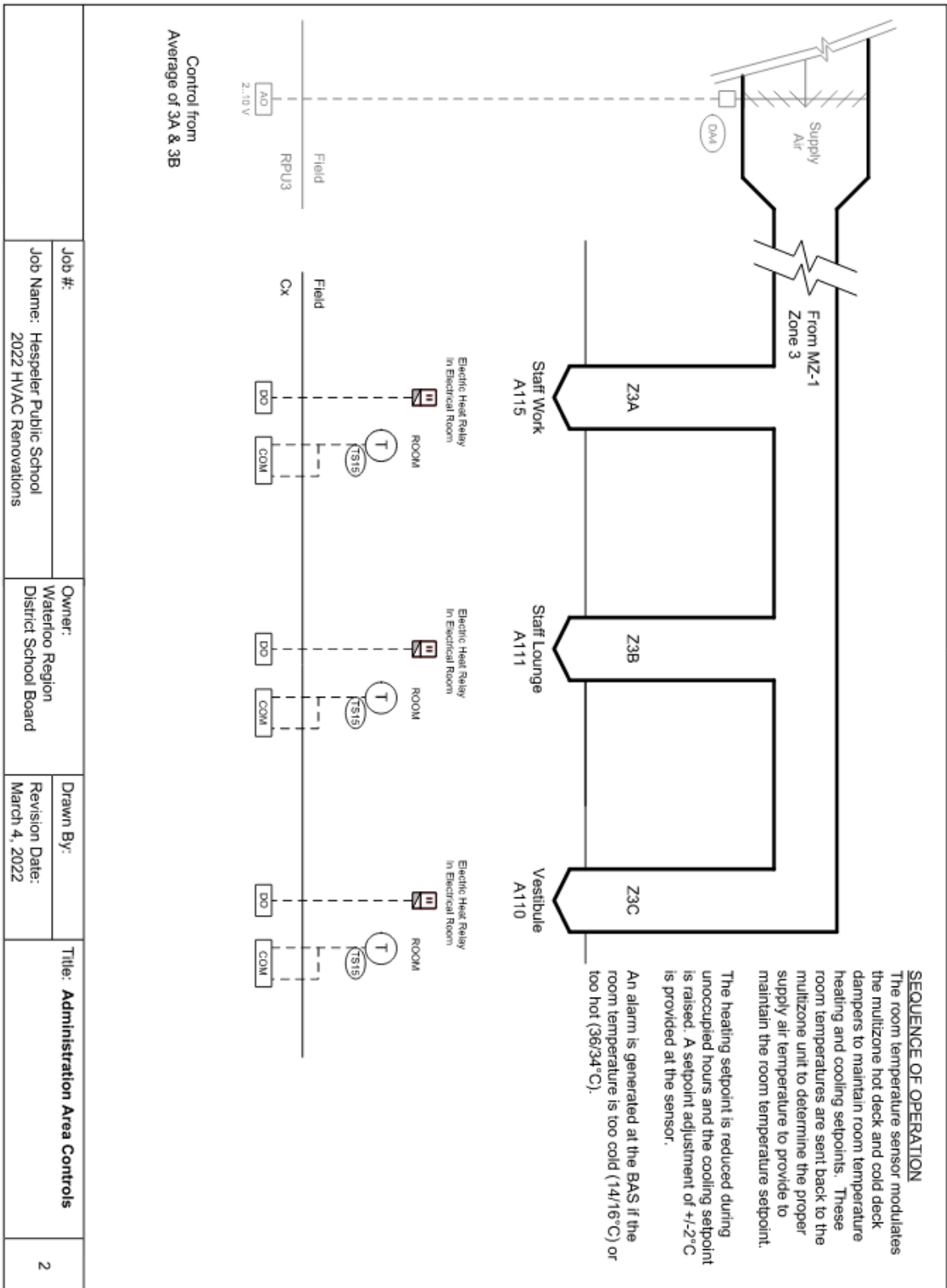
- .1 All setpoints shall be adjustable.
- .2 Outdoor air temperature shall be broadcasted to all controllers.

- .3 Heating mode: Heating is enabled between October 15 and April 15 or if the outdoor air temperature is below 10°C. This heating mode is used in all controllers for the building.
- .4 Cooling Mode: Mechanical cooling is enabled if the outdoor air temperature is above 18°C.
- .5 Carbon Dioxide Damper Override: In any air handling system with a return air or room air carbon dioxide sensor, it shall override the minimum position of the outdoor air damper during occupied mode. It shall override the minimum outdoor air damper between 0 and 40 % as the carbon dioxide varies between 1000 and 1200 ppm. All limit controls shall take priority to maintain safe supply air temperatures. An alarm shall be generated if the carbon dioxide level is higher than 1700 ppm or lower than 200 ppm.
- .6 Occupancy mode shall be determined by a weekly schedule with an annual holiday schedule. Each system shall have this schedule but there shall be provision for operating under a general (to the building) schedule as well. An adjustable parameter shall be available to select the local or general schedule for each system.
- .7 Lead/lag: Devices designed for lead lag operation shall operate in automatic lead/lag mode to equalize run time. If the lead unit fails the lag shall automatically start and an alarm shall be generated. The lead unit shall be advanced through the series of devices in sequence every Tuesday at noon.

4.2 EQUIPMENT SERVICES

- .1 See the graphical sequence of operations attached to the end of this specification for equipment and systems.





SEQUENCE OF OPERATION

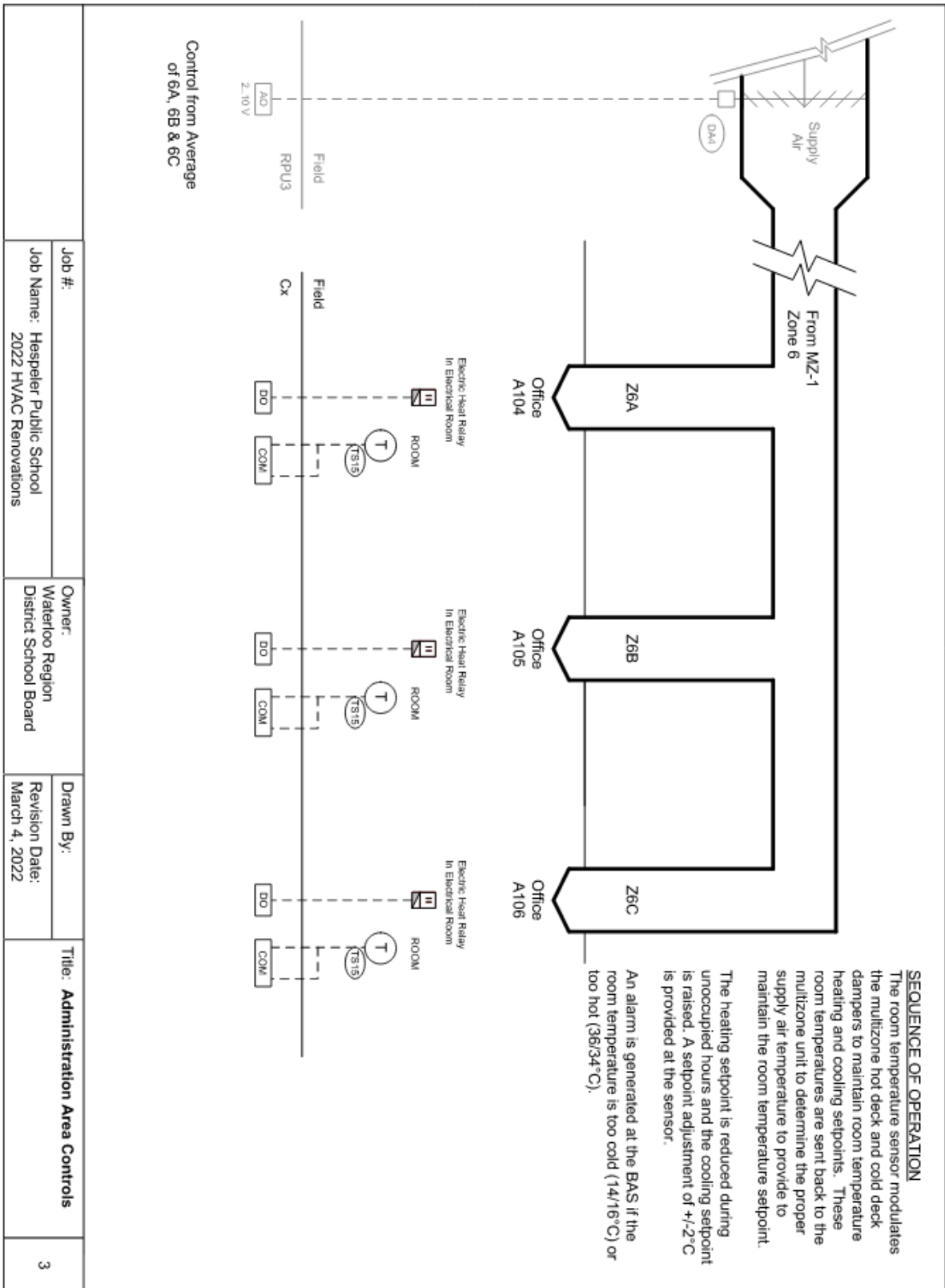
The room temperature sensor modulates the multizone hot deck and cold deck dampers to maintain room temperature heating and cooling setpoints. These room temperatures are sent back to the multizone unit to determine the proper supply air temperature to provide to maintain the room temperature setpoint.

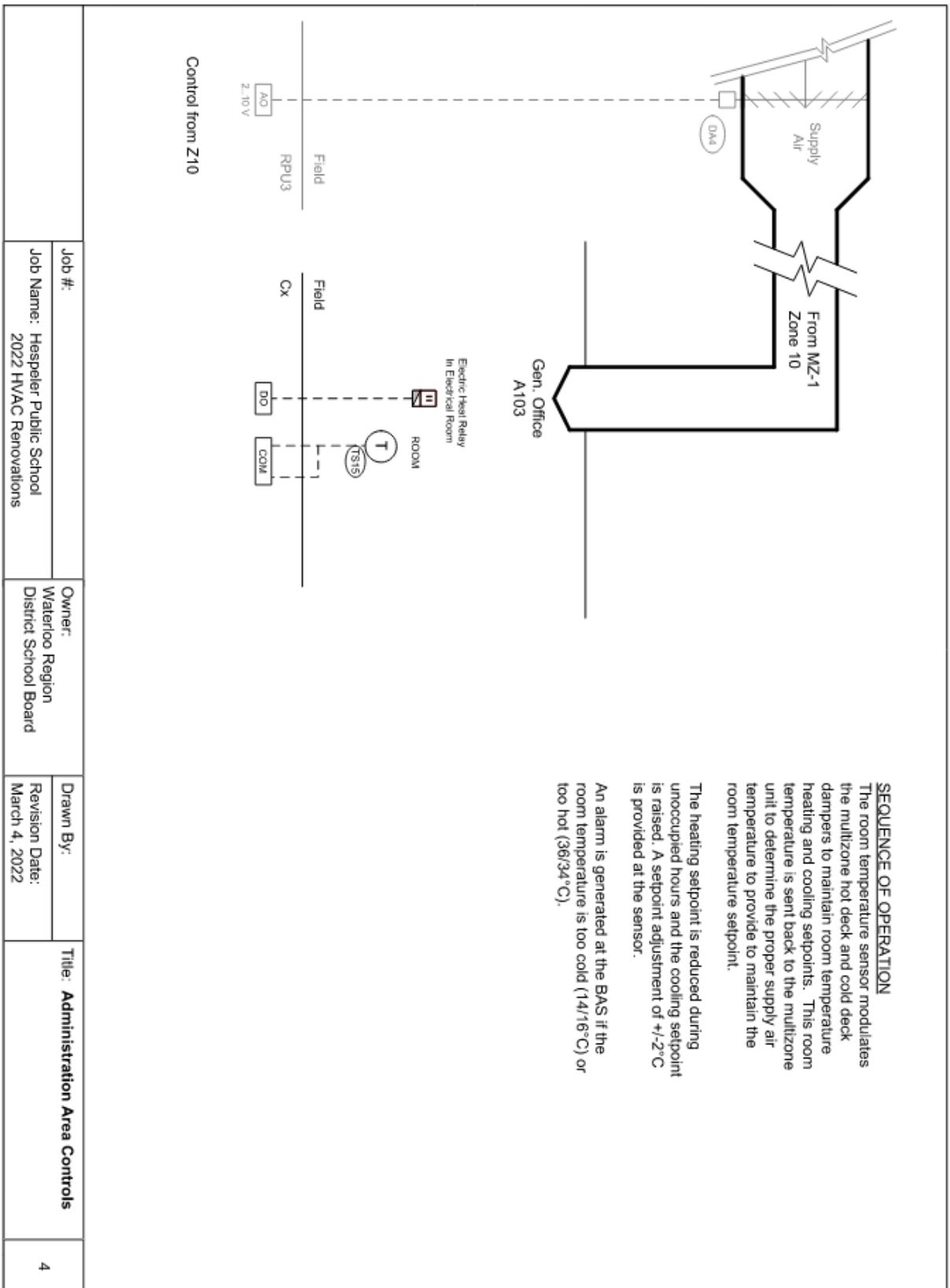
The heating setpoint is reduced during unoccupied hours and the cooling setpoint is raised. A setpoint adjustment of +/-2°C is provided at the sensor.

An alarm is generated at the BAS if the room temperature is too cold (14/16°C) or too hot (36/34°C).

Control from Average of 3A & 3B

Job #:	Job Name:	Owner:	Drawn By:	Title:
	Hespeler Public School 2022 HVAC Renovations	Waterloo Region District School Board	March 4, 2022	Administration Area Controls
2				





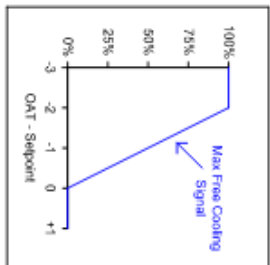
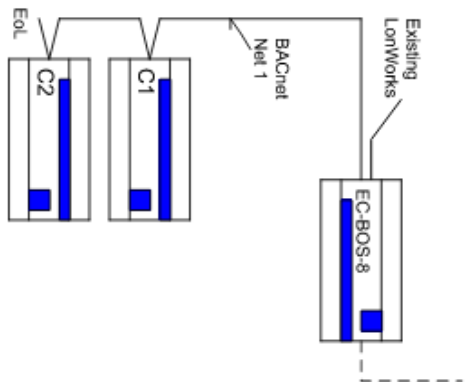
SEQUENCE OF OPERATION

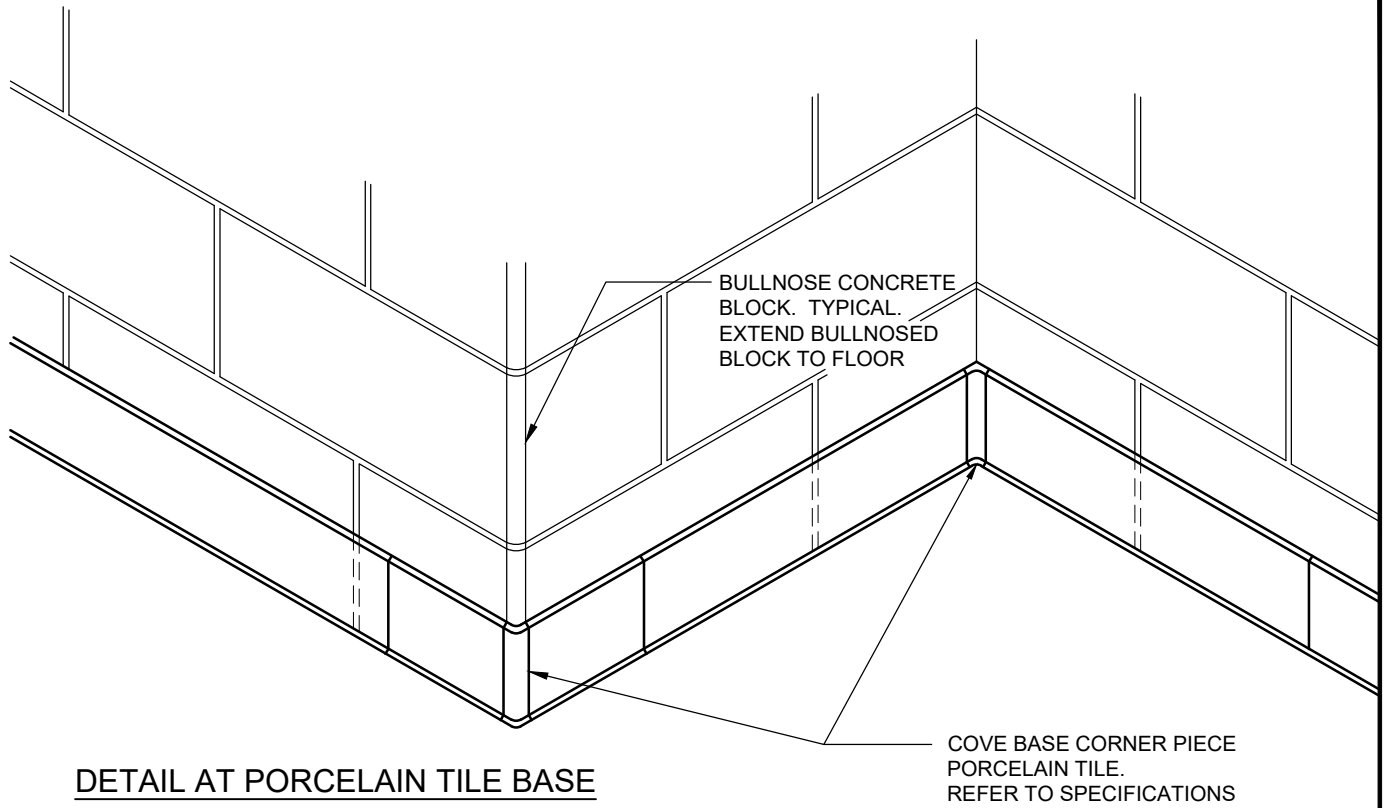
The room temperature sensor modulates the multizone hot deck and cold deck dampers to maintain room temperature heating and cooling setpoints. This room temperature is sent back to the multizone unit to determine the proper supply air temperature to provide to maintain the room temperature setpoint.

The heating setpoint is reduced during unoccupied hours and the cooling setpoint is raised. A setpoint adjustment of +/-2°C is provided at the sensor.

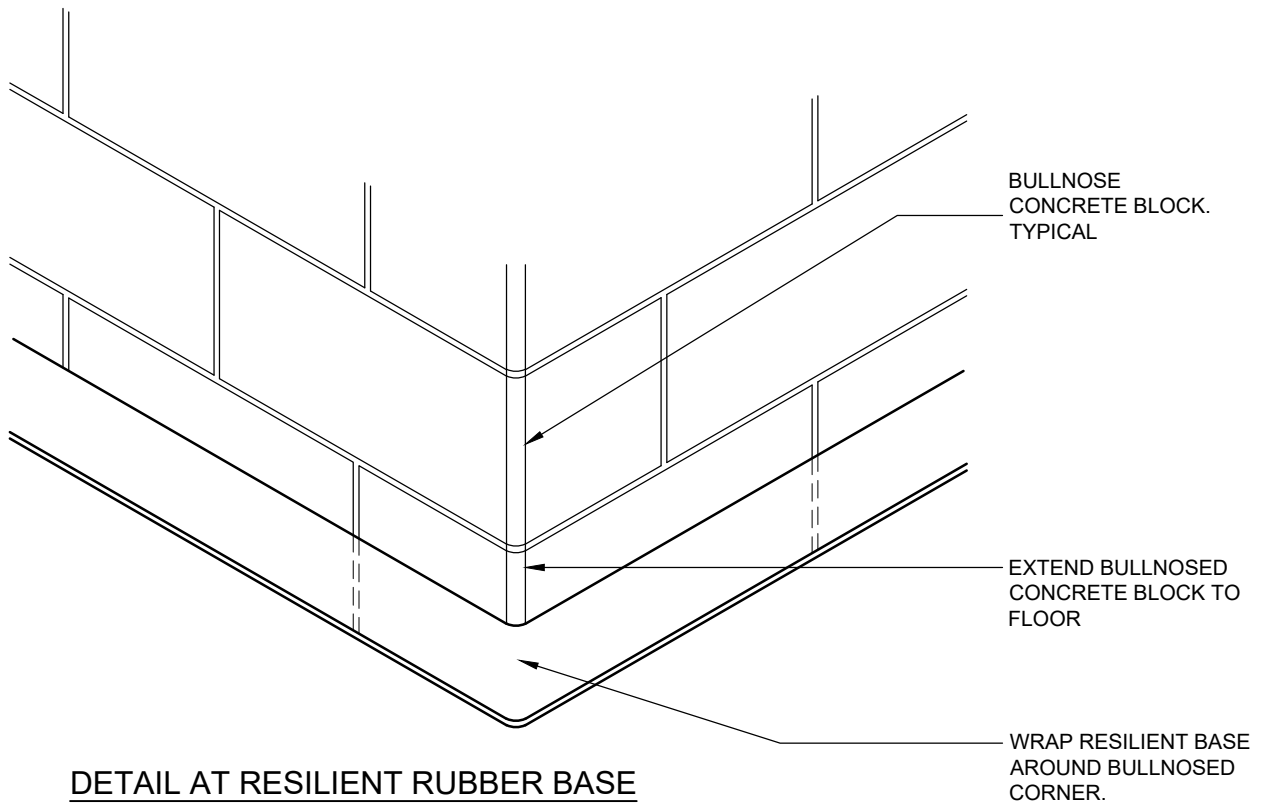
An alarm is generated at the BAS if the room temperature is too cold (14/16°C) or too hot (36/34°C).

Job #:	Job Name:	Owner:	Drawn By:	Title:
	Hespeler Public School 2022 HVAC Renovations	Waterloo Region District School Board	March 4, 2022	Administration Area Controls

	<p>Job #: Job Name: Hespeler Public School 2022 HVAC Renovations</p>	<p>Owner: Waterloo Region District School Board</p>	<p>Drawn By: Revision Date: March 4, 2022</p>	<p>Title: Miscellaneous Controls</p>	<p>5</p>
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>FREE COOLING SETPOINT</p> <p>The average outdoor air relative humidity is sent from the Vista Server to the Global Input for this school where the Free Cooling Setpoint is calculated.</p>  <p>SEQUENCE OF OPERATION Free cool when OAT < minimum(23, 29.4°C - Ø/7.43) where Ø is the average relative humidity in %RH. The free cooling signal is 100% when the outdoor air temperature is more than 2°C less than the free cooling setpoint. It drops linearly as the outdoor air temperature increases from 2°C less than the free cooling setpoint to 0% at the setpoint. This free cooling signal is used in each mixed air damper controller as the maximum the outdoor air dampers can open.</p> </div> <div style="width: 45%;"> <p>NEW WEB SERVER</p>  <p>STAND-BY VENTILATION OCCUPANCY SCHEDULE</p> <p>Add to Existing Mentia Programs Weekly Schedule on Main Graphic</p> <p>SEQUENCE OF OPERATION Provide a new EC-BOS web server for the new BACnet controls and integrate the existing LonWorks controls using Baudrate IO.</p> <p>SEQUENCE OF OPERATION Minimum outdoor air damper position is 0% even during occupied periods unless the Minimum Outdoor Air Schedule for the school is in Occupied mode. Each unit has an 'opt-out' parameter so that it can run with an individual minimum outdoor air schedule.</p> </div> </div>					



DETAIL AT PORCELAIN TILE BASE



DETAIL AT RESILIENT RUBBER BASE

CONCRETE BLOCK WALL BASES

PROJ: 20121

SCALE: NTS

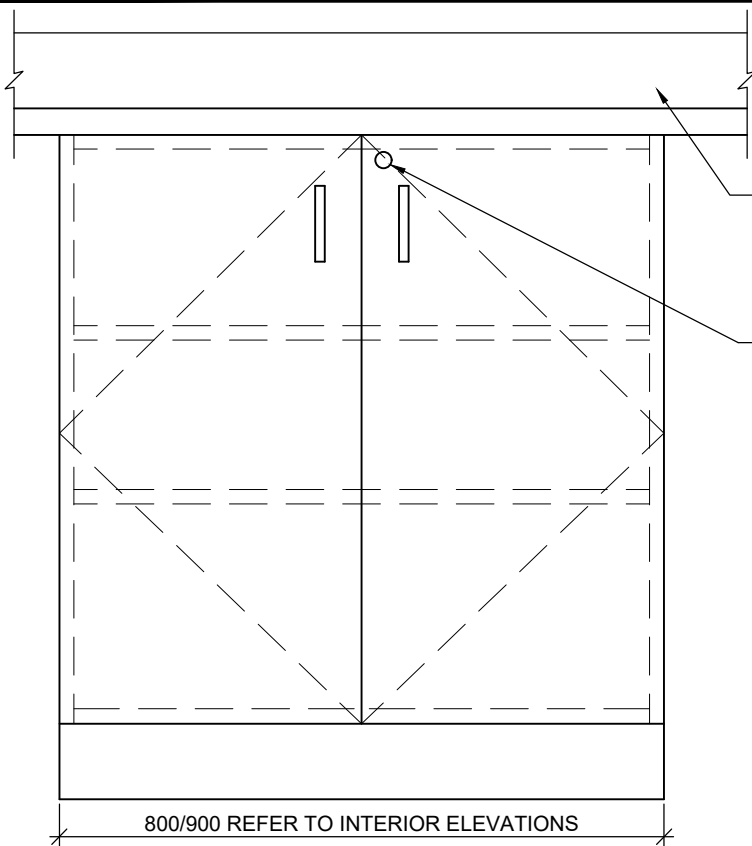
DRAWN: GB

DATE: FEB 2022



ISSUE/REV.
00

AD
501



CONTINUOUS COUNTERTOP
AND BACKSPASH. POST
FORMED PLASTIC LAMINATE

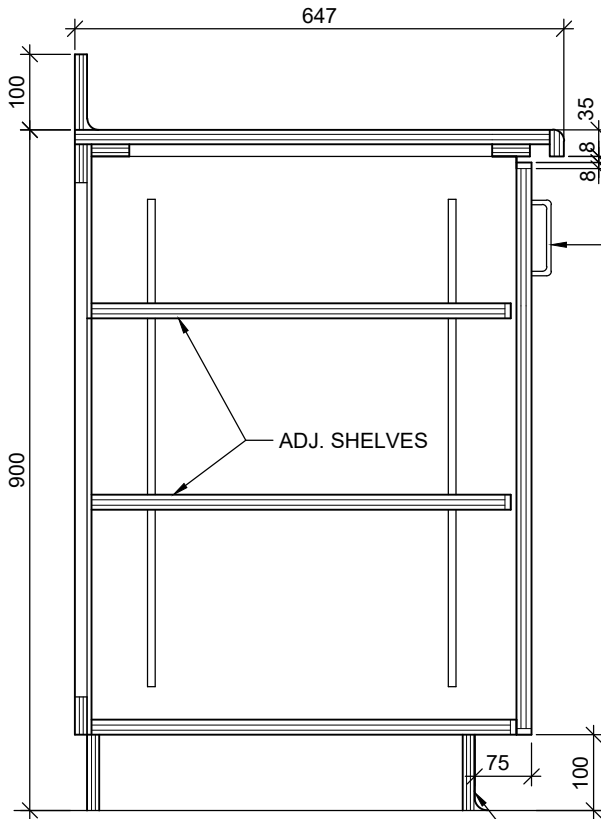
LOCK (TYP.)

ELEVATION

SCALE 1 : 10

800/900 REFER TO INTERIOR ELEVATIONS

NOTE: CUT SPLASHBACK
AT WINDOWS



DOOR PULL

NOTE:
ALL MILLWORK DOORS AND DRAWERS TO
BE EQUIPPED WITH LOCKS. ALL
MILLWORK TO BE OF 19mm MELAMINE
FACED PARTICLE BOARD UNLESS
OTHERWISE NOTED.

SECTION

SCALE 1: 10

BASE TYP.

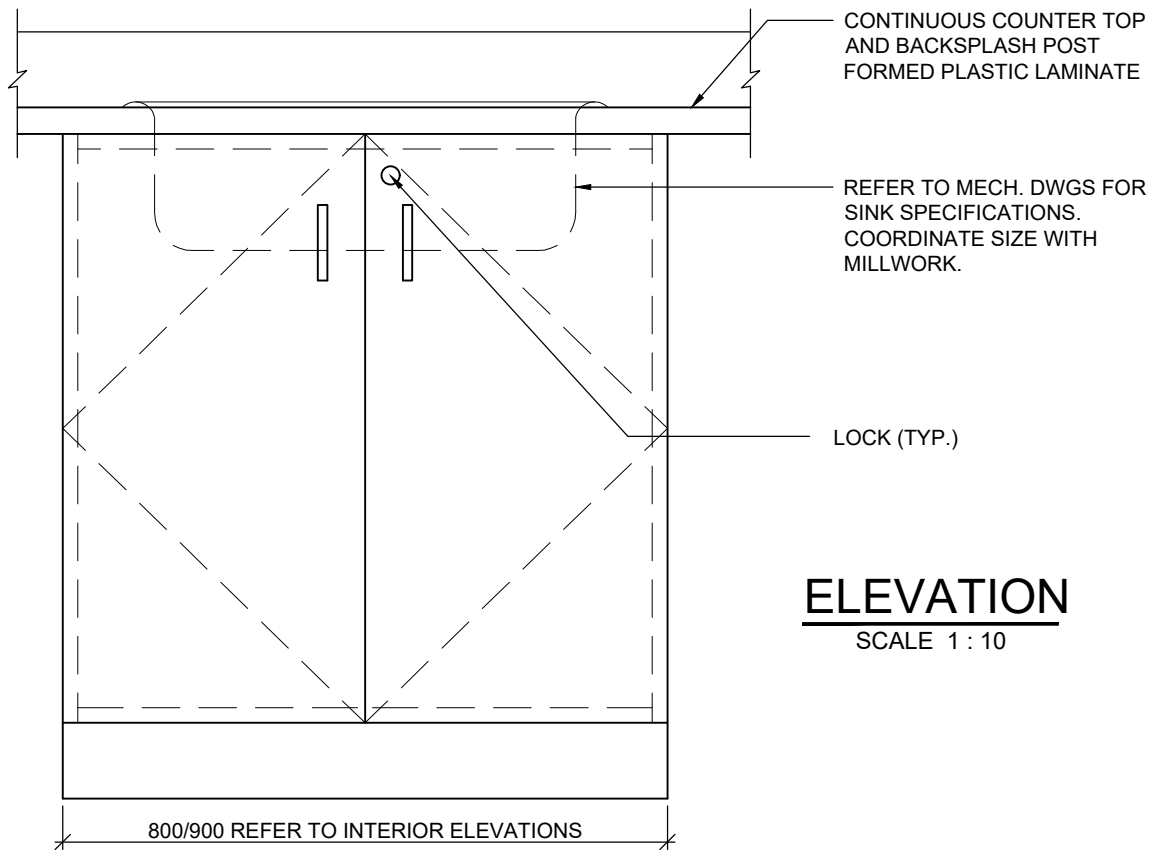
CABINET TYPE B1

PROJ: 20121
SCALE: 1:10
DRAWN: GB
DATE: FEB 2022

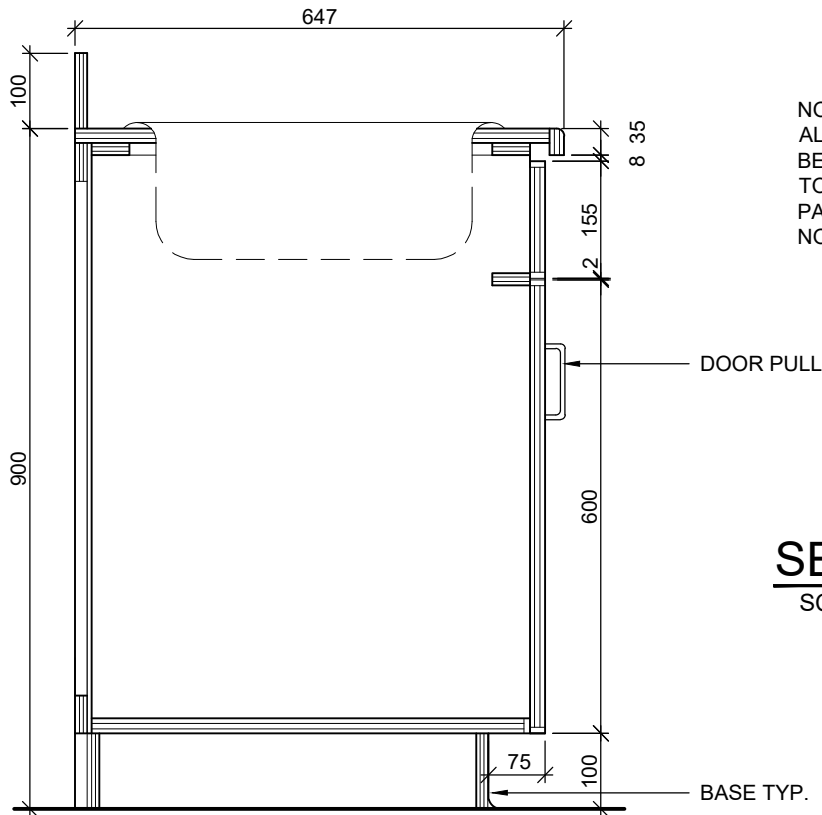
**HOSSACK
& ASSOCIATES
ARCHITECTS**

ISSUE/REV.
00

AD
601



ELEVATION
SCALE 1 : 10



NOTE:
ALL MILLWORK DOORS AND DRAWERS TO
BE EQUIPT WITH LOCKS. ALL MILLWORK
TO BE OF 19mm MELAMINE FACED
PARTICLE BOARD UNLESS OTHERWISE
NOTED.

SECTION
SCALE 1: 10

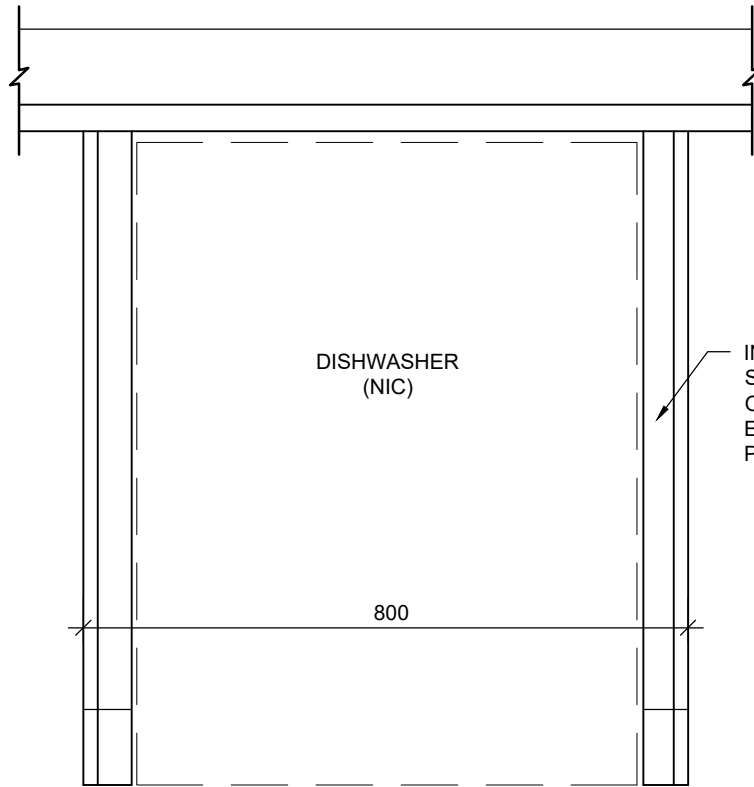
CABINET TYPE B2

PROJ: 20121
SCALE: 1:10
DRAWN: GB
DATE: FEB 2022

**HOSSACK
& ASSOCIATES
ARCHITECTS**

ISSUE/REV.
00

AD
602

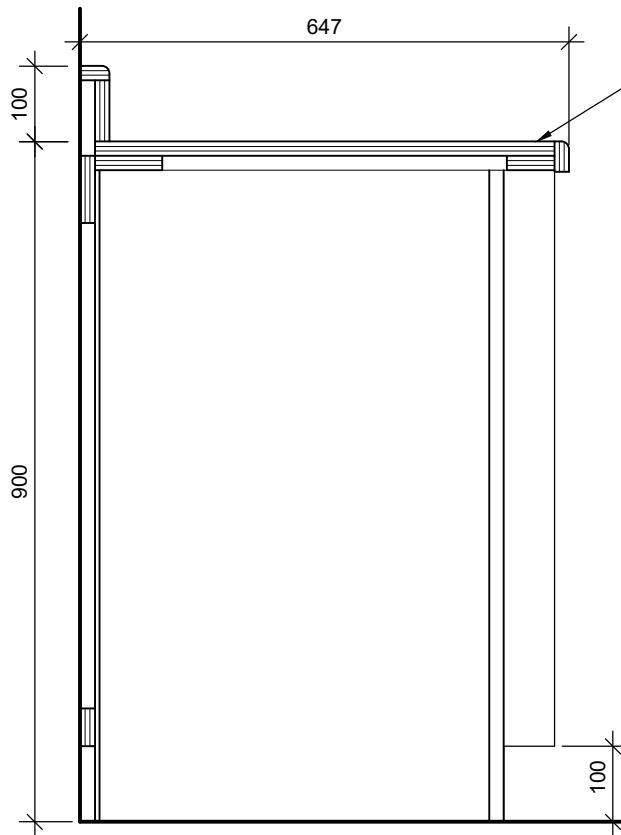


DISHWASHER
(NIC)

INCLUDE FOR FILLER STRIPS TO BE INSTALLED ON SITE. COORDINATE EXACT DIMENSIONS WITH PURCHASED APPLIANCES

ELEVATION

800



CONTINUOUS POST FORMED PLASTIC LAMINATE COUNTERTOP AND BACKSPLASH

NOTE:
REFER TO SPECIFICATIONS FOR MILLWORK CONSTRUCTION AND HARDWARE. CONFIRM UNIT SIZE WITH INTERIOR ELEVATIONS. TYP

SECTION

647

100

900

100

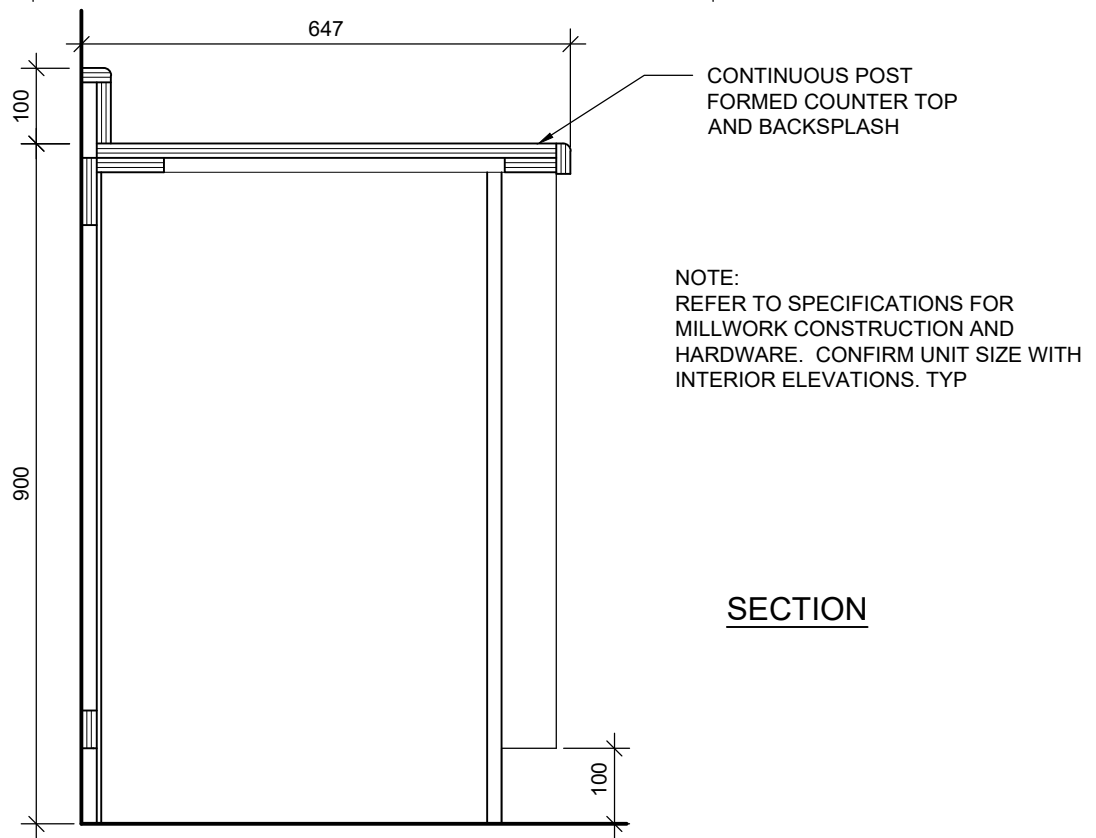
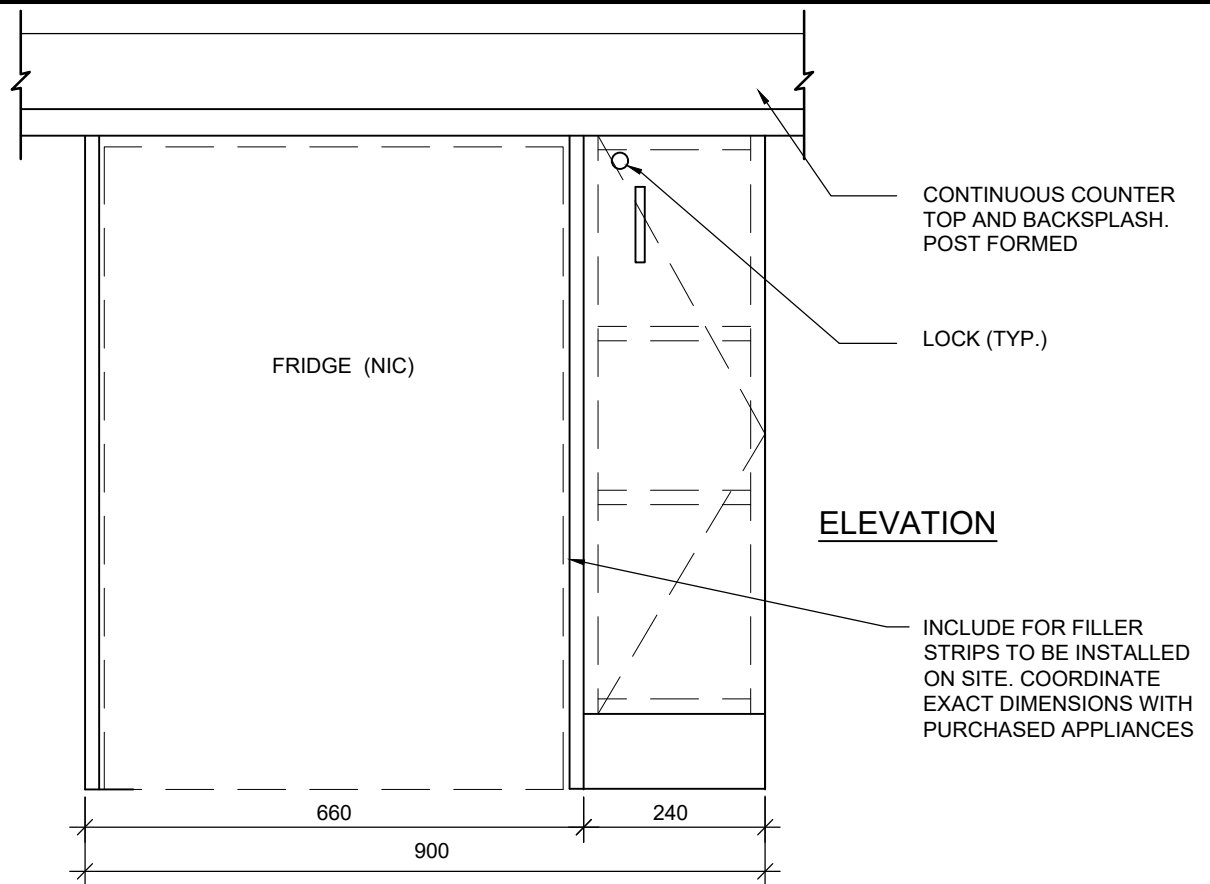
TYPE B3 - DISHWASHER LOWER MILLWORK

PROJ:	20121
SCALE:	1:10
DRAWN:	GB
DATE:	FEB 2022



ISSUE/REV.
00

AD
603



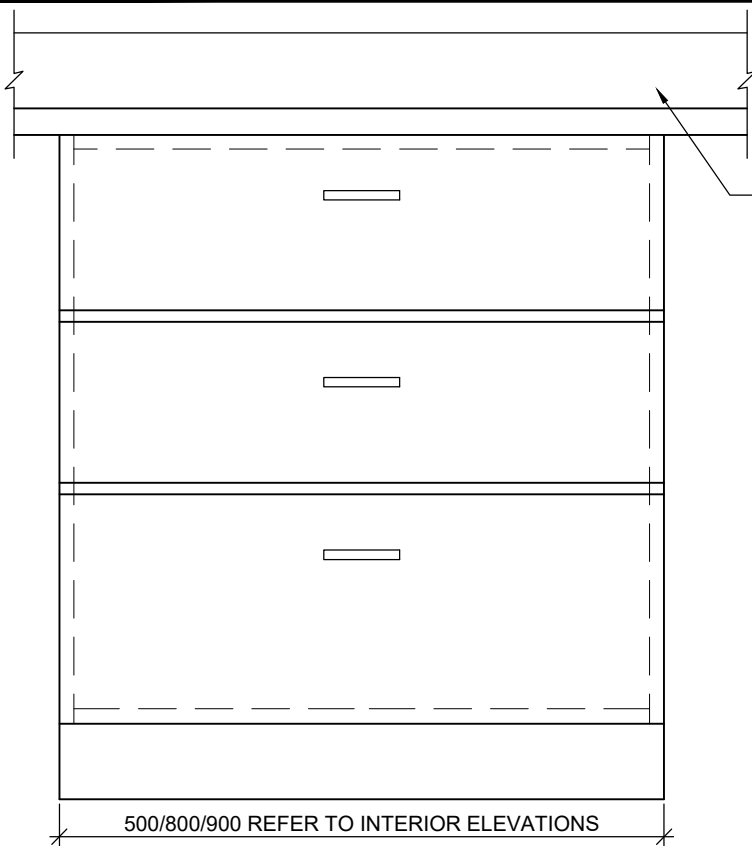
TYPE B4 - FRIDGE LOWER MILLWORK

PROJ: 20121
SCALE: 1:10
DRAWN: GB
DATE: FEB 2022

**HOSSACK
& ASSOCIATES
ARCHITECTS**

ISSUE/REV.
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AD
604



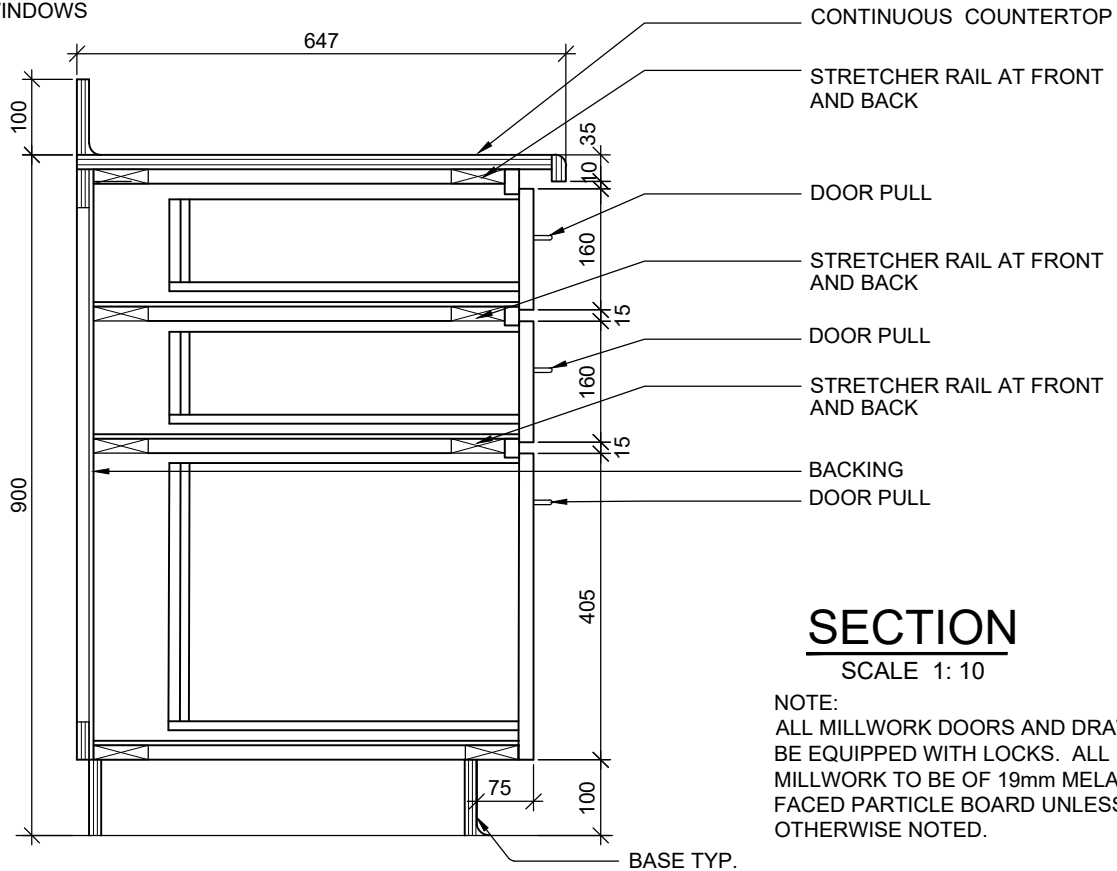
CONTINUOUS COUNTER
TOP AND BACKSPLASH.
POST FORMED PLASTIC
LAMINATE

ELEVATION

SCALE 1 : 10

500/800/900 REFER TO INTERIOR ELEVATIONS

NOTE: CUT SPLASHBACK
AT WINDOWS



SECTION

SCALE 1: 10

NOTE:
ALL MILLWORK DOORS AND DRAWERS TO
BE EQUIPPED WITH LOCKS. ALL
MILLWORK TO BE OF 19mm MELAMINE
FACED PARTICLE BOARD UNLESS
OTHERWISE NOTED.

BASE TYP.

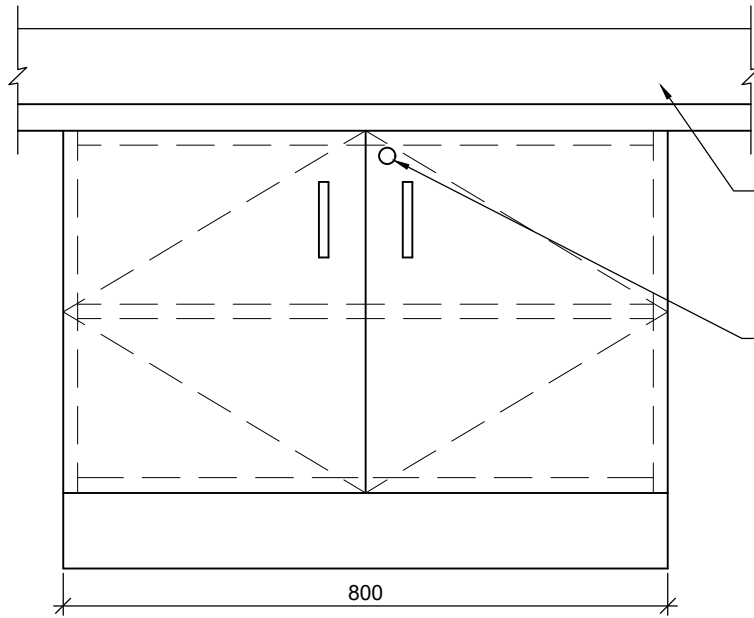
CABINET TYPE B7

PROJ:	20121
SCALE:	1:10
DRAWN:	GB
DATE:	FEB 2022

**HOSSACK
& ASSOCIATES
ARCHITECTS**

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AD
607

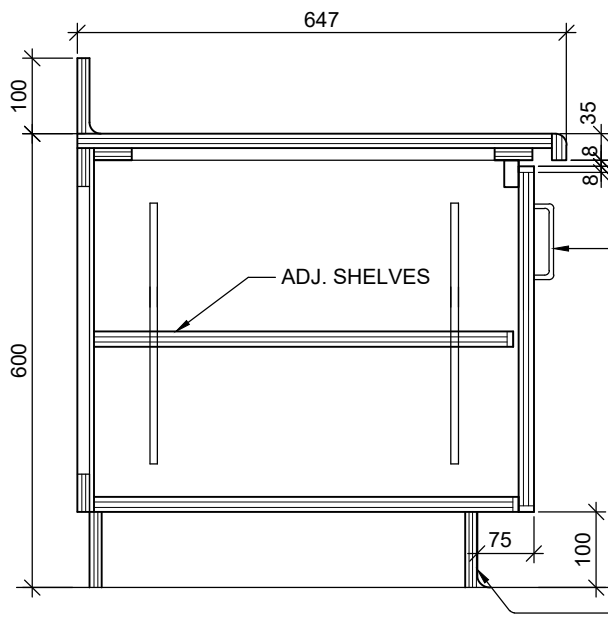


CONTINUOUS COUNTER
TOP AND BACKSPLASH.
POST FORMED PLASTIC LAMINATE

LOCK (TYP.)

ELEVATION

SCALE 1 : 10



SECTION

SCALE 1 : 10

DOOR PULL

ADJ. SHELVES

NOTE:
ALL MILLWORK DOORS AND DRAWERS
TO BE EQUIPT WITH LOCKS.

BASE TYP.

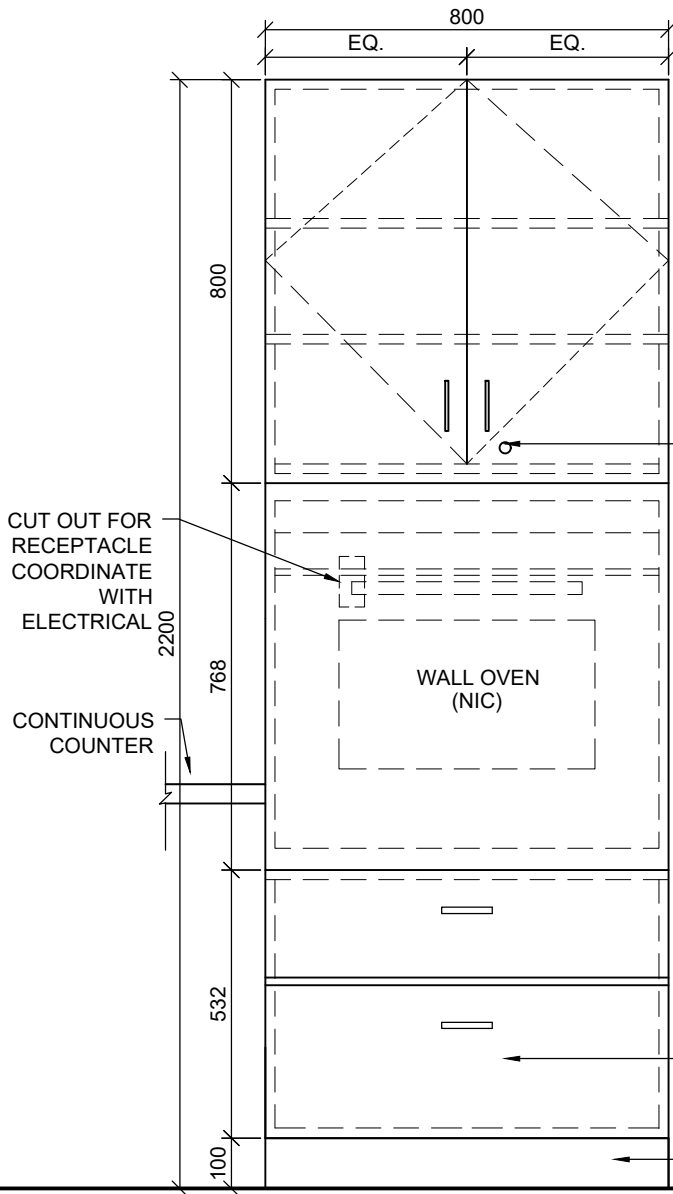
CABINET TYPE B8

PROJ:	20121
SCALE:	1:10
DRAWN:	GB
DATE:	FEB 2022

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& ASSOCIATES
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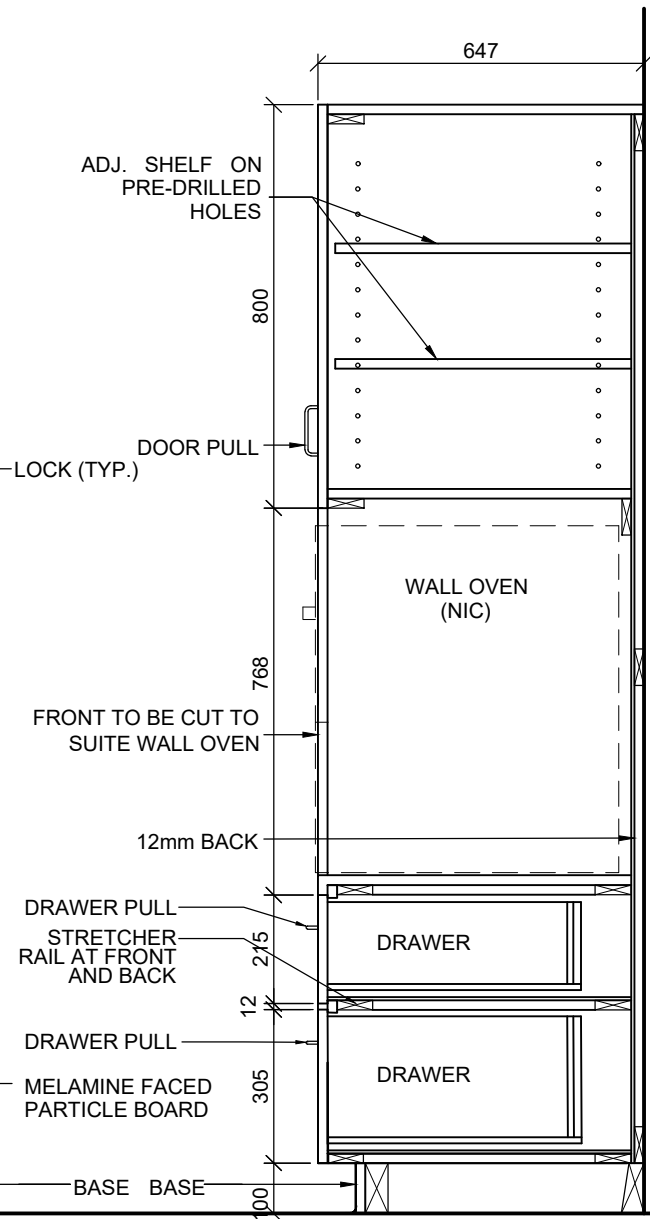
ISSUE/REV.
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608



ELEVATION

SCALE 1 : 15



SECTION

SCALE 1 : 15

NOTE:

ALL MILLWORK DOORS AND DRAWERS TO BE EQUIPPED WITH LOCKS

REFER TO SPECIFICATION FOR MILLWORK CONSTRUCTION AND HARDWARE.

REFER TO INTERIOR ELEVATIONS FOR DOOR SWING DIRECTION

TYPE B25 BARRIER FREE WALL OVEN CABINET

PROJ: 20121

SCALE: 1:15

DRAWN: GB

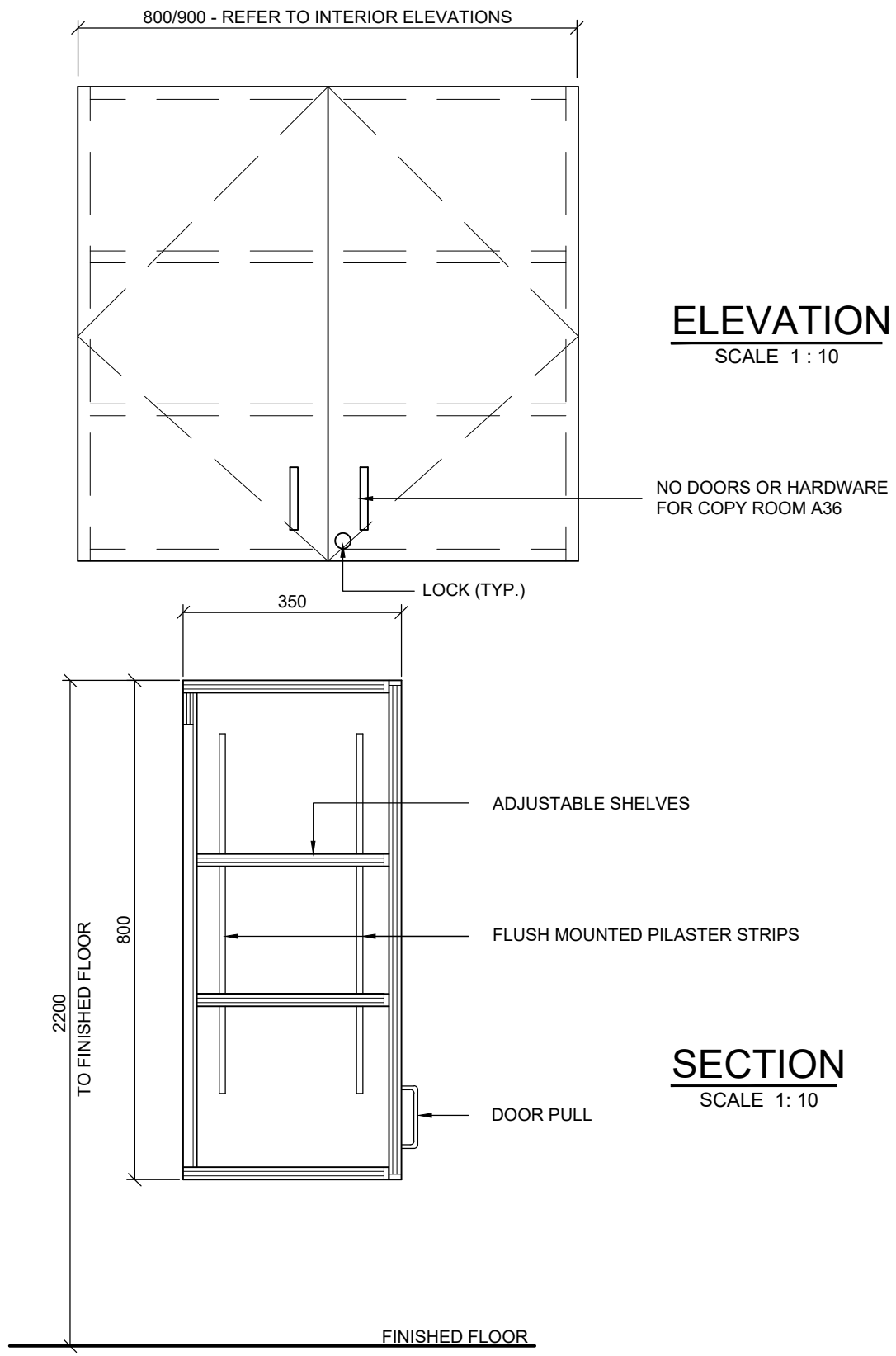
DATE: FEB 2022

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610



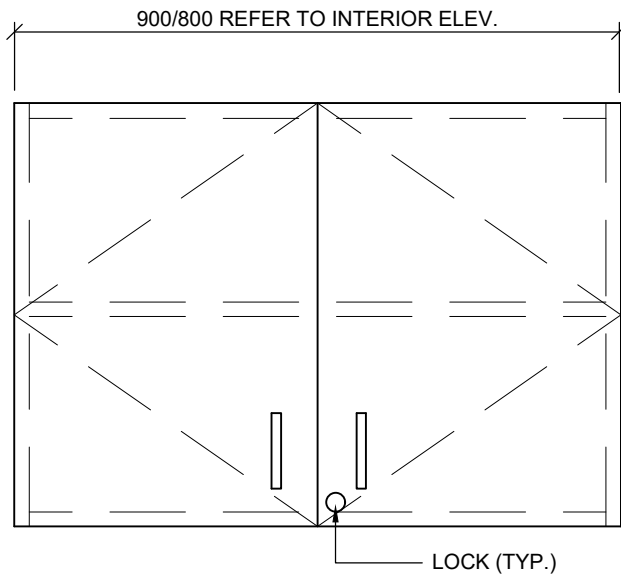
CABINET TYPE U1

PROJ: 20121
 SCALE: 1:10
 DRAWN: GB
 DATE: FEB 2022

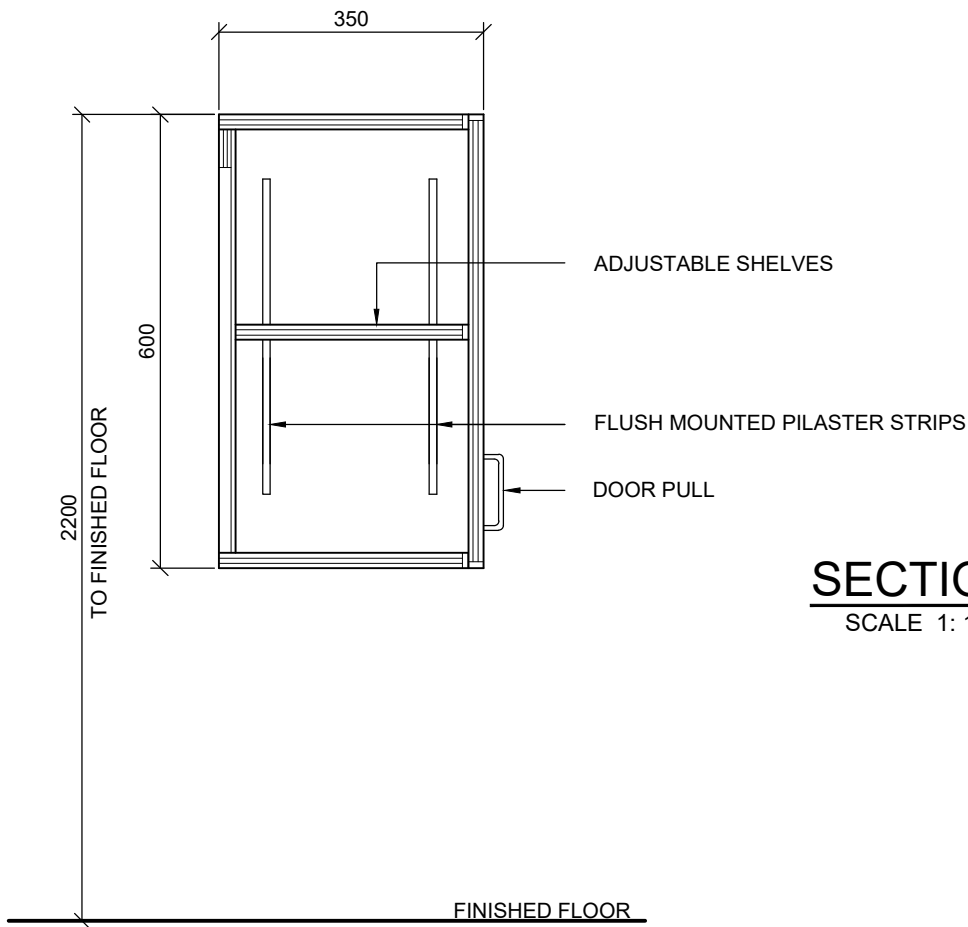


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621



ELEVATION
SCALE 1 : 10



SECTION
SCALE 1 : 10

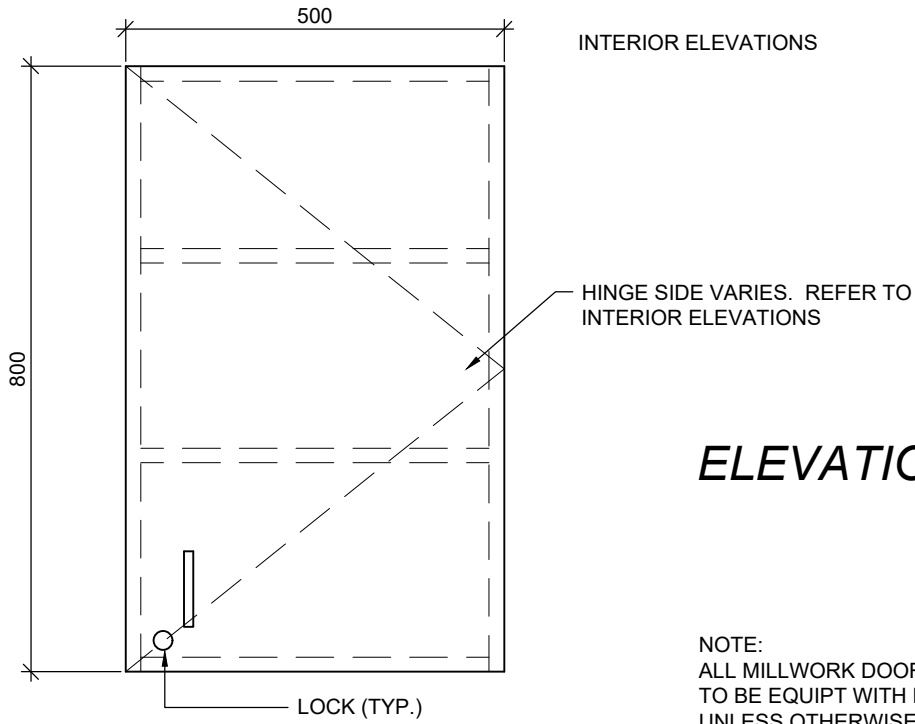
CABINET TYPE U3

PROJ: 20121
SCALE: 1:10
DRAWN: GB
DATE: FEB 2022



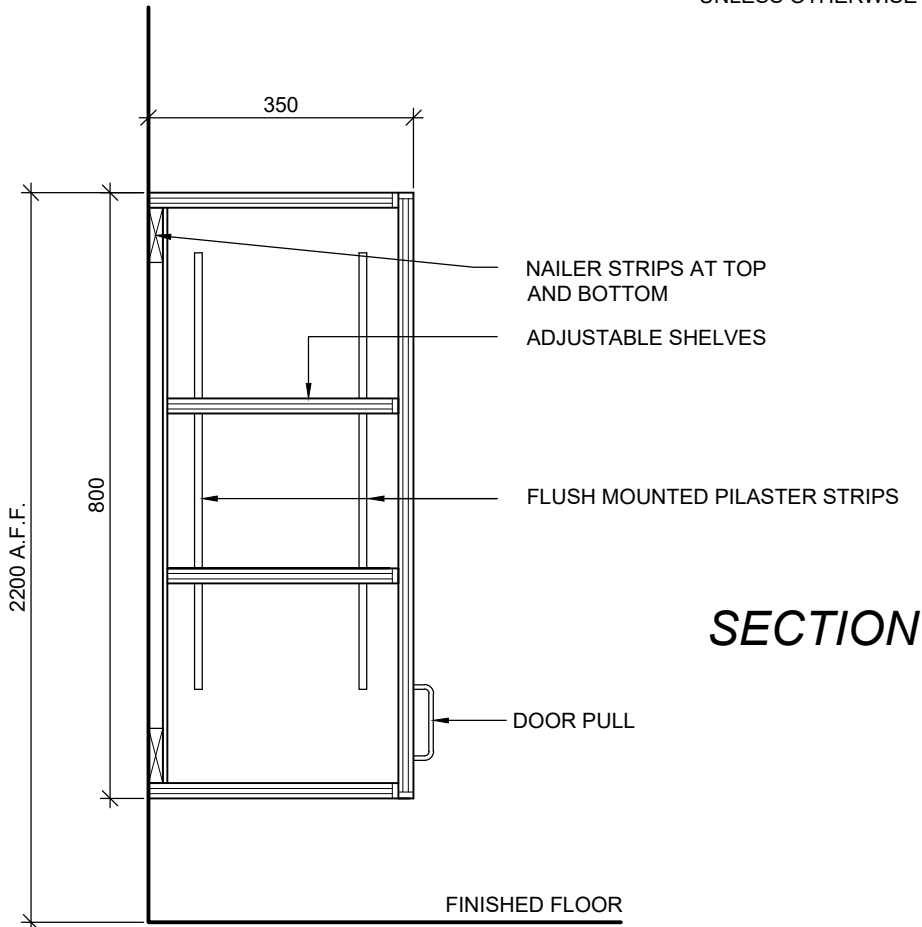
ISSUE/REV.
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AD
622



ELEVATION

NOTE:
ALL MILLWORK DOORS AND DRAWERS
TO BE EQUIPT WITH LOCKS.
UNLESS OTHERWISE NOTED.



SECTION

CABINET TYPE U4

PROJ: 20121

SCALE: 1:10

DRAWN: GB

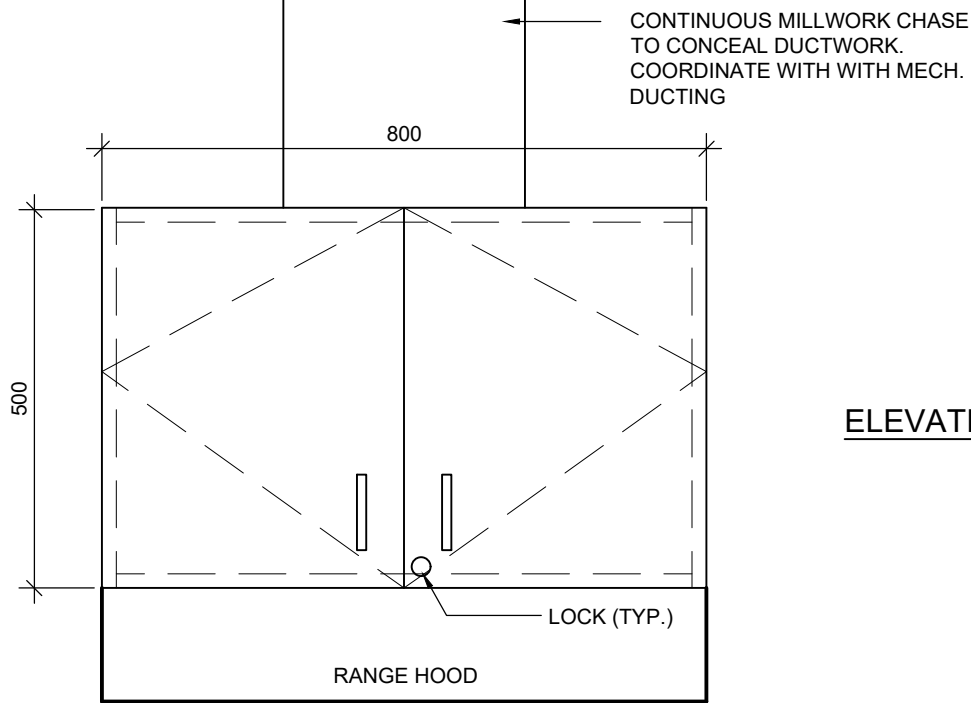
DATE: FEB 2022

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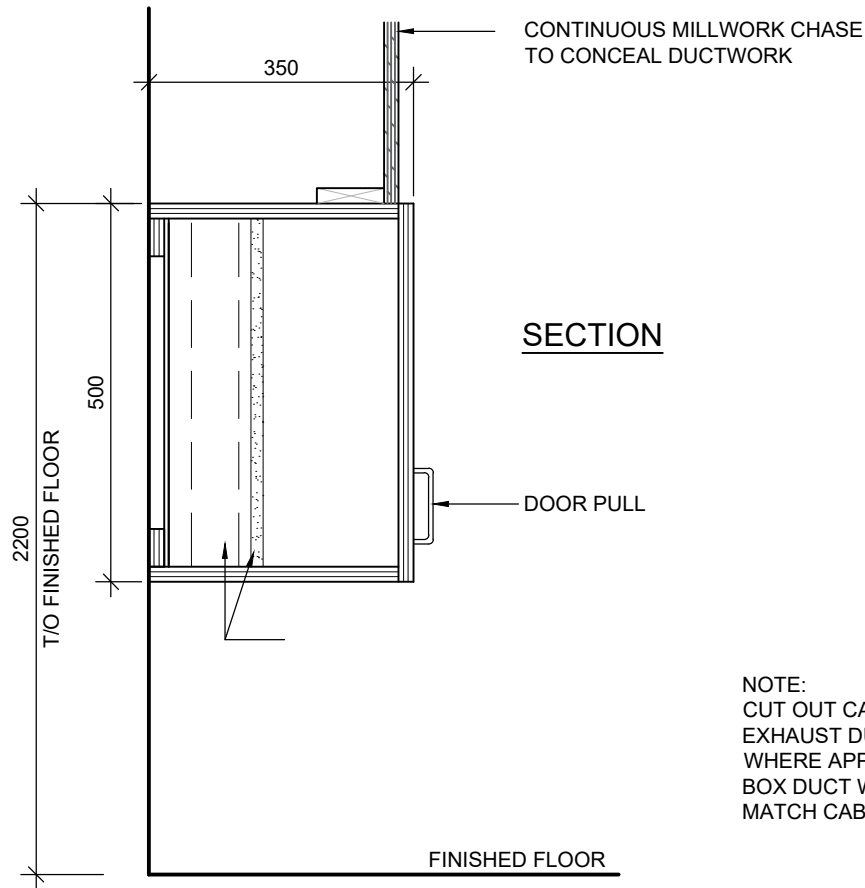


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AD
623



ELEVATION



SECTION

NOTE:
CUT OUT CABINET FOR EXHAUST DUCT FROM HOOD WHERE APPLICABLE. BOX DUCT WITH MATERIAL TO MATCH CABINET.

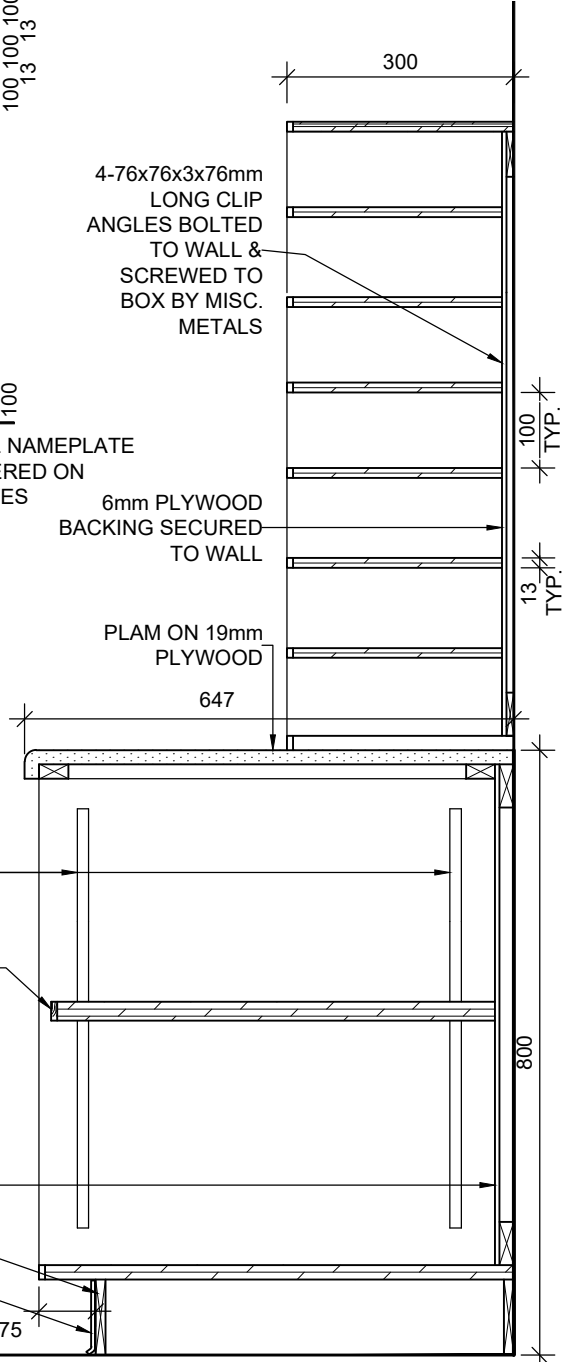
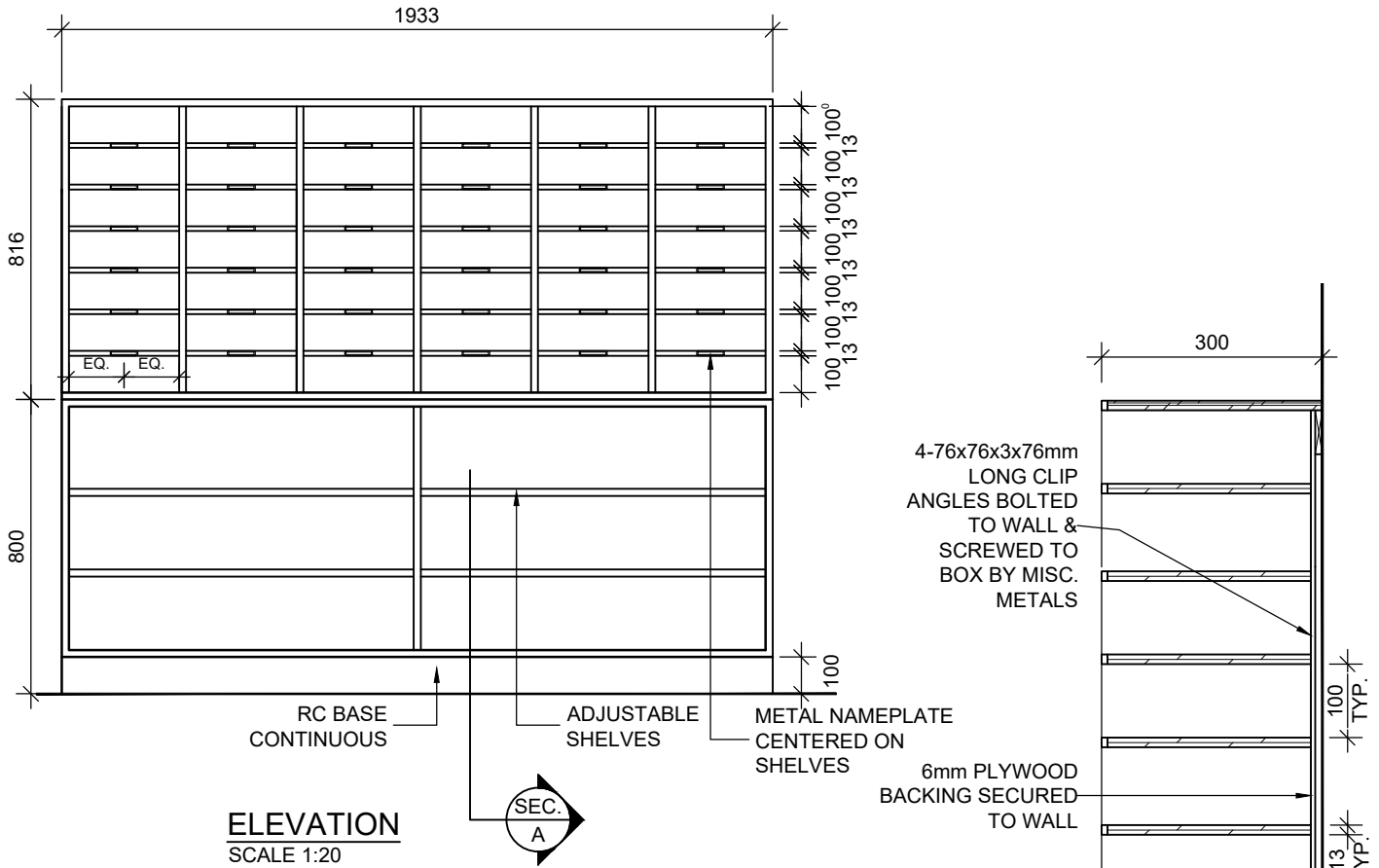
CABINET TYPE U6

PROJ:	20121
SCALE:	1:10
DRAWN:	GB
DATE:	FEB 2022



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626



NOTE:

- NUMBER OF SLOTS = SCHOOL STAFF + 20% (TO BE CONFIRMED DURING CONSTRUCTION).
- TEACHER NAME PLATES TO BE INCLUDED IN CONTRACT.
- REFER TO SPECIFICATIONS FOR MILLWORK CONSTRUCTION AND HARDWARE.
- CONFIRM UNIT SIZE WITH INTERIOR ELEVATIONS. TYP.
- ALL MILLWORK DOORS AND DRAWERS TO BE EQUIPPED WITH LOCKS UNLESS OTHERWISE NOTED.

SECTION A
SCALE 1:10

MAIL SLOTS - C8

PROJ: 20121
SCALE: 1:20
DRAWN:GB
DATE: FEB 2022

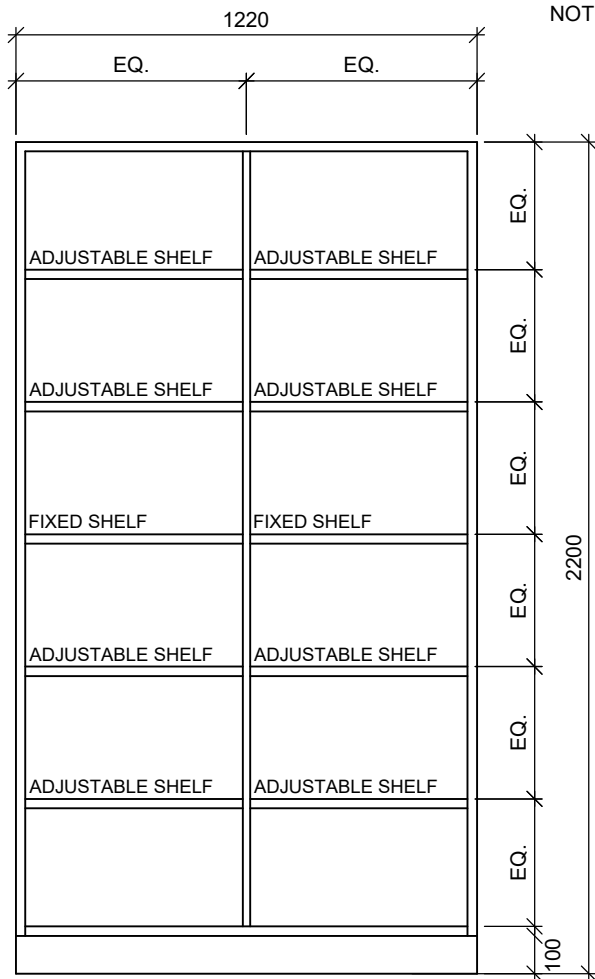
HOSSACK & ASSOCIATES ARCHITECTS



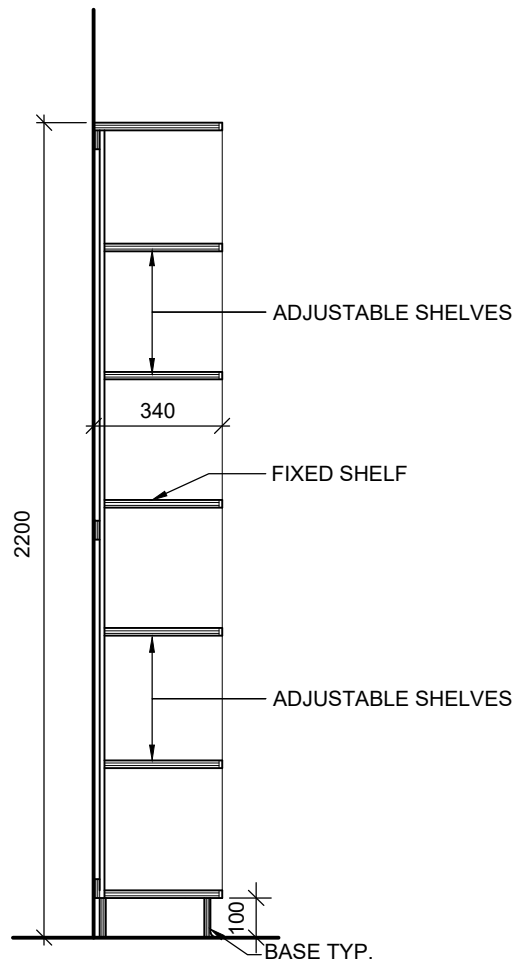
ISSUE/REV.

AD
638

NOTE:
 ALL MILLWORK TO BE OF 19mm MELAMINE
 FACED PARTICLE BOARD UNLESS OTHERWISE
 NOTED.



ELEVATION
 SCALE 1 : 20



SECTION
 SCALE 1 : 20

CABINET TYPE C2

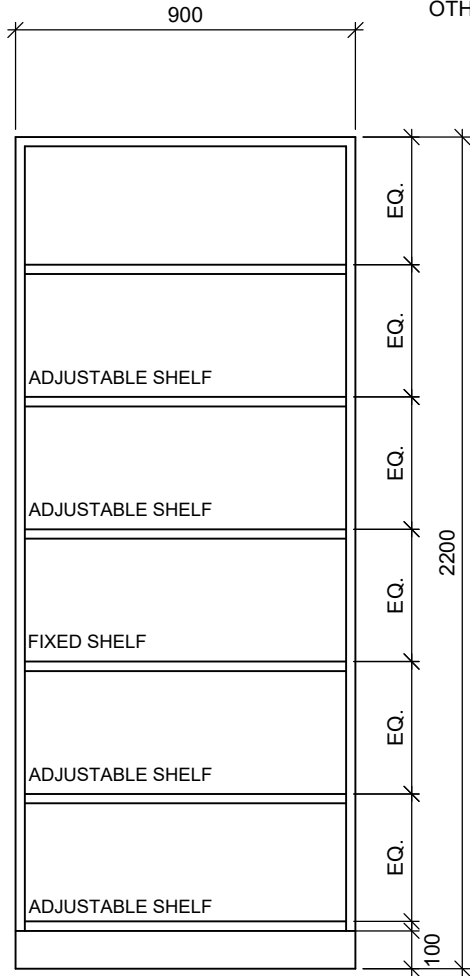
PROJ:	20121
SCALE:	1:20
DRAWN:	GB
DATE:	FEB 2022



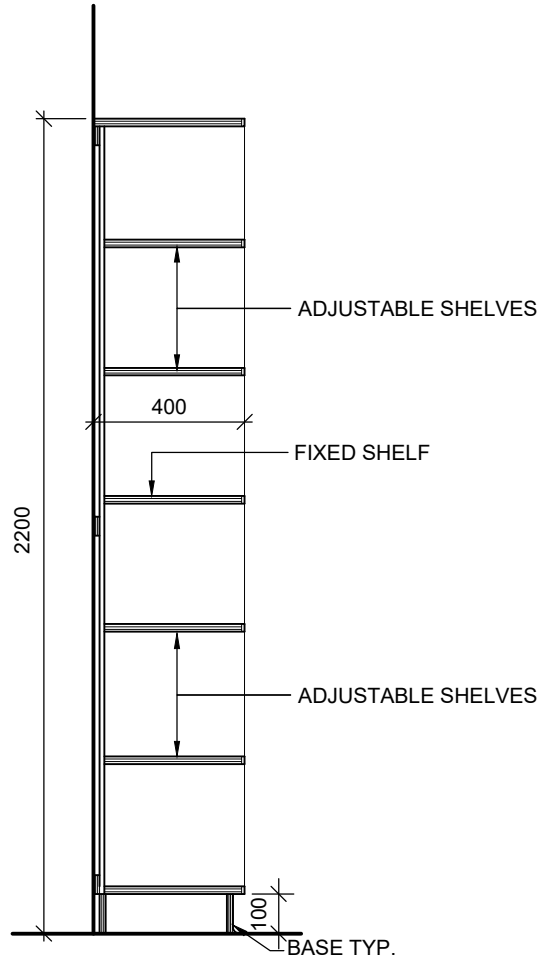
ISSUE/REV.
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AD
 652

NOTE:
 ALL MILLWORK TO BE OF 19mm MELAMINE
 FACED PARTICLE BOARD UNLESS
 OTHERWISE NOTED.



ELEVATION
 SCALE 1 : 20



SECTION
 SCALE 1 : 20

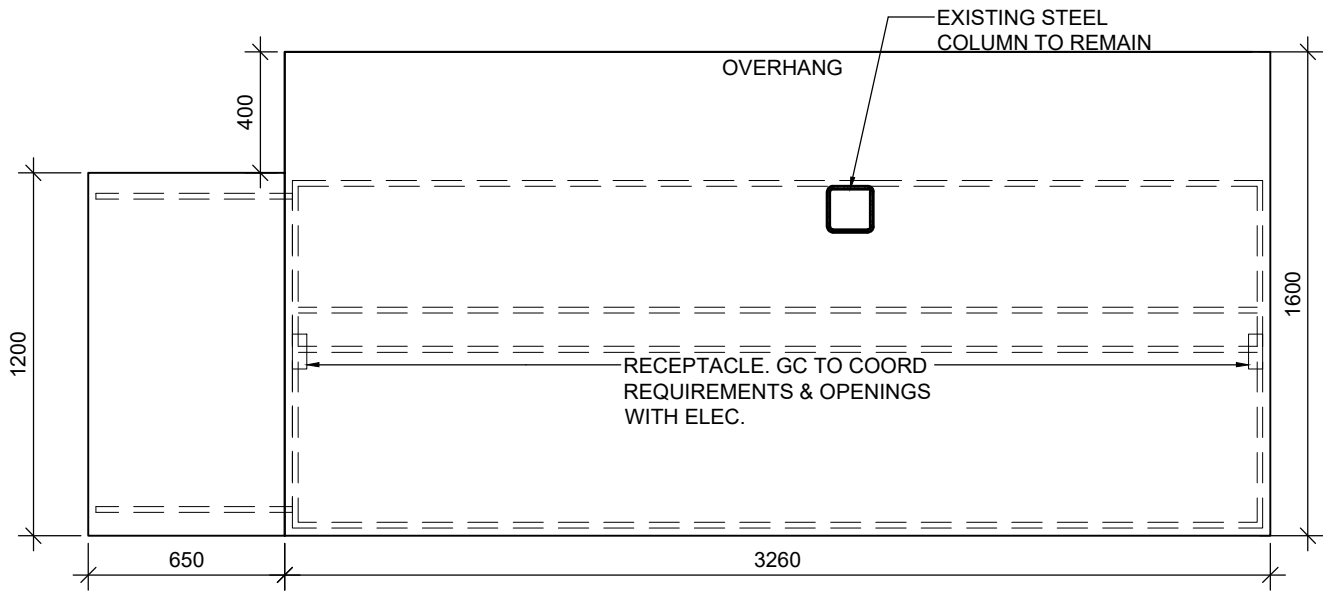
CABINET TYPE C3

PROJ:	20121
SCALE:	1:20
DRAWN:	GB
DATE:	FEB 2022

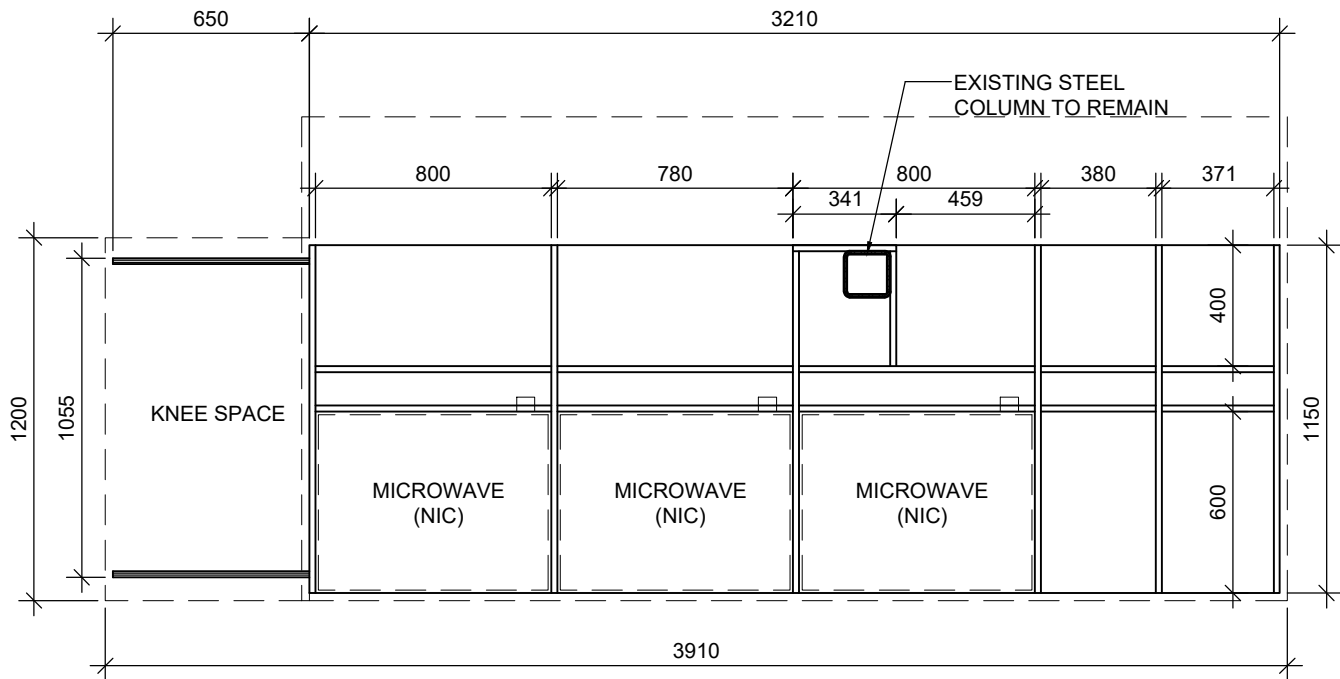
**HOSSACK
 & ASSOCIATES
 ARCHITECTS**

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653



PLAN



PLAN SECTION

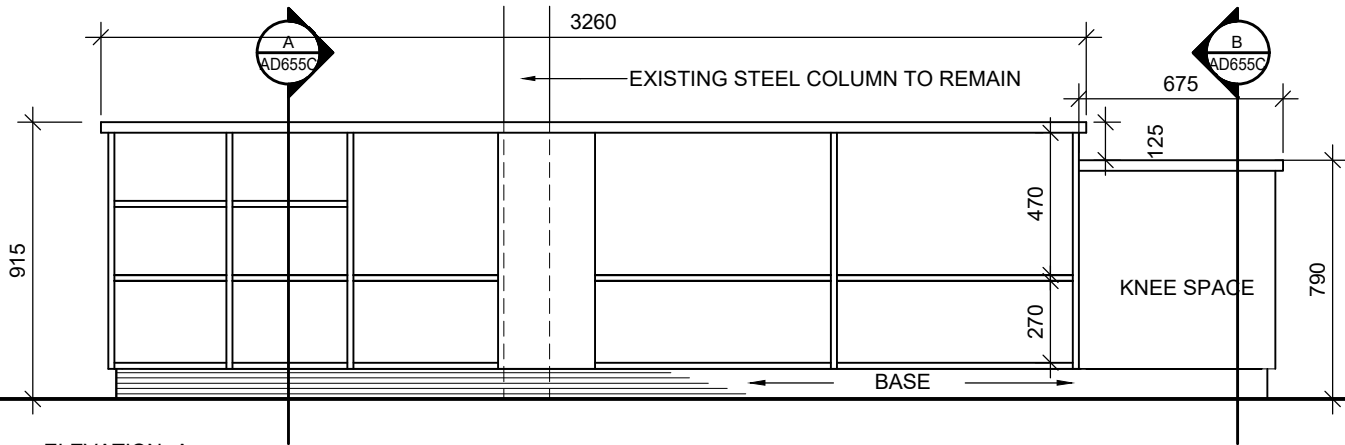
STAFF LOUNGE ISLAND - TYPE B29

PROJ: 20121
 SCALE: 1:25
 DRAWN: GB
 DATE: FEB 2022



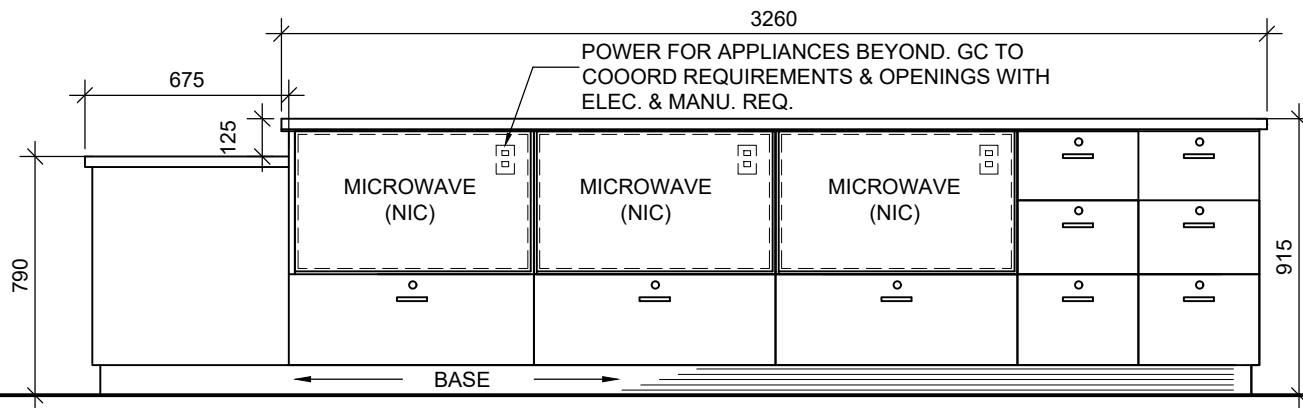
ISSUE/REV.
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655A



ELEVATION -A

NOTE:
ALL MILLWORK DOORS AND DRAWERS TO BE
EQUIPPED WITH LOCKS.



ELEVATION -B

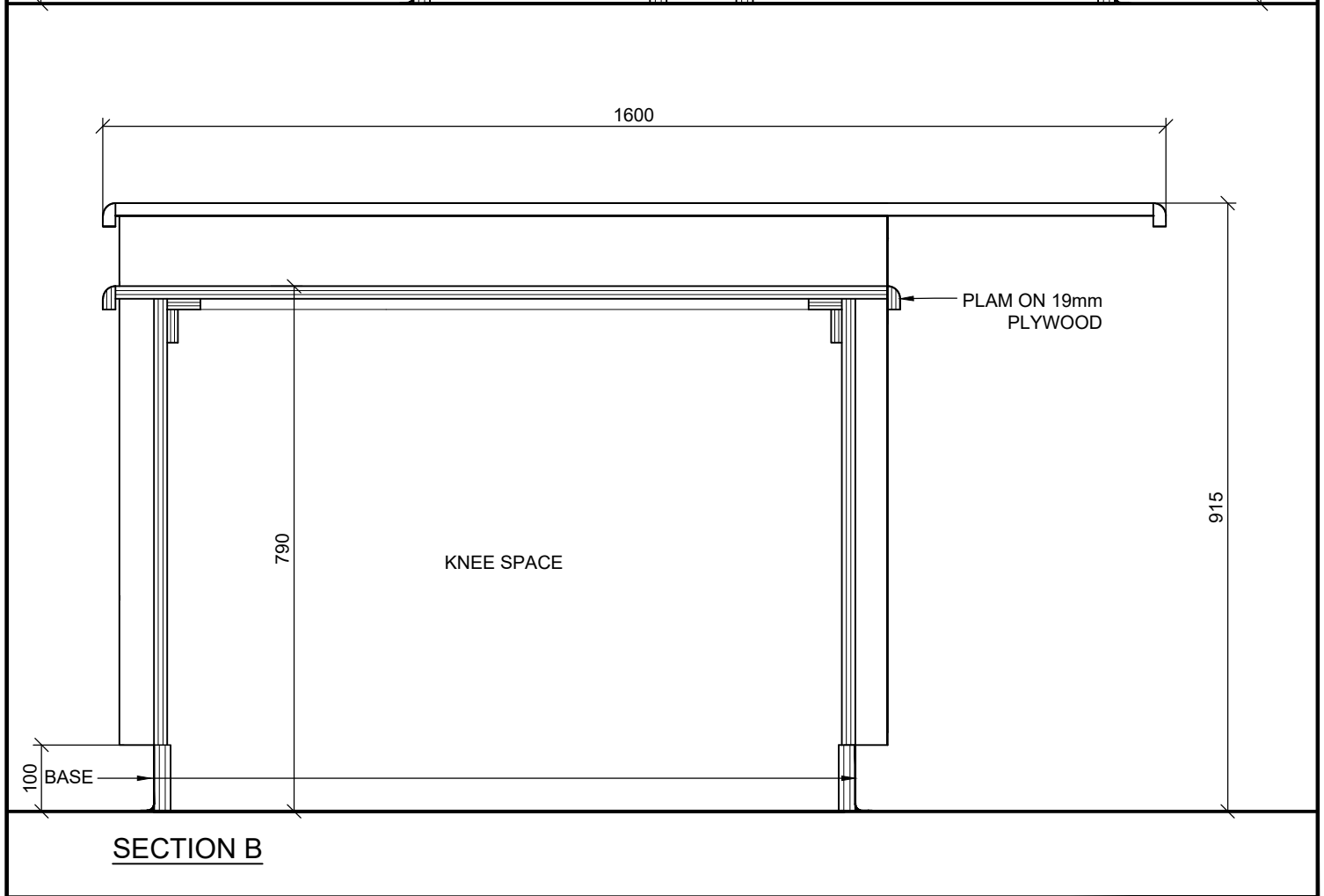
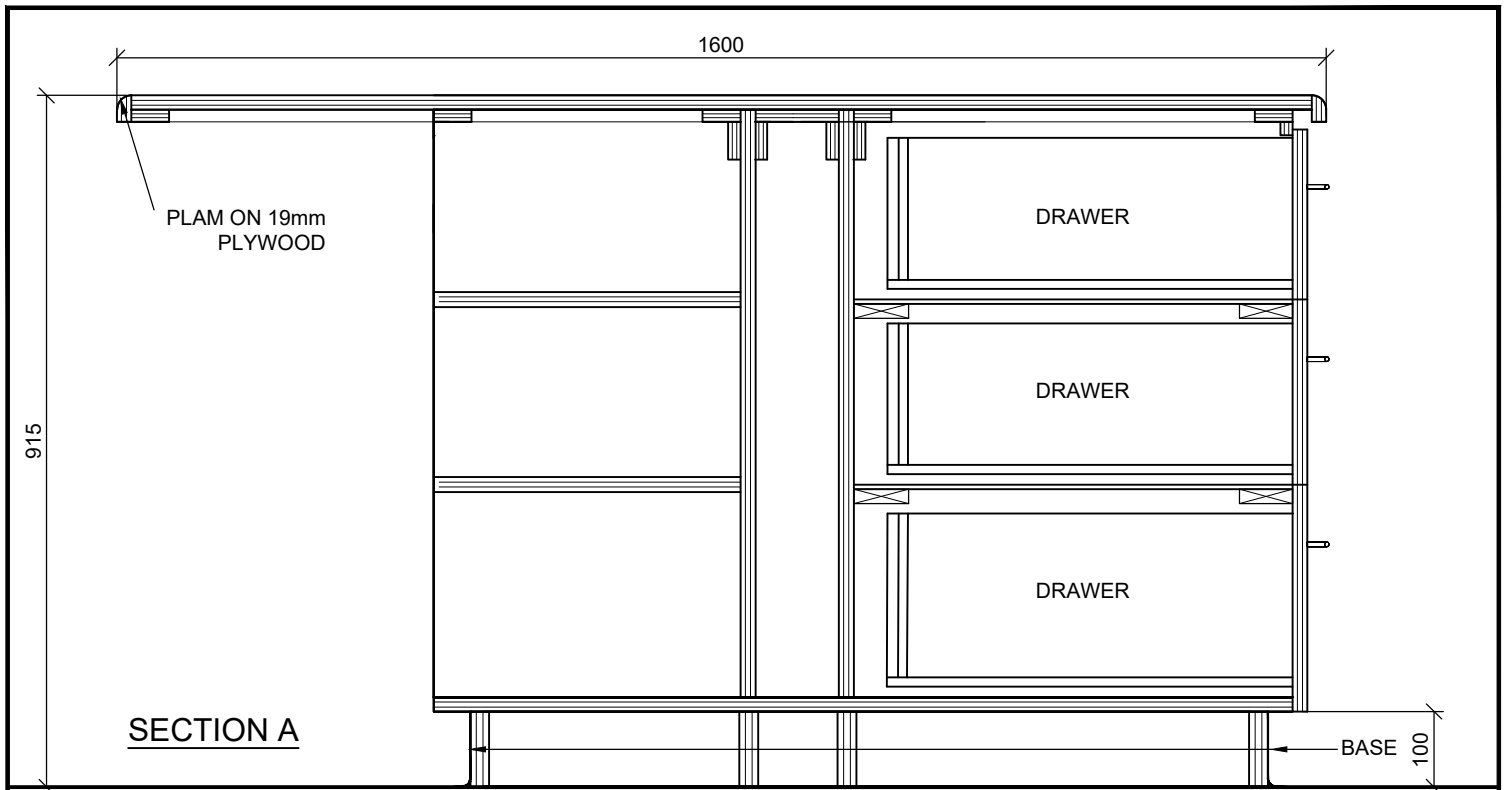
STAFF LOUNGE ISLAND - TYPE B29
ELEVATIONS

PROJ:	20121
SCALE:	1:25
DRAWN:	GB
DATE:	FEB 2022



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655B



STAFF LOUNGE ISLAND - TYPE B29
SECTIONS

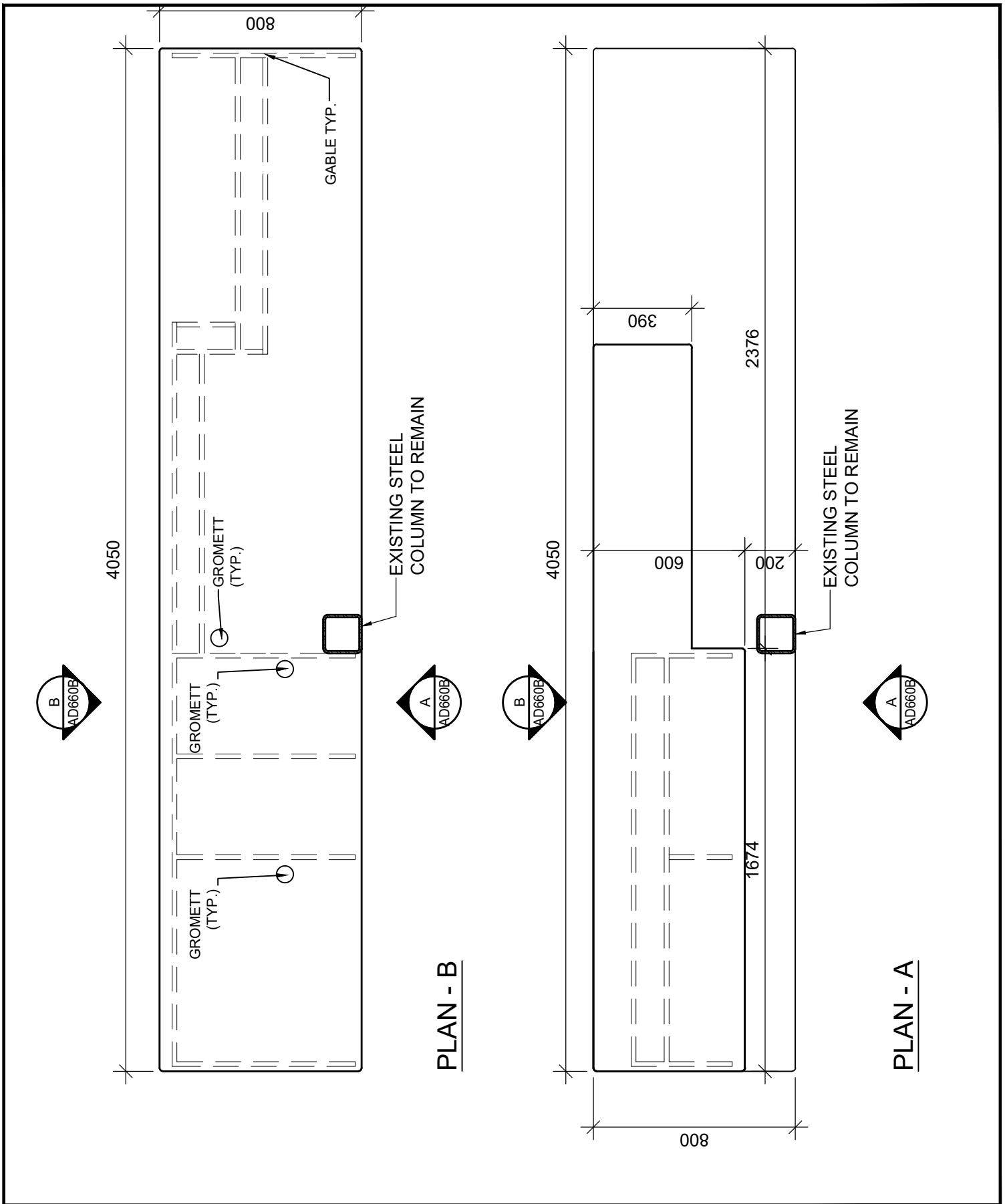
PROJ: 20121
SCALE: 1:10
DRAWN: GB
DATE: FEB 2022

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655C



PLAN - B

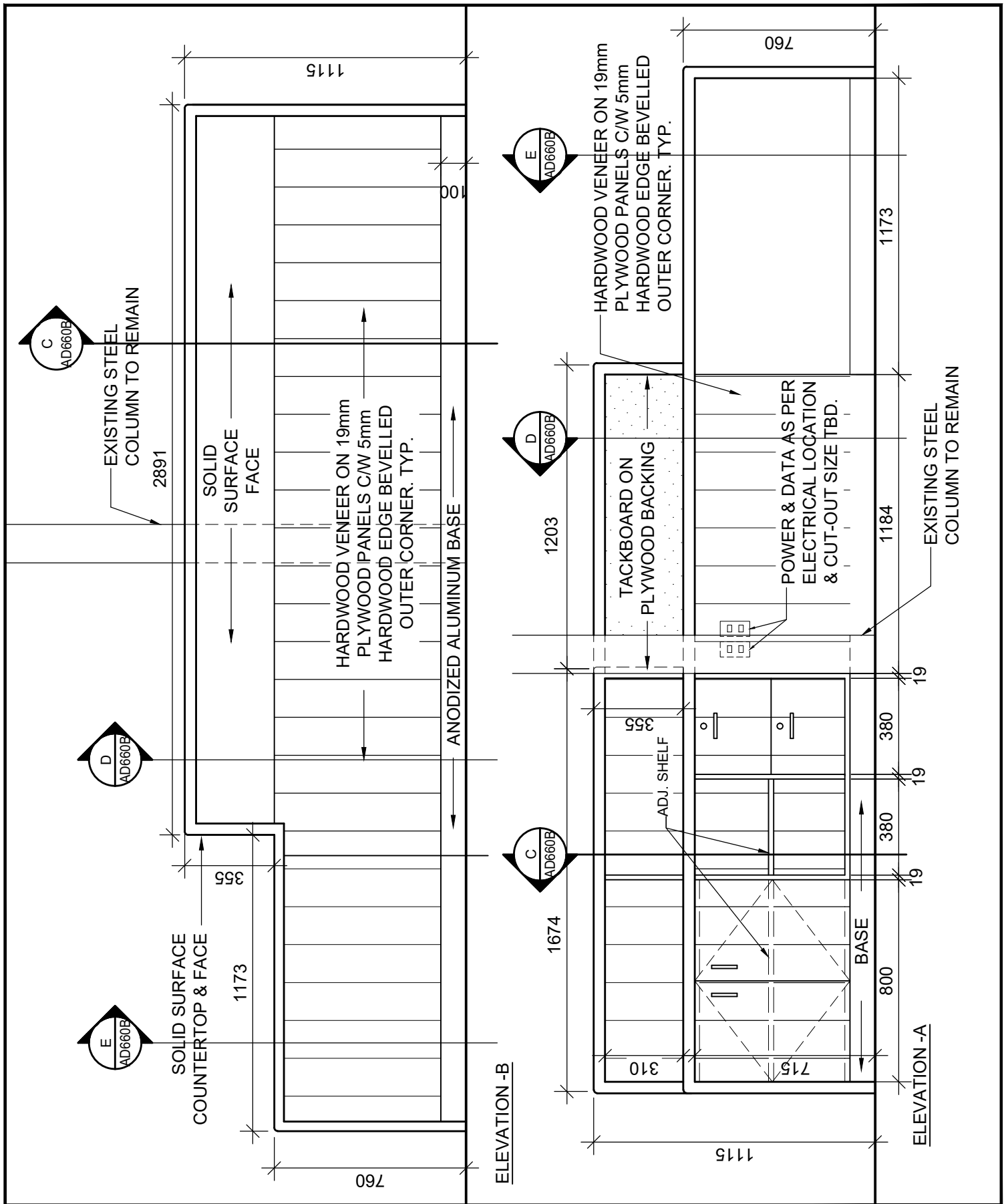
PLAN - A

**RECEPTION DESK
TYPE B30 - DETAILS**

PROJ:	20121
SCALE:	1:20
DRAWN:	GB
DATE:	FEB 2022



ISSUE/REV.	00
AD	656A



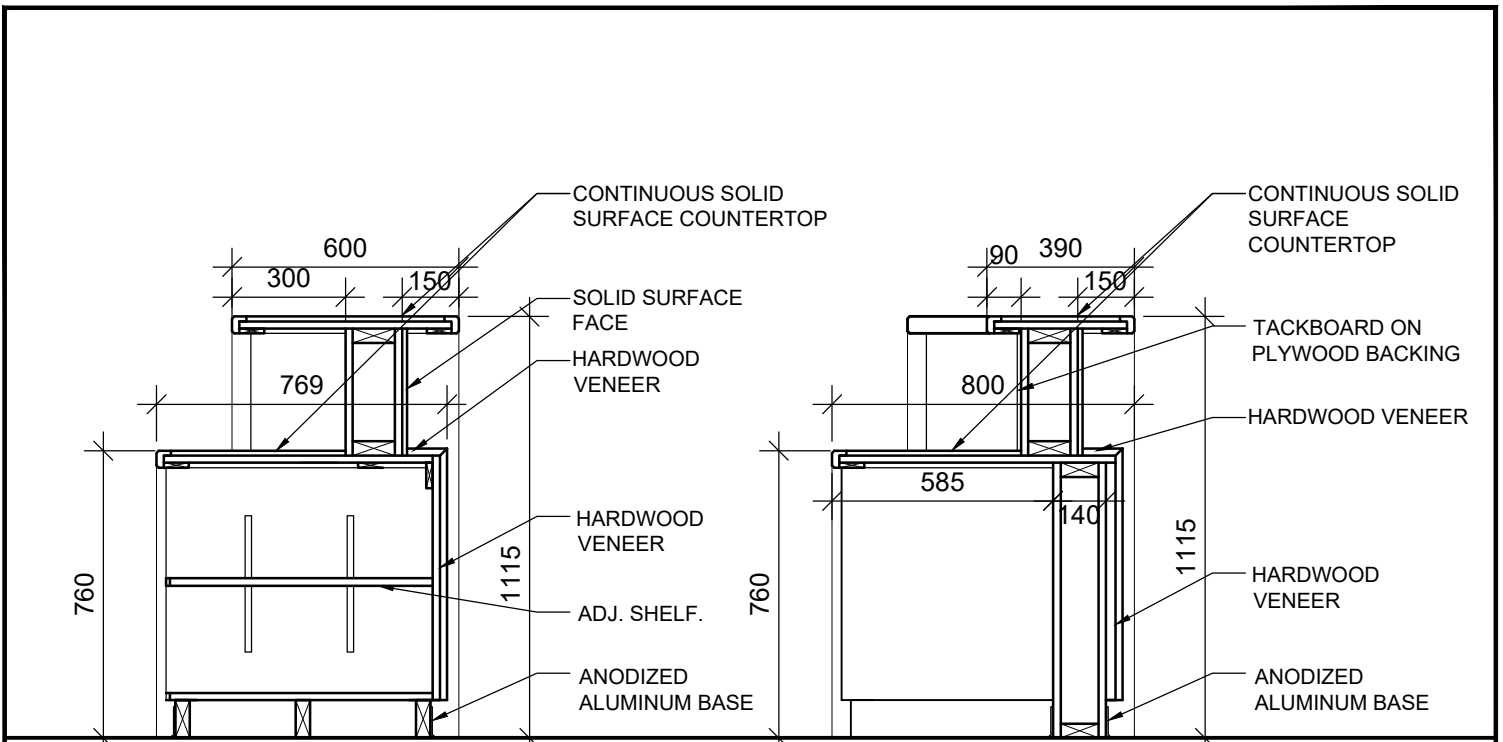
RECEPTION DESK
 TYPE B30 - DETAILS
 ELEVATIONS & SECTIONS

PROJ: 20121
 SCALE: 1:20
 DRAWN: GB
 DATE: FEB 2022



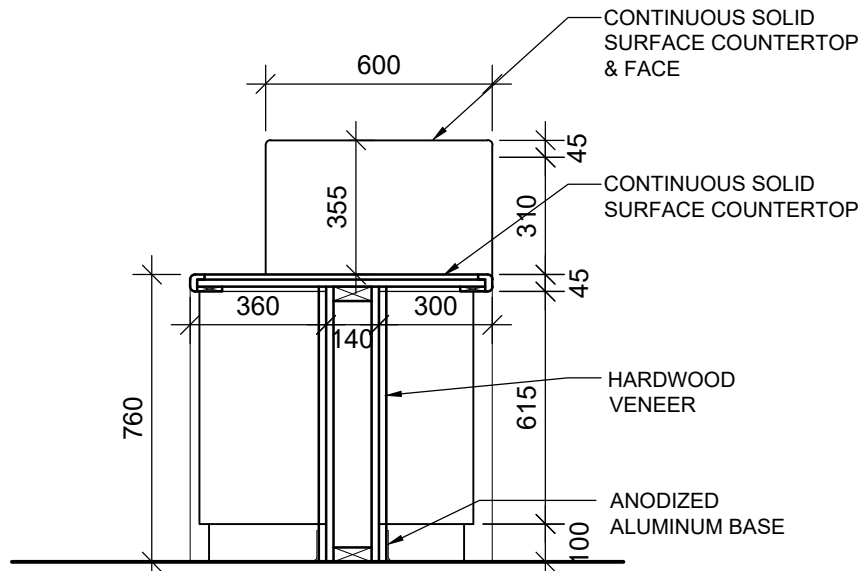
ISSUE/REV.
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 656B



SECTION- C

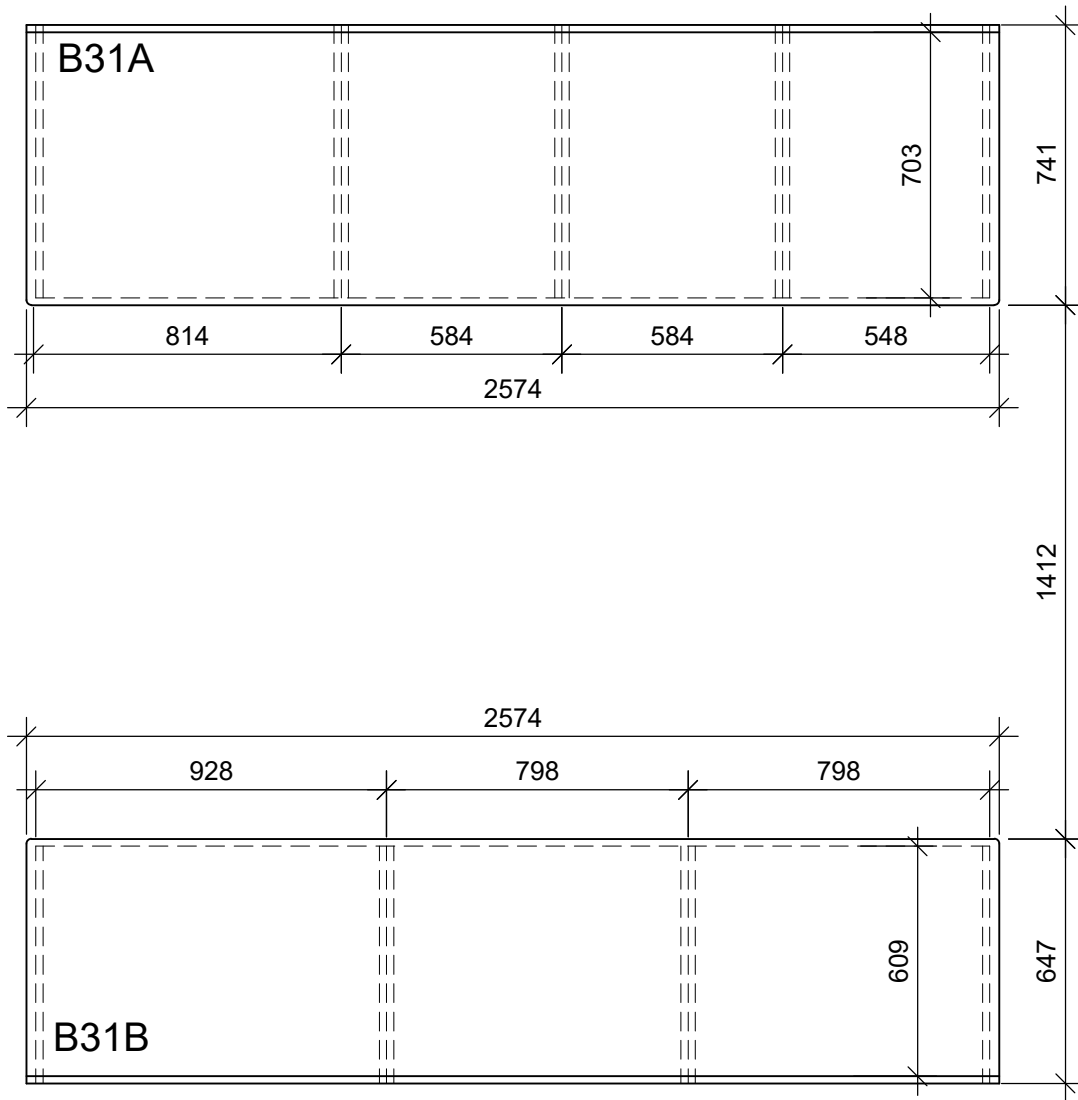
SECTION- D



SECTION- E

C
AD660B

<p>RECEPTION DESK TYPE B30 - DETAILS SECTIONS</p>	<p>PROJ: 20121</p>	<p>HOSSACK & ASSOCIATES ARCHITECTS</p> 	<p>ISSUE/REV. 00</p>
	<p>SCALE: 1:20</p>		<p>AD 656C</p>
	<p>DRAWN: GB</p>		
	<p>DATE: FEB 2022</p>		



1 PLAN

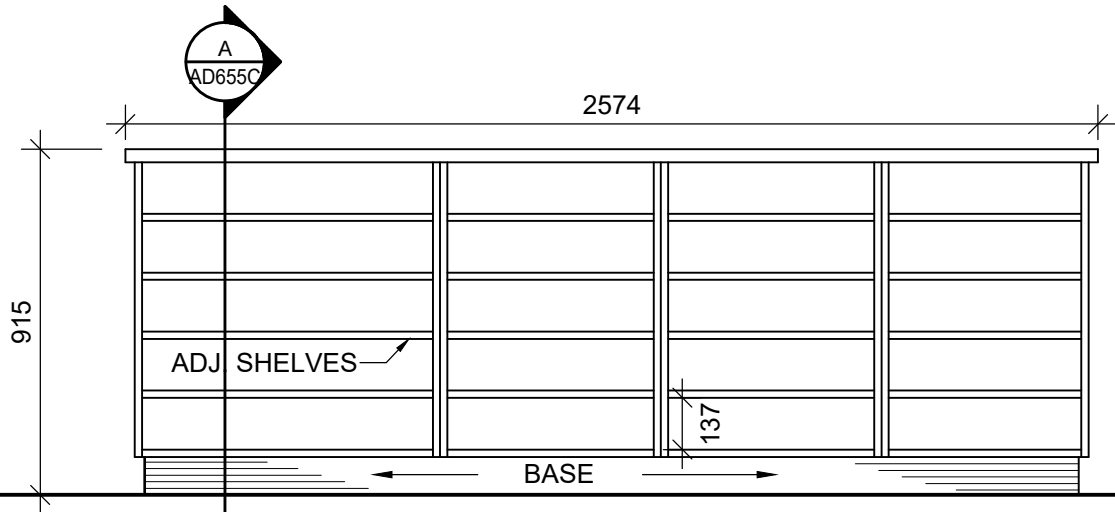
STAFF WORKROOM COUNTER - TYPE B31A &
TYPE B31B

PROJ:	20121
SCALE:	1:20
DRAWN:	GB
DATE:	FEB 2022

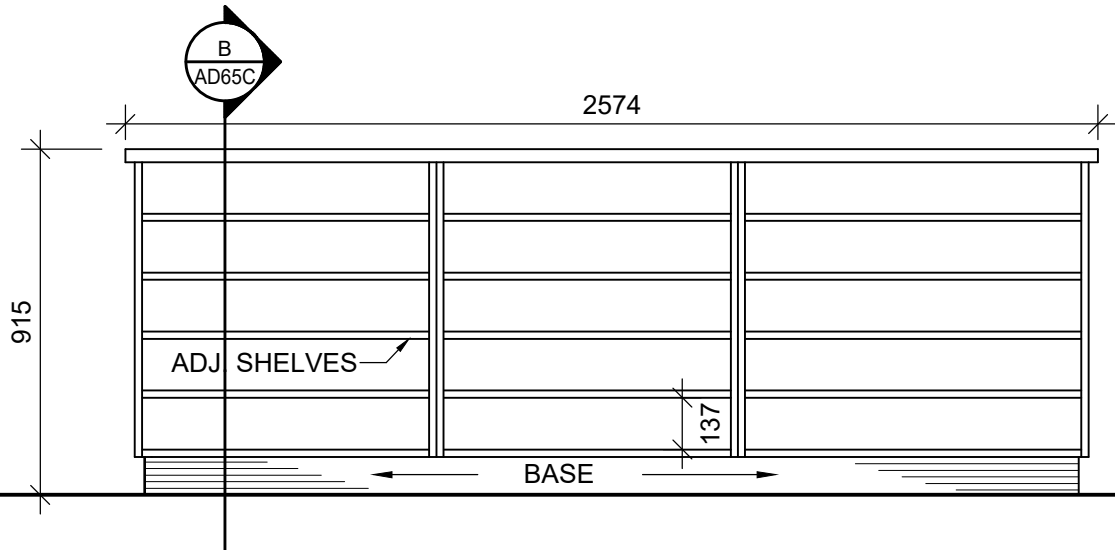


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657A



ELEVATION - B31A



ELEVATION - B31B

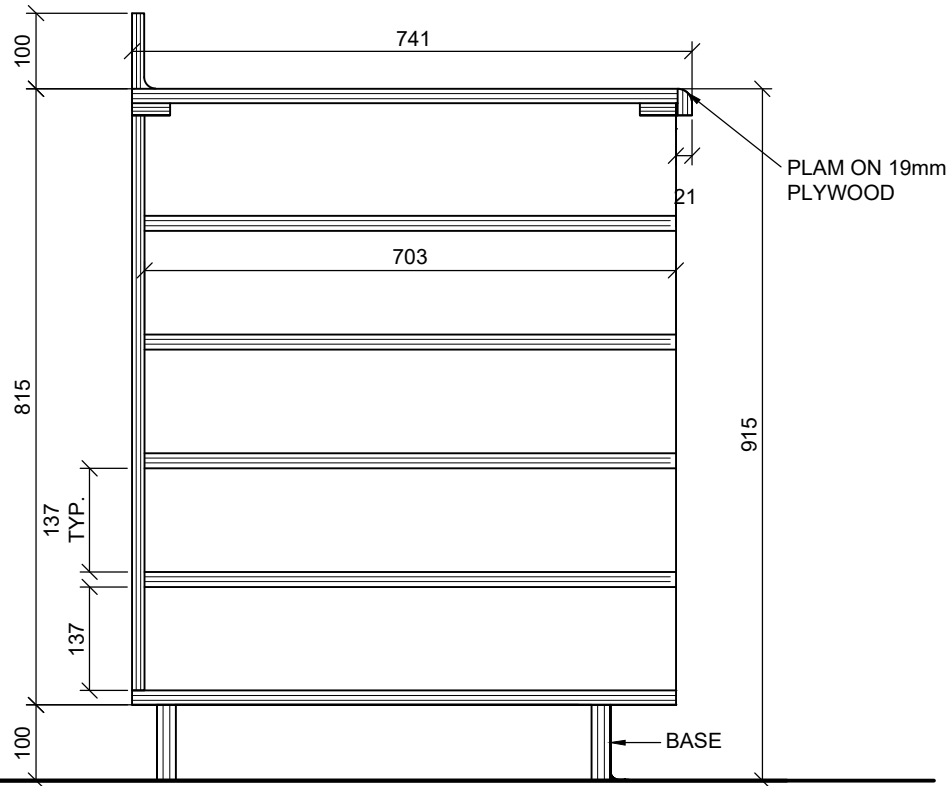
STAFF WORKROOM ISLAND - TYPE B31A &
TYPE B31B
ELEVATIONS

PROJ:	20121
SCALE:	1:20
DRAWN:	GB
DATE:	FEB 2022

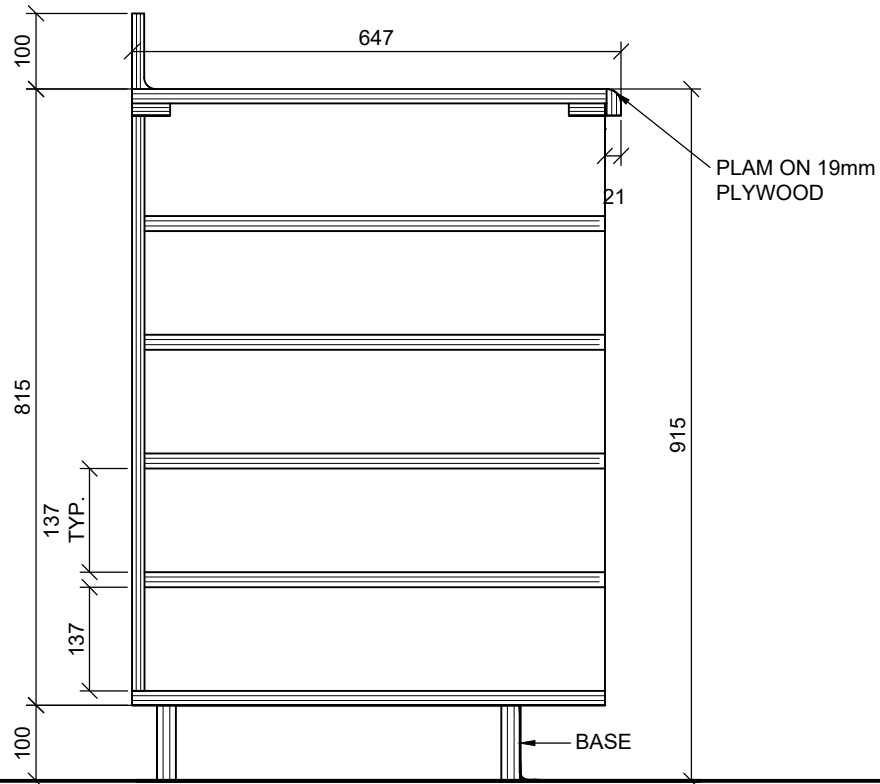


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657B



SECTION A



SECTION B

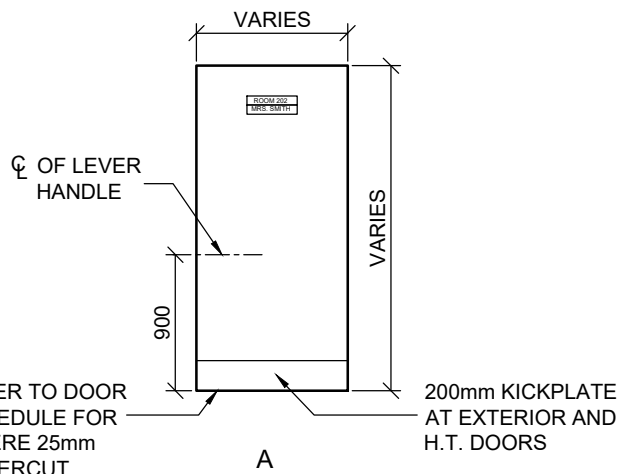
STAFF WORKROOM ISLAND - TYPE B31A &
TYPE B31B
SECTIONS

PROJ:	20121
SCALE:	1:10
DRAWN:	GB
DATE:	FEB 2022

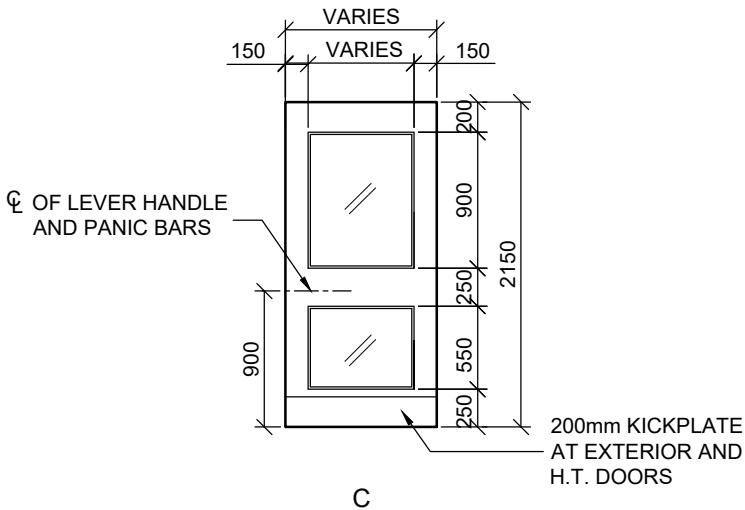
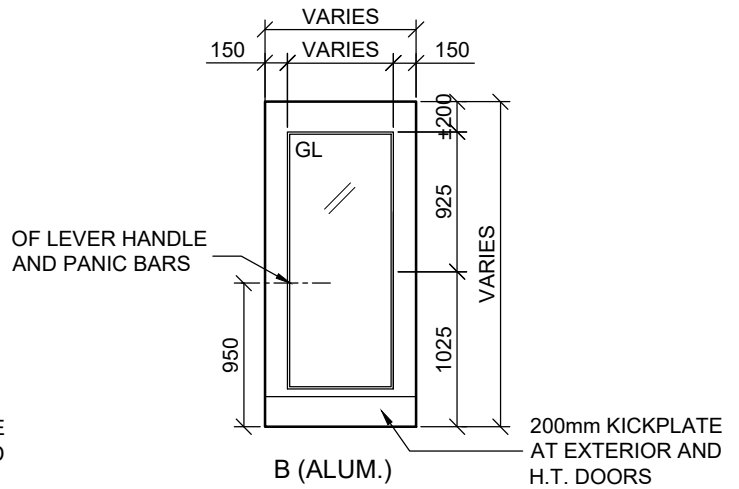


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657C



REFER TO DOOR SCHEDULE FOR WHERE 25mm UNDERCUT IS REQUIRED



NOTES:

1. GLAZING TO BE:
FIRE RATED GLASS AT FIRE RATED DOORS - REFER TO SPECIFICATIONS. 6mm TEMPERED PLATE GLASS AT NON-FIRE RATED DOORS.
2. ALL DOORS AND FRAMES ARE VIEWED FROM EXTERIOR OF ROOM OR AREA SERVED
3. REFER TO DOOR SCHEDULE FOR SOLID CORE WOOD DOORS W/STAINED FINISH OR HOLLOW METAL
4. EXTERIOR EXIT DOORS AND HEAVY TRAFFIC DOORS TO HAVE PIANO HINGES. SEE HARDWARE SCHEDULE
5. CL FOR HANDLE LEVERS ARE **ALWAYS** AT 900mm, PANIC BAR CL MAY DIFFER IN HEIGHT UNLESS THERE IS NO HANDLE, THEN PANIC BAR IS AT 900mm.

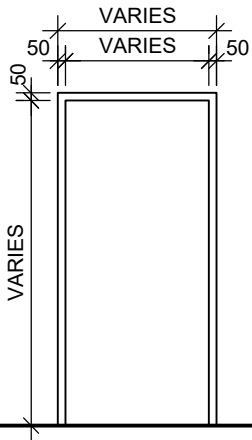
DOOR TYPES

PROJ: 20121
SCALE: 1:50
DRAWN: SC
DATE: JAN 2022

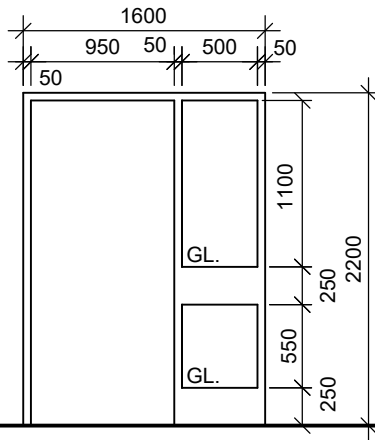


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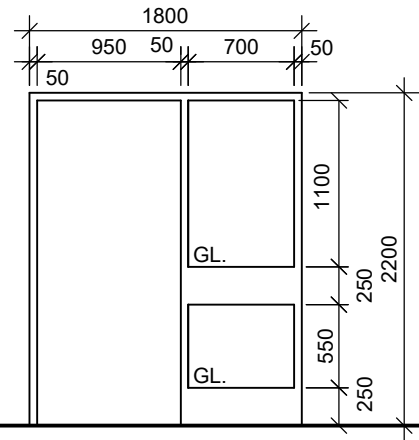
AD
800



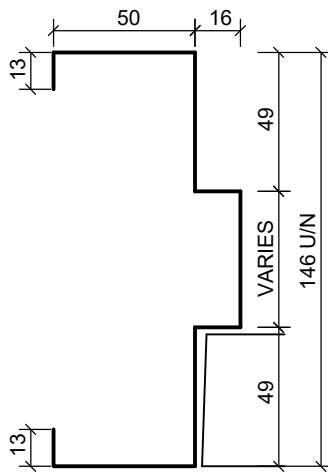
TYPE 1
H.M. INT



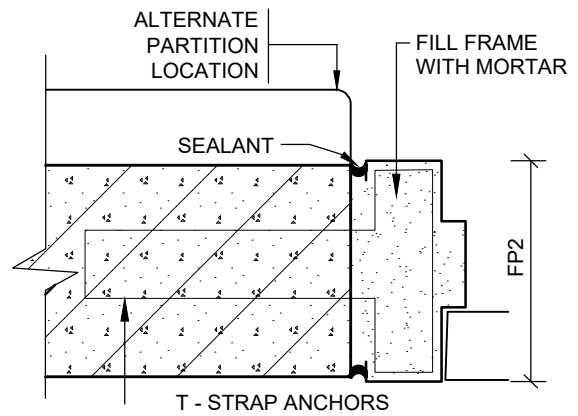
TYPE 2
H.M. INT



TYPE 3
H.M. INT



FRAME PROFILE FP1
METAL FRAME SECTION (MASONRY WALLS)
(NTS)



MF1 (NTS)

HOLLOW METAL FRAMES & JAMB DETAILS

PROJ: 20121
SCALE: 1:50
DRAWN: SC
DATE: JAN 2022



ISSUE/REV.

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801

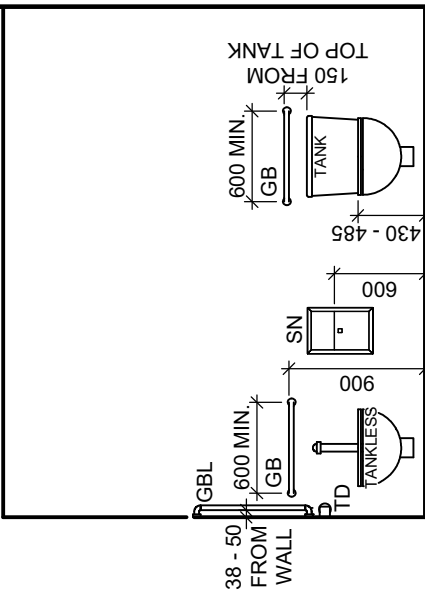
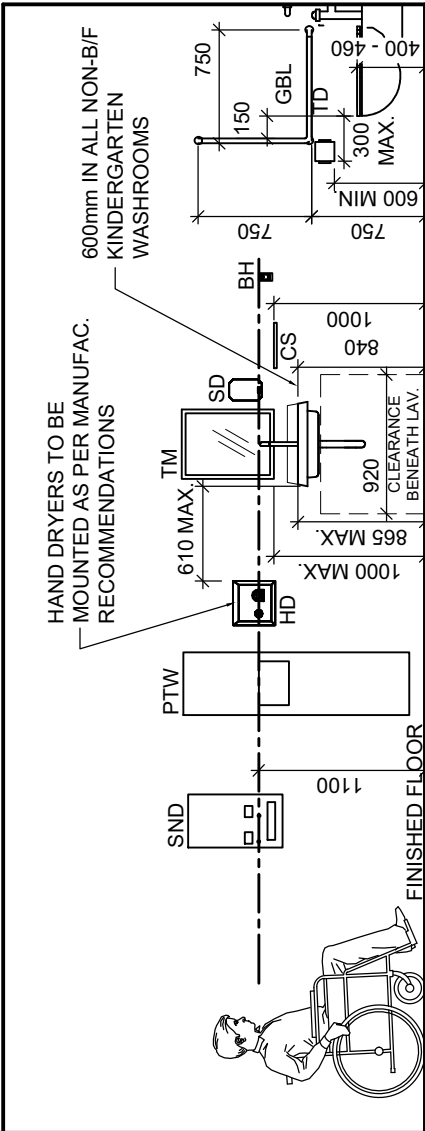
WASHROOM FIXTURE MOUNTING HEIGHTS

PROJ:	20121
SCALE:	1:50
DRAWN:	GB
DATE:	22 02 24

HOSSACK & ASSOCIATES ARCHITECTS



ISSUE/REV. 00
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ABBREVIATIONS

- BH BREAK-AWAY TYPE COAT HOOK
- CS CONVENIENCE SHELF
- HD HAND DRYER
- GB GRAB BAR (STRAIGHT)
- GBL GRAB BAR 'L' SHAPE
- GBF GRAB BAR FOLDING TYPE
- PTD PAPER TOWEL DISPENSER
- PTW PAPER TOWEL DISPENSER / WASTE RECEPTACLE COMBO UNIT
- SN SANITARY NAPKIN DISPOSAL
- SND SANITARY NAPKIN DISPENSER
- TM TILTED MIRROR
- TD TOILET PAPER DISPENSER

- NOTES:**
- WHERE APPLICABLE, THE DIMENSION IS TO THE OPERATOR.
 - REFER TO PROJECT FLOOR PLANS AND INTERIOR ELEVATIONS FOR WASHROOM FIXTURE LAYOUT

7201-RW-22 - Hespeler Public School Office Renovation and Site Improvements

Opening Date: March 16, 2022 4:00 PM

Closing Date: April 6, 2022 2:00 PM

Schedule of Prices

* Denotes a "MANDATORY" field

Do not enter \$0.00 dollars unless you are providing the line item at zero dollars to the Board.

Bid Price Form

Note: Cash Allowances included in BID PRICE.

Blackout Period Protocol is understood and will be adhered to.

HST is additional.

Line Item	Description	Unit of Measure	Quantity	Bid Price *	Total
1	Hespeler Public School Office Renovations, as per tender documents	Lump Sum	1		
Subtotal:					

Summary Table

Bid Form	Amount
Bid Price Form	
HST (13%)	\$ 0.00
Total Contract Amount:	

Specifications

Bidder's Contact Information

Provide contact information for the following employees for this project.

If any of the contacts are to change within the duration of the contract the Board must be immediately notified and pre-approve the change(s).

Title	Name *	E-mail *	Cell Phone Number *	
Project Manager				*
Site Supervisor				*

Documents

It is your responsibility to ensure the uploaded file(s) is/are not defective or corrupted and are able to be opened and viewed by the Owner. If the attached file(s) cannot be opened or viewed, your Bid Submission may be rejected.

COVID RESPONSE

Submit a work plan that outlines how the company plans to address COVID-19, including implementing workplace strategies that include, but are not limited to, social distancing, personal hygiene recommendations, and other relevant recommendations made

by the government of Ontario, the government of Canada, the local municipal government, and their respective ministries, agencies, and departments, in respect of the employees and other personnel of the successful bidder, their subcontractors and suppliers, as well as the employees and other personnel of the Board, the Board's Consultant, and the general public.

- WSIB * (mandatory)
- Covid Response * (mandatory)

BONDING UPLOAD SECTION

Refer to the Bonding Requirements Section of the Terms and Conditions.

- Bid Deposit Bond * (mandatory)
- Agreement to Bond * (mandatory)

Addenda, Terms and Conditions

I/We have read and understand this Bid Solicitation document, and agree to perform the Work required in accordance with this Bid Solicitation document, including all addenda, at the price(s) detailed in the Bid.

I/We confirm that:

1. The person named in this Bid is authorized to sign and electronically submit this Bid through the Bidding System.
2. I/We meet all mandatory requirements of the Bid Solicitation document.
3. The bid will remain open for a specified acceptance period after the Closing Time. The Board may, at any time within this period, accept the Bid whether or not any other Bid has previously been accepted.
4. All prices provided in the Bid will remain fixed and firm for the duration of the term of the agreement, unless specified otherwise.
5. All prices provided in my/our Bid are in Canadian funds and include all charges of every kind attributable to the Work. Harmonized Sales Tax will be extra and not shown, unless specified otherwise.
6. To the best of my/our knowledge and belief:
 - a) the information provided in the Bid is correct; and
 - b) the Bid is made without any comparison of figures or arrangement with any other individual, corporation or person submitting a Bid for the same Work and is in all respects fair and without collusion or fraud.
7. I/We comply with the all applicable Board policies, provincial, and federal laws, and are aware of the Board's "Principles of Business Conduct" and will comply.
8. I/We agree and understand that the recommendation to award the Work may be subject to the approval from the Board as well as availability of funds.
9. I/We agree to be bound by the terms and conditions of the Bid Solicitation document and submit this Bid on behalf of the Bidder.

I have the authority to bind the Bidder.

The Bidder/Proponent is to declare any actual, potential or perceived conflict of interest that could arise from submitting the Bid/Proposal.

Do you have a potential conflict of interest?

Yes No

The Bidder acknowledges and agrees that the addendum/addenda below form part of the Bid Solicitation Document.

Please check the box in the column "**I have reviewed this addendum**" below to acknowledge each of the addenda.

File Name	I have reviewed the below addendum and attachments (if applicable)	Pages
There have not been any addenda issued for this bid.		