



**Waterloo Region
District School Board**

REQUEST FOR TENDER

24-7517-RFT

**Elmira District Secondary School Special Education Relocation and HVAC
Upgrades**

ISSUE DATE: March 01, 2024

**ELECTRONIC SUBMISSIONS will be received by the Bidding System no later than
2:00 p.m. local time, on March 21, 2024.**

DIVISION 00 – BIDDING AND CONTRACT DOCUMENTS

| | |
|-------------------------------------------------------------------|-----|
| 00 01 00 Consultant/Professional Seals | 6 |
| DIVISION 00 – BIDDING AND CONTRACT DOCUMENTS | 7 |
| 00 21 13 Instructions to Bidders | 7 |
| 00 21 14 – General Contractors and Subcontractors | 19 |
| 00 21 15 – Scope of Work | 21 |
| 00 31 34 – Subsurface Investigation Report – Not Applicable | 22 |
| Appendix 00 31 34A – Soil Report | 23 |
| Not Applicable | 23 |
| 00 41 13A – Asset and Warranty Card | 24 |
| 00 41 73 – Supplementary Bid Information | 25 |
| 00 56 13 – Definitions Stipulated Price | 26 |
| 00 72 13 – Standard Terms and Conditions | 28 |
| 00 73 00 “The Supplementary Conditions” | 62 |
| DIVISION 01 - GENERAL REQUIREMENTS | 120 |
| 01 14 00 – Work Restrictions | 120 |
| 01 21 00 – Allowances | 124 |
| 01 31 00 – Project Managing And Coordination | 127 |
| 01 32 00 – Construction Progress Documentation | 133 |
| 01 33 00 – Submittal Procedures | 136 |
| 01 35 17 – Fire Safety Procedures | 141 |
| Appendix 013517-A Contractor Hot Work Permit | 148 |
| 01 35 23 – Health And Safety | 149 |
| 01 35 43 – Hazardous Materials | 154 |
| Appendix 01 35 43A Asbestos Audit Report | 158 |
| Appendix 01 35 34B– Lead Report- Not Applicable | 159 |
| 01 42 00 – References | 160 |
| 01 45 00 – Quality Control | 165 |
| 01 51 00 – Temporary Utilities | 172 |
| 01 53 00 – Temporary Construction Facilities | 177 |
| 01 54 00 – Materials and Equipment | 183 |
| 01 61 00 – Product Requirements | 186 |
| 01 74 00 – Cleaning and Waste Management | 198 |
| 01 78 10 – Closeout Submittals and Requirements | 202 |
| 01 78 40 – Maintenance Requirements | 208 |
| 01 79 00 – Demonstration and Training | 211 |

DIVISION 04 – MASONRY

04 20 00 Unit Masonry

DIVISION 05 – METALS

05 40 00 Cold-Formed Metal Framing
05 50 00 Metal Fabrications

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

06 10 00 Rough Carpentry
06 20 00 Finish Carpentry
06 40 00 Architectural Woodwork

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

07 21 00 Thermal Insulation

| | |
|--------------------------------------------------|---------------------------------------------------------------|
| 07 51 30 | Built-up Bituminous Roofing |
| 07 62 00 | Sheet Metal Flashing and Trim |
| 07 84 00 | Firestopping |
| 07 92 00 | Joint Sealants |
| DIVISION 08 – DOORS AND OPENINGS | |
| 08 11 00 | Metal Doors and Frames |
| 08 70 00 | Hardware |
| 08 71 13 | Automatic Door Operators |
| 08 80 00 | Glazing |
| DIVISION 09 – FINISHES | |
| 09 21 16 | Gypsum Board Assemblies |
| 09 30 00 | Tiling |
| 09 51 00 | Acoustical Ceilings |
| 09 65 00 | Resilient |
| 09 65 66 | Resilient Athletic Flooring |
| 09 66 00 | Terrazzo Flooring |
| 09 90 00 | Painting and Coating |
| DIVISION 10 – SPECIALTIES | |
| 10 10 00 | Information Specialties |
| 10 20 00 | Interior Specialties |
| DIVISION 12 – FURNISHINGS | |
| 12 24 12 | Roller Window Shades |
| DIVISION 14 –CONVEYING EQUIPMENT | |
| 14 26 00 | Limited-Use/Limited-Application Elevators |
| DIVISION 20 – COMMON REQUIREMENTS FOR MECHANICAL | |
| 20 00 01 | Mechanical Specification Index |
| 20 02 51 | Mechanical Contract General Requirements |
| 20 05 11 | Mechanical Work Requirements |
| 20 05 21 | Demolition and Renovation |
| 20 05 34 | Bases, Hangers and Supports (Indoor) |
| 20 05 35 | Bases, Hangers and Supports (Outdoor) |
| 20 05 49 | Vibration Control Measures |
| 20 05 53 | Identification of Mechanical Services |
| 20 06 11 | Testing, Adjusting, and Balancing (TAB) of Mechanical Systems |
| DIVISION 22 – PLUMBING | |
| 22 07 19 | Plumbing Piping Insulation |
| 22 11 16 | Domestic Water Piping – Copper |
| 22 11 31 | Potable Water Auxiliary Equipment |
| 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 |
| 22 13 23 | Sanitary Interceptors |
| 22 37 13 | Portable Fire Extinguishers |
| 22 44 13 | Plumbing Fixtures Combined with Drawing Schedule |

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

| | |
|-------------|--------------------------------------------------|
| 23 05 81 | Pipe Welding |
| 23 07 13 | Duct Insulation |
| 23 07 19 | HVAC Piping Insulation |
| 23 11 23 | Facility Natural-Gas & Propane Piping |
| 23 21 11 | Hydronic Accessories |
| 23 21 13 | Hydronic Piping – Screwed/Welded |
| 23 23 13 | Refrigerant Piping and Specialties |
| 23 31 13 | Metal Ducts |
| 23 33 13 | Duct Accessories |
| 23 33 13.13 | Volume-Control Dampers |
| 23 33 16 | Fire Dampers |
| 23 33 17 | Smoke Control Dampers |
| 23 33 18 | Operating Dampers |
| 23 33 46 | Flexible Ducts |
| 23 33 53 | Duct Liners |
| 23 34 23 | Packaged Exhausters |
| 23 37 13 | Diffusers, Registers, and Grilles |
| 23 37 23 | Louvres and Vents for Intake and Exhaust |
| 23 38 13 | Commercial-Kitchen Hoods |
| 23 72 19 | Fixed-Plate Air-to-Air Heat Recovery Ventilators |
| 23 74 45 | Packaged Rooftop Dual Fuel Heat Pump HVAC Units |
| 23 75 38 | Custom Outdoor Direct Fired Make-up Air Units |
| 23 82 23 | Hydronic Unit Ventilators |
| 23 82 29 | Radiators, Convectors, and Cabinet Heaters |

DIVISION 25 – INTEGRATED AUTOMATION

| | |
|----------|-------------------------|
| 25 40 11 | Building Control System |
|----------|-------------------------|

DIVISION 26 – ELECTRICAL

| | |
|----------|--------------------------------------------------------------------------------|
| 26 00 11 | Electrical Specification Index |
| 26 01 13 | Electrical Supplemental Tender Form |
| 26 01 15 | Allowances and Fees |
| 26 01 16 | Electrical Contract General Requirements |
| 26 01 17 | Demolition and Renovation |
| 26 01 20 | Commissioning and Integrated Testing of Life Safety and Fire Protection System |
| 26 05 19 | Wire and Cables |
| 26 05 20 | Splitters, Junction, and Pull Boxes |
| 26 05 21 | Outlet Boxes, Conduit Boxes and Fittings |
| 26 05 22 | Wire and Box Connectors – 0 – 1000 V |
| 26 05 33 | Conduits, Conduit Fastenings and Conduit Fittings |
| 26 05 73 | Short Circuit/Coordination Study |
| 26 05 75 | Auxiliary Systems |
| 26 24 16 | Panelboards |
| 26 24 17 | Moulded Case Circuit Breakers |
| 26 27 26 | Wiring Devices |
| 26 28 13 | Fuses – Low Voltage |
| 26 28 16 | Disconnect Switches |
| 26 29 13 | Starters and Contactors |
| 26 51 13 | Lighting Equipment |
| 26 51 16 | Digital Occupancy & Daylight Control Systems |

DIVISION 28 – ELECTRICAL SAFETY AND SECURITY
28 31 25 Fire Alarm System (Addressable)

00 01 00 Consultant/Professional Seals

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

1.1.1 Architect



1.1.2 Mechanical



1.1.3 Electrical



END OF SECTION

DIVISION 00 – BIDDING AND CONTRACT DOCUMENTS

00 21 13 Instructions to Bidders

1. Designated Contact

To contact the Board or ask questions in relation to this Procurement, bidders must initiate the communication electronically through the Bidding System. The Board will not accept any respondent's communications by any other means, except as specifically stated in the Procurement. Bidder's must not communicate in any manner with anyone other than the Designated Contact.

For the purposes of this procurement process, the Designated Contact will be:

Procurement Lead: Ardith Inapan
Title: Junior Buyer
Waterloo Region District School Board
Email: ardith_inapan@wrdsb.ca

2. Consultant

The Board has hired the following architect/consultant to assist in the preparation of this Tender: **WalterFedy**

The architect/consultant and any sub consultants are not to be contacted by any interested parties from the bid issue date to the bid award notification. The architect/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

3. 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 or employees, unless initiated by the Board's Designated Representative, noted above.

4. Communication and Question Protocol

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

The 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 Designated Representative, noted above in writing, shall not be relied upon.

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 Procurement Document.

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

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

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

5. Doing Business with 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.

The Waterloo Region District School Board’s Vendor Registration program is transitioning to a fully integrated online eProcurement tool for bid opportunities through the electronic bidding system: [bids&tenders](#).

Bid opportunities may be posted as Public or by Invitation only and are based on dollar thresholds outlined in WRDSB Administrative [Procedure 4570 Procurement](#).

The Board utilizes prequalified Roster Lists for specific categories/commodities awarded through a competitive process.

Competitive opportunities including Requests of Prequalification (RFPQ) are posted on the Electronic Bidding System, [bids&tenders/wrdsb](#).

6. Anticipated Project Schedule

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

| DESCRIPTION | DATE |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Issue Date of Tender | March 01, 2024 |
| Non-Mandatory Pre-Bid Site Examination | Date: Wednesday, March 6, 2024 Time: 2:30 PM Address: EDSS - 4 University Ave E, Elmira, ON N3B 1K2 Meeting Area: Main Entrance |
| Deadline for Questions | March 14, 2024 |
| Closing Date and Time | March 21, 2024, 2:00 pm local time |
| Anticipated Contract Start / Work begins | April 8, 2024 |
| Substantial Completion Date | August 30, 2024 |
| Ready for Takeover | September 03, 2024 |
| Deemed Complete Date | November 08, 2024 |

7. Pre-Bid Site Examination

Bidders are strongly encouraged to attend the non-mandatory pre-bid site examination and sign the attendance sheet. Date, time and location are provided above in the Anticipated Project Schedule. The Board may not provide another opportunity to visit the site. However, absence from this site meeting will not disqualify any Bidder.

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

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

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

8. Secondary Site Examinations

Bidder may request a secondary site examination visit through the Bidding System by clicking on the “Submit a Question” button found within the bid details page of that Procurement. Include the contact’s name and email of the person who will visit the site.

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

Bidders not in attendance of a Mandatory Pre-Bid Site Examination meeting will not be provided an opportunity to a secondary site examination visit.

Bidders must adhere to all communication protocols, as describe in Section 1.0, Sub Section 4. Communication Protocol.

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

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

9. Examination of Bid Documents and Work and Submitting Questions

- i. Bidders are required to fully acquaint themselves with the Procurement documents; fully inform themselves of all conditions, limitations and requirements involved in the Procurement; and obtain all information that may be necessary to complete those requirements before submitting a Bid.
- ii. Submission of a Bid shall be considered conclusive evidence that the Bidder has satisfied itself as to the requirements of this Procurement.
- iii. In the event a Bidder discovers any errors, discrepancies, inconsistencies, or omissions or requires clarification within this Procurement, they are to submit their observations and/or questions through bids&tenders by clicking on the “Submit a Question” button found within the bid detail of the specified Procurement by the Deadline for Questions specified in this paragraph.
- iv. Bidders are strongly encouraged to ask clear and concise question(s) or statements citing the relevant section of the Bid Solicitation Document. The Board cannot guarantee a response to questions received by the Board after the Deadline for Questions.
- v. The Board has endeavored 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.

- vi. Bidders are solely responsible for determining if they require additional information or if anything appears incorrect or incomplete. The onus is on the Bidder to contact the Designated Representative prior to the Deadline for Responses indicated in this document, if they have any questions or queries whatsoever or find omissions from or discrepancies in this 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.
- vii. Written responses or clarifications to issues of substance will be shared with all Bidders in the form of an Addendum.

10. Electronic Bid Submission Only / Electronic Bidding System

Competitive opportunities including Requests of Prequalification (RFPQ) are posted on the Electronic Bidding System, [bids&tenders/wrdsb](#).

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

- i. In order to submit a bid, bidders must be registered with [bids&tenders](#). The sole onus is on the bidder to have the most current correct information set-up in Bids and Tenders including but not limited to plan taker contact information, categories, and agency.
- ii. All Bids shall be submitted through [bids&tenders](#) only. The onus is on the Bidder to ensure all requirements of the Bid Solicitations are submitted.
- iii. If the bidder encounters technical issues, the onus is on the bidder to have this resolved prior to the closing date and time by contacting support@bidsandtenders.ca
- iv. Bidder shall have a "Vendor account" in the Bidding System and shall ensure the account is created with the Bidders full legal company name and be registered as a "plan taker" for this bid solicitation. Only the plan takers will have access to download bid documents, receive addenda email notifications, download addenda and to submit their bid electronically through the Bidding System.
- v. The onus is on the Bidder to ensure that the Bid is received 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.
- vi. Bidders shall allow sufficient time to upload their Bid submission including all requirements as stated in this Procurement and to resolve any issues that may

- arise as Bid transmission can be delayed in an “internet traffic jam” due to file transfer size, transmission speed, and other electronic considerations
- vii. All prices including provisional/supplementary pricing, if requested, shall be submitted in the Schedule of Prices forms available through the Bidding System.
 - viii. The Owner reserves the right to accept or reject any or all provisional bid prices submitted, and such prices shall remain in effect for the duration of the Contract. Failure to submit provisional prices where required may result in the Bid being declared non-compliant.
 - ix. Bids submitted by fax or paper copy, or any other format will not be accepted.
 - x. The Bidding System will not accept Bids after the Closing Time as determined by the Bidding System’s web clock.
 - xi. 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.
 - xii. Upon submitting a Bid, the Bidding System will send a confirmation email to the Bidder advising that the Bid was submitted successfully. If a Bidder does not receive a confirmation email despite submitting a Bid, the Bidder should contact technical support of the service provider hosting the Bidding System via email: support@bidsandtenders.ca
 - xiii. There will be no public opening for this Bid.
 - xiv. If a Bid is a joint submission of two (2) or more firms, a single Bid is to be coordinated and submitted by the lead Bidder with the required information. If two or more parties submitted a joint response to this Bid Solicitation, they shall decide between them who is to be the Bidder, without any involvement of the Board.
 - xv. Your online Bid submission shall be taken as your statement that you understand the requirements and agree to comply with the requirements as well as terms and conditions stated in this Bid Solicitation document, including Board’s Standard Terms and Conditions. Your Bid submission through the Bidding System confirms that you have checked and confirmed your pricing and by submitting the Bid online, you agree that you have not omitted any items from your Bid.
 - xvi. For construction projects with Bids above \$200,000 the Successful Bidder will be required to execute a “Canadian Standard Form of Construction Contract to a Stipulated Sum” (CCDC 2 - 2020 including amendments thereto as set out in this Procurement.

11. Bid Prices

- i. The amounts stipulated on the Schedule of Prices are intended to cover the cost of the complete Work as described in this Bid Solicitation Document.
- ii. All prices shall be in Canadian Funds, Free On Board (FOB) Destination, Freight Prepaid (Board locations).
- iii. HST is extra and shall not be included in Bid prices.
- iv. The person submitting the Bid on behalf of the Bidder must have authority to bind the Bidder.
- v. Quantities may be estimated, and therefore the Board, at its discretion, may purchase more or less of the commodity based on the unit price bid.
- vi. All information required on the forms shall be completed in full including references and subcontractors that it proposes to use for Work described. Changes made to the list of nominated subcontractors after the closing of the Bid, must have prior written approval of the Board's Single Point of Contact.
- vii. All price(s) submitted shall be a reasonable price for each particular item as determined by the Board and under no condition will an unbalanced Bid be considered. Submissions containing prices which appear to be so unbalanced as to likely affect the interests of the Board adversely will be clarified and may be rejected.
- viii. Unit prices and/or provisional/supplementary pricing, if any will set the foundation for any approved increases or decreases in Work. The unit prices must remain fixed and firm for the term of the Contract, unless otherwise specified in this Bid Solicitation document.
- ix. Provisional or Supplementary Pricing may or may not be required for completion of the Work called for under the Contract. The Board will decide necessity of these items and quantities thereon based on the unit prices(s) included in their Bid. If Provisional or Supplementary items are not purchased, or quantities are less than estimated, no adjustment or compensation will be awarded to the Bidder by the Board. Provisional or Supplementary pricing is not used for comparison of Bids for award purpose.

12. References – Not Applicable

Bidders must provide a minimum of three (3) references for work of comparable size and scope that has been successfully completed within the last five (5) years. One (1) reference must be from the WRDSB, if you've done previous work, otherwise one (1) reference must be of a government entity of similar size, scope, and complexity.

References must contain information about your clients including a complete organization name, contact person's names, title, telephone number and/or email address, details of the work provided, start and end dates of the work, and total cost of the work. Bidders cannot use references that pertain to another Vendor/Contractors' work.

The Board reserves the right to contact the clients noted to verify information provided

and assess overall client experience. Bidders should ensure that their references are prepared to provide a response if contacted by the Board. If the Board is unable to obtain a satisfactory reference, or if the reference does not respond to the reference call (after Board's best efforts), or if the reference chooses not to comment, the reference will be deemed unsatisfactory, and the Board may ask the Bidder for additional references. Unsatisfactory references may result in the Bidder's submission being rejected.

13. Addenda

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

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.

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

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

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

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

Addenda cannot be acknowledged after the Closing Date and Time.

14. Edit and Withdrawal of Bid Submission

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

- ii. Any edits to a bid submission will cause the submission to automatically be withdrawn. The bid submission must be re-submitted to be accepted.
- iii. The Bidder is solely responsible for ensuring that its re-submission is received prior to Closing Date and Time. The closing time shall be determined by the web clock within the Bidding System. After such time, requests to withdraw Bid will not be considered.

15. Irrevocable Period

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

16. Tie Bids

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

17. Bid Irregularities

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

- i. Bids that do not comply strictly with all terms and conditions of the Bid Solicitation Document.
- ii. Bids that are incomplete, conditional, qualified, or obscure.
- iii. Bids that are based upon an unreasonable period of time for completion of the Work.
- iv. Bids received from Bidders involved in Claims with either of the Board or banned or on probation with the Board.
- v. Bids received from any Bidder deemed to be unskilled or experienced in the work contemplated, or those who have defaulted on, or failed to satisfactorily complete other similar work in the past.
- vi. Bids submitted by Bidders that are not prequalified, where applicable.

18. Bid Review

- i. All Bids received on or before the Closing Time will be reviewed for compliance based on this Bid Solicitation document. Non-compliant Bids will be rejected. Bids not meeting any of the mandatory requirements included in this Bid Solicitation document will be disqualified. Bidders may be contacted to clarify their submissions.
- ii. Should there be any error in extensions, additions or computations, the Board shall be entitled to correct such errors based upon the unit prices supplied, and the corrected total shall be considered as representing the intention of the Bidder and shall be used as the basis for comparison of Bids.

- iii. It is the Bidder's responsibility to satisfy the Board that they can comply with the requirements contained within this Bid Solicitation document and that they possess 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 of the Board.
- iv. The Board also reserves the right to examine Bidder's facilities, equipment and visit the subcontractors or sub-consultants proposed and/or Bidder's existing and past clients. The award decision may be revised based on the above.
- v. The Board will not be responsible for travel costs 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.
- vi. The Board may, in its sole discretion, check references, conduct credit checks, review the litigation history and history of professional liability or other insurance claims, and obtain any other type of information that might aid the Board in its selection. The Board reserves 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 their Bid.

19. Post-Award Meeting

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

20. Intent to Award

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

- i. Subject to the reserved rights of the Board and availability of funds, the lowest compliant Bid will be recommended for award.
- ii. There shall be no obligation on the Board as a result of seeking Bids or conducting the procurement process and the Board reserves the right to pursue other

Bidders, cancel the Bid Solicitation, issue a revised request, or to pursue any other course of action which would aid in meeting their needs.

- iii. If Applicable, within **twenty-four (24) “workday” hours** of receiving a request or intent to award from the Board, the Bidder (the “Recommended Bidder”) shall provide a list of all Subcontractors/Subconsultants that it proposes to use for all Work described in this Procurement including the Company Name, Sub Trade Category and if applicable, related Divisions.
- iv. Within **seven (7) calendar days** of receiving a request or intent to award from the Board, the Bidder (the “Recommended Bidder”) shall provide the following mandatory requirements:
 - a. Insurance certificate with coverage specified in the Bid Solicitation Document.
 - b. WSIB clearance certificate valid on date of award or an exemption letter (if applicable and requested).
 - c. Non-Disclosure Agreement (NDA) duly signed by the authorized signatory (to be renewed annually). The Board will provide this form.
 - d. Bonding Requirements, if applicable, as specified in the Bid Solicitation Document.
 - e. An executed Board issued Form of Agreement, if applicable, and duly signed by the authorized signatory.
 - f. Any other submittal specified in the Bid Solicitation Document or in the intent to award, as a requirement of award.
 - g. For construction projects above \$200,000 the Successful Bidder will be required to execute a “Canadian Standard Form of Construction Contract to a Stipulated Sum” (CCDC 2 – 2020) including amendments thereto as set out in this Procurement.
- v. The documents listed below will be incorporated as deemed necessary by the Board, into the Contract with the Bidder. If there is a discrepancy between the wording of one document and the wording of any other document that appears on the list, the wording of the document that first appears on the list shall take precedence:
 - a. Board approved change order(s) or Contract / Agreement / CCDC 2 -2020 amendment(s)
 - b. Purchase Order(s), Contract(s) Agreement(s) / CCDC 2 -2020 executed with the Bidder including exhibits
 - c. Bid Solicitation document issued by the Board, including addenda, if applicable
 - d. Bid submitted by the Bidder

21. Post Award

Ministry of Labour Notice of Project confirmation notice to be uploaded in Bids and Tender prior to mobilization and/or prior to first project draw

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

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

22. Award Notification

For procurements valued at \$100,000 or more, and in accordance with the Broader Public Sector Procurement Directive, once the Board is satisfied that all requirements are met, the project award notification will be posted in the same manner as the procurement documents were posted. The notification will be posted after the purchase order and/or agreement between the successful bidder and the Board has been issued/executed. The award notification will list the name of the successful bidder, agreement start and end dates, and any extension options.

END OF SECTION

00 21 14 – General Contractors and Subcontractors

1.0 General Contractor Roster List

- 1.1 Only invited prequalified General Contractors, as a result of the award of a competitive prequalification process, #23-7430-RFPQ, may submit a bid for this opportunity. Invitations are based on awarded Project Size Categories. Roster approved GCs can only bid on the projects size categories based on the award.

2.0 Subcontractors/Subconsultants

- 2.1. Refer to specification sections for products, suppliers and installers that will be required.
- 2.2. The Subcontractor/Subconsultant list is not required at time of bid submission.
- 2.3. The Subcontractor/Subconsultant list is mandatory after the bid closing date from the Recommended Bidder **within twenty-four (24) hours** of receiving a request or intent to award from the Board.
- 2.4. The Bidder (the “Recommended Bidder”) shall provide a listing in a Board approved formatted list of Subcontractor/Subconsultant that it proposes to use for all Work described in this Procurement including the specification sections, as per the following:
 - 2.5.1 Bidders shall select experienced and qualified Subcontractor/Subconsultant or Suppliers in their field to perform or supply an item of Work indicated in this Procurement.
 - 2.5.2 The Bidder shall be fully aware of the capability of each Subcontractor/Subconsultant and/or Supplier included in its bid, including but not limited to technical ability, financial stability and ability to maintain the proposed construction schedule.
 - 2.5.3 The Owner reserves the right to reject any nominated Subcontractor/Subconsultant or supplier, based on the following but not limited to unsatisfactory past performance, suspended/removed from doing business with the Board and/or outstanding/unresolved corrective action notice issued by the Owner to the Subcontractor/Subconsultant within the last three (3) years.
 - 2.5.4 The Owner reserves the right to obtain information from the Bidder and from third parties respecting the qualifications and experience of the Bidder’s nominated list of Subcontractor/Subconsultant for such item of the Work.
 - 2.5.5 The Board reserves the right to examine Bidder’s facilities, equipment and visit the Subcontractor/Subconsultant’s proposed.
 - 2.5.6 The substitution of any Subcontractor/Subconsultant and/or Suppliers after the list is submitted will not be accepted unless a valid reason is given in writing to and approved by the Owner, whose approval may be arbitrarily withheld.
 - 2.5.7 Where a bidder lists “own forces” in place of a Subcontractor/Subconsultant, the bidder shall carry out such item of the Work with its own forces.

- 2.5.8 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.

END OF SECTION

00 21 15 – Scope of Work

Renovation to various spaces at Elmira District Secondary School. The scope of work includes the re-location of the special education classroom, installation of a LULA elevator to connect to the basement for future work, addition of a classroom space within the library, outfitting a section of the existing kitchen space to be converted into a team room, as well as splitting existing special education washroom into two individual washrooms – one barrier-free and one standard. Original special education classroom will be renovated as the new school's staff room.

END OF SECTION

00 31 34 – Subsurface Investigation Report – Not Applicable

1.0 General

1.1. Related Sections

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

1.2. SUBSURFACE INVESTIGATION REPORT

- .1 An investigation report with respect to the applicable building site and important immediate affected surroundings, is titled as follows:
 - .1 Title:
 - .2 Dated:
 - .3 Prepared By:
- .2 A copy of this detailed investigation report is included as an appendix to this section.
- .3 The subsurface investigation report records properties of the soils, subgrade conditions, and offers recommendations for the design of foundations.
- .4 The report as prepared primarily for the use of the Consultants.
- .5 The recommendations given shall not be construed as a requirement of this Contract unless also contained in the Contract Documents.
- .6 The report, by its nature, cannot reveal all conditions that exist or can or might occur on the subject site. Should subsurface conditions be found or be a concern thereto, or to vary substantially from the investigation report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Price accruing to the Owner.

END OF SECTION

Appendix 00 31 34A – Soil Report

Not Applicable

00 41 73 – Supplementary Bid Information

a) General Contractor

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

b) Identified Price Form - Not Applicable

Such work and amounts ARE included in the Bid Price.

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.

NOTE – Information below is for Reference purposes only. Bidders will complete all price bid forms electronically through bids&tenders. Do not complete or submit this sheet.

Reference/Information Only

| Description | Lump Sum |
|-------------|----------|
| | |

00 56 13 – Definitions Stipulated Price

1.1. Definitions Declaration

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

1.2. Supplementary Words and Terms to CCDC 2-2020

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

- .14 Instructions To Bidders: Instructions contained in the Bid Documents to convey an Owner's expectations and criteria associated with submitting a Bid.
- .15 Ready for Takeover: *Ready-for-Takeover* shall have been attained when the conditions set out in GC12.1, SC 55.1 , 12.1.1
- .16 Section: A portion of a Project Specification covering one or more segments of the total Work or requirements. Sections are included in a Project manual as required to meet Project requirements.
- .17 Standard: A document describing a grade or a level of quality, which has been established by a recognized agency or organization, utilizing an internal voting process.
- .18 Separate Price: A separate price for work to be added to the base price if selected by the Owner. This price type is not a part of the base bid price.
- .19 Stipulated Price: An amount set forth in a Stipulated Price Contract as the total payment for the performance of the Work. Sometimes referred to as a stipulated sum or a lump sum stipulated price.
- .20 Tender: Refer to definition of Bid.
- .21 Unit Price: The amount payable for a single unit of Work as stated in a Schedule of Prices.
- .22 Install: To remove from site storage, move or transport to intended location, install in position, connect to utilities, repair site caused damage, and make ready for use.
- .23 Supply: To acquire or purchase, ship or transport to the site, unload, remove packaging to permit inspection for damage, re-package, replace damaged items, and safely store on-site.
- .24 Provide: To Supply and Install
- .25 Wherever words 'approved', 'selected', 'satisfactory', 'directed', 'permitted', 'inspected', 'instructed', 'required', 'submit', 'ordered', 'reviewed', 'reported to', or similar words or phrases are used in Contract Documents, it shall be understood, unless context provides otherwise, that words 'by Consultant' or 'to Consultants' follow.
- .26 Words 'by others' when used in Specifications or on Drawings shall not mean by someone other than Contractor. Only means by which something shown or specified shall be indicated as not being in Contract is by initials 'NIC' or words 'not in Contract', 'by Owner', or 'by Other Contractor'.

END OF SECTION

00 72 13 – Standard Terms and Conditions

1. **Applicable Terms and Conditions**

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

2. **Bankruptcy**

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

3. **Basis of Award (Price factor)**

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

4. **Bonding Requirements**

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

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

i. **Bid Amount**

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

ii. **Bid Deposit Bond & Agreement to Bond**

Bid submissions must be accompanied by a bid deposit in the form of a digital Bid Bond in an electronically verifiable and enforceable (e-Bond) format in the amount of 10% of the total base bid (inclusive of HST) made payable to the Waterloo Region District School Board (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.

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

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

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

The bid deposit of the Bidder whose submission is accepted shall be forfeited by the Bidder should the Bidder fail to execute a Contract or provide the necessary documents as required within this Bid Solicitation document (including but not necessarily limited to: signed agreement, satisfactory security, insurance certificate, appropriate Workplace Safety and Insurance Board letter of clearance certificate) within the time stipulated as a written notice from the 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 seven (7) calendar days of written notification of the award of the contract.

iii. Performance and Labour & Materials Bonds

For bid amounts where bonding is required, inclusive of all taxes, the 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 Contract Price 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 and extends protection to Subcontractors, Suppliers, and any other persons supplying labour or materials to the Project. For more information, contact your surety company or visit the Surety Association of Canada website.

If the successful Bidder fails to provide a performance bond and/or labour and materials 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 bond 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 bond are the responsibility and cost of the Bidder.

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

5. Business Code of Conduct for Board Employees

The Board will not knowingly purchase goods and/or services from Vendor/Contractors who operate 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 Vendor/Contractor, including the cancellation of the contract.

The Board expects that all employees and Vendor/Contractors act within the parameters of the [Administrative Procedure 4360 Principles of Business Conduct for Board Employees](#)

6. Code of Conduct for Vendors/Contractors

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

- i. **Courtesy and Respect:** all vendor/contractors and their employees must conduct themselves in a manner that is lawful, courteous, businesslike, and respectful of all students, staff, faculty, guests, or visitors.
- ii. **Language and Behavior:** vendors/contractors and their employees cannot engage in behavior that is rude, threatening, or offensive. Use of profane or insulting language is prohibited. Harassment of any type, including sexual harassment is strictly prohibited. Abusive, derogatory, obscene or improper language, gestures, remarks, whistling, cat calls or other disrespectful behavior cannot be tolerated. Rough housing, fighting, fisticuffs, physical threats,

- destruction of property, vandalism, littering, or physical abuse of anyone on WRDSB property are not permitted under any circumstance.
- iii. **No Weapons, Alcohol, or Drugs:** The use, possession, distribution, or sale of any weapon, alcohol, illegal drug, or controlled dangerous substance by any contractor or contractor's employee is prohibited. Offenders will be removed from WRDSB property and/or reported to the local Police Department.
 - iv. **Smoking:** Contractors and their employees are not permitted to smoke on WRDSB property, in or near any buildings.
 - v. **Fraternization:** Vendor/Contractors and their employees may not fraternize or socialize with WRDSB students or employees.
 - vi. **Appearance:** Vendor/Contractors and their employees are required to wear appropriate work wear, hard hats and safety footwear, as the case may be, while on WRDSB property. Articles of clothing must be neat and tidy in appearance, and cannot display offensive or inappropriate language, symbols or graphics. WRDSB has the right to decide if such clothing is inappropriate.
 - vii. **Reporting:** The Vendor/Contractor is required to report any matter involving a violation of these rules of conduct, any matter involving health or safety, including any altercations, to WRDSB Facilities staff.

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

7. **Compliance with Laws, Acts and Regulations**

Vendor/Contractors shall abide by all applicable provincial and federal laws, as well as Board Policies. Some of the applicable laws are highlighted below for information purposes only. In case of any discrepancy between this Bid Solicitation Document and the provision of applicable laws, the latter shall prevail. This list is not intended to be a comprehensive summary of relevant laws or be a complete list of applicable regulations or interpretation of the provisions of any laws

- i. Broader Public Sector Accountability Act, 2010
- ii. Construction Act
- iii. Architect Act
- iv. Canada Revenue Agency (CRA) regulations
- v. Accessibility for Ontarians with Disabilities Act (AODA)
- vi. Workplace Safety and Insurance Act (WSIB)
- vii. Occupational Health and Safety Act
- viii. Trade Agreements (CETA/CFTA)

- ix. Education Act
- x. [Fighting Against Forced Labour and Child Labour in Supply Chains Act](#)
- xi. [WRDBS Procurement Services Policies website](#)
- xii. [WRDSB Policies and Procedures](#)

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

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

The successful Bidder(s) will be required to comply with all applicable federal, provincial laws as well as Board policies in performing its obligations under the Contract including, without limitation, the Occupational Health and Safety Act, as amended, and the Workplace Safety and Insurance Act, 1997, as amended, and Accessibility for Ontarians With Disabilities Act, 2005, S.O. 2005, c.11, Accessibility Standards for Customer Services O. Reg. 429/07 requirements, under the Accessibility for Ontarians With Disabilities Act, 2005, as amended, or any successor legislation applicable, and to provide to the Board, upon request, periodic reports and evidences confirming such compliance.

By supplying the goods or equipment and/or providing services, the Vendor warrants that the goods or equipment supplied, and services provided to the Board conforms in all respects to the standards and codes set forth by federal and provincial agencies. Failure to comply with this condition will be considered a breach of this Contract.

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

8. Confidential Information and Municipal Freedom of Information and Protection of Privacy Act

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

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

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

9. Confirmation to Proceed

No work shall commence until the Board has issued a purchase order and/or contract, if applicable 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 and/or the CCDC 2 - 2020 if applicable, are 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.

10. Conflict of Interest

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

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

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

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

It is of the essence of the Contract that the Owner shall not have direct or indirect liability to any Subcontractor or Supplier, and that the Owner relies on the maintenance of an arm's-length relationship between the Vendor/Contractor and its Subcontractors and Suppliers. Consistent with this fundamental term of the Contract, the Vendor/Contractor will not enter into any agreement or understanding with any Subcontractor or Supplier, whether as part of any contract or any written or oral collateral agreement, pursuant to which the parties thereto agree to cooperate in the presentation of a claim for payment against the Owner, directly or through the Vendor/Contractor, where such claim is, in whole or in part, in respect of a disputed claim by the Subcontractor or Supplier against the Vendor/Contractor, where the payment to the Subcontractor or Supplier by the Vendor/Contractor is agreed to be conditional or contingent on the ability to recover those amounts or a portion thereof from the Owner, failing which the Vendor/Contractor shall be saved harmless from all or a portion of those claims. The Vendor/Contractor acknowledges that any such agreement would undermine the required arm's-length relationship and constitute a conflict of interest. For greater certainty, the Vendor/Contractor shall only be entitled to advance claims against the Owner for amounts pertaining to Subcontractor or Supplier claims where the Vendor/Contractor has actually paid or unconditionally acknowledged liability for those claims or where those claims are the subject of litigation or binding arbitration between the Subcontractor or Supplier and the Vendor/Contractor has been found liable for those claims.

A breach by the Vendor/Contractor, any of the Subcontractors, Suppliers or any of their respective advisors, partners, directors, officers, employees, agents, and volunteers shall entitle the Owner to terminate the Contract, in addition to any other rights and remedies that the Owner has in the Contract, in law, or in equity.”

11. Construction Act Guidelines

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

12. Criminal Background Checks and Collection of Personal Information

The Board must comply with Ontario Regulation 521/01 (Collection of Personal Information) of the Education Act with respect to criminal background checks and offence declarations.

If required by the Board, the Vendor/Contractor will provide to the Board, or designate, a Criminal Background check for pertinent individuals 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.

An Offence Declaration on a Board-approved form for every employee of the Vendor/Contractor who may come in 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 may be required. Updated Offence Declarations may be required annually. The Board will determine in its sole discretion whether this is a requirement.

Termination of contracts may be the result of non-compliance to this requirement.

13. Damage Responsibility of Contractor/Vendor

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

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

Notwithstanding the indemnity provisions contained in this section, where in the opinion of the Board Representative the Vendor/Contractor has failed to rectify any damage, injury or infringement or has failed to adequately compensate any person for any damage, injury or infringement for which the Vendor/Contractor is responsible under the Contract, the Board, following notice in writing to the Vendor/Contractor of his intention so to do, may withhold payment of any monies due to the Vendor/Contractor under this or any other Contract until the Vendor/Contractor has rectified such damage, injury or infringement or has paid adequate compensation for such damage, injury or infringement.

14. Damage Reporting

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

It is understood that all damage caused by workers engaged in the work under these specifications will be repaired by the Vendor/Contractor and at the Vendor/Contractor's

sole expense. Damaged turf areas will be levelled and seeded, all horticultural planting damaged beyond repair will be replaced and any damage to structures, utilities, signs, light fixtures, landscape furniture, irrigation systems etc. will be repaired or replaced. Repair work will be carried out by skilled workers acceptable to the Board representative. All repairs and replacements will be approved by a Board representative prior to final payment.

15. Debriefing Requests

For procurements valued at \$100,000 or more, and in accordance with the Broader Public Sector Procurement Directive, unsuccessful Bidders are entitled to a debriefing to receive feedback with respect to their Bid submission. To obtain a debriefing, Bidders shall contact the Single Point of Contact listed in this Bid Solicitation Document in writing with their request within sixty (60) calendar days of the award notification.

16. Default

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

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

17. Delay Claims

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

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

18. Designated Substances

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

are present, produced, processed, used, handled or stored and at which a worker is likely to be exposed to the designated substance.

I. Asbestos

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

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

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

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

II. Lead

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

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

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

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

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

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

III. Mercury

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

IV. Silica

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

All work involving the demolition silica-containing materials shall follow the procedures outlined in the MOL "Silica on Construction Projects" guideline. Type 1

operations may be necessary based on the type of work conducted and the Vendor/Contractor shall implement dust suppression methods and protect workers.

V. Other Designated Substance

In addition to asbestos and/or lead, silica, and mercury are present in all WRDSB facilities. New construction, renovation or alterations require compliance by the Vendor/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. responsible for obtaining its own independent financial, legal, accounting, and technical advice with respect to any information included in the Bid Solicitation Document or in any data, materials, or documents provided or required by the Board.

19. Dispute Resolution

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

20. Electrical Safety Requirements

All electrical equipment and components must bear a C.S.A. or Electrical Safety Association (E.S.A.) label.

21. Emergency and Maintenance

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

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

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

22. Equivalent or Brand Name

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

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

Bidders shall request through the Bidding System by clicking on the "Submit a Question" button found within the bid details page of that Procurement that a proposed product be considered an approved equivalent prior to the Deadline for Questions in the Anticipated Project Schedule.

The request must include enough detail to determine equivalency by comparing the Board's specifications to the alternate product. It will not be the Board's responsibility to perform this comparison.

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

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

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

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

23. Evidence of Quality

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

24. Force Majeure

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

Any cause, unknown at the effective date of the Contract and beyond either party’s control, other than financial difficulties, bankruptcy or insolvency, which prevents the performance by a party, or both, of any of their respective obligations under the Contract and the event of Force Majeure did not arise from a party’s default and could not be avoided or mitigated by the exercise of reasonable effort or foresight. Force Majeure includes Labour Disputes; fire; unusual delay by common carriers or unavoidable casualties; delays in obtaining third-party licenses, permits, agreements, or approvals (excluding approvals of any Subcontractors or Suppliers of any tier); civil disturbance; emergency acts, orders, legislation, regulations or directives or revoking of funding from any government or other public authority; acts of a public enemy; war; riot; sabotage; blockage; embargo; lightning; earthquake; adverse weather conditions but only if substantially beyond the weather norms of the Place of the Work; acts of God; or declared epidemic or pandemic outbreak or other public health emergency (e.g. SARS, COVID-19)

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

25. Hot Work Procedure

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

- i. Whenever possible, complete Hot Work in a welding shop or out of doors at the school.
- ii. Flammable liquids, dust lint and oily deposits to be removed from within 50-ft (15m) of Work. Remove other combustibles where possible. Otherwise protect with fire-resistive tarpaulins or metal shields.
- iii. Explosive atmosphere in area eliminated. Floors swept clean. Combustible floors wet down, covered with damp sand or fire-resistive tarpaulins.
- iv. All wall and floor openings covered. Fire-resistive tarpaulins suspended beneath Work.
- v. For on-site Work (indoor and out of doors), advise the Head Custodian, Principal, Consultant (if assigned) and Project Coordinator/Lead prior to Work being performed, and of related dangers.
- vi. Where the Fire Alarm system is required to be set to stand-by to discourage false alarms from smoke detectors provide a firewatch throughout the building or structure being worked on. NEVER put the fire alarm system in stand-by mode when the building is occupied by staff or students.
- vii. In the event of a fire 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.
- viii. Barriers must be set up to protect staff and students (i.e. pylons, shields, and caution tape) from exposure to arc flash and smoke migration.
- ix. Have all necessary doors, windows and/or drapes closed. Confer with the Head Custodian to shut down all fan systems in the area to reduce or eliminate smoke distribution.
- x. Provide and keep fire extinguishers handy and in good Working condition. Temporarily cover all smoke detectors in the area during time of Work.
- xi. Provide a fire watch/spot check for several hours after Work is completed. Uncover smoke detectors.
- xii. On new construction, the requirements of the Hot Wok permit may be waived, until such time as either Substantial Completion or Occupancy is granted, whichever comes first.
- xiii. On additions to existing buildings, the requirements for Hot Work permits shall remain in place.

25.1 Hot Work Permit

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

- ii. The contractor must obtain Hot Work Permits from the School Board's representative prior to the start of work.
- iii. The contractor must complete the form as required and must keep the form on site.
- iv. Return each completed form to the School Board's representative on the date of expiration.
- v. The most current version of the Permit and its requirements shall be used for the purposes of the Work.

26. Incurred Costs

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

27. Indemnification

The Bidder will indemnify and save harmless and defend the Board, and their respective elected officials, officers, employees, agents and their respective successors and assigns, from and against all actions claims and demands whatsoever which may be brought against or made upon any of the Indemnified Parties and against all losses, liability, judgments, claims, costs, demands or expenses which the Indemnified Parties may sustain, suffer, or be put to resulting from or arising out of the Bidder's failure to exercise reasonable care, skill or diligence in the performance or rendering of any Work or service required hereunder to be performed or rendered by the Bidder, its agents, servants, employees or subcontractors, or any of them as well as for the infringement of or use of any intellectual property rights including any copyright or patent arising out of the reproduction or use in any manner of any plans, designs, drawings, specifications, information, negatives, data, material, sketches, notes, documents, memoranda, or computer software furnished by the Bidder in the performance of this Contract.

28. Insurance Provisions

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

- i. **General Liability Insurance:** The Vendor/Contractor shall maintain liability insurance acceptable to the Board throughout the term of this Agreement from the date of commencement of work until one (1) year from the date of substantial performance of work. Liability coverage shall be provided for completed operations hazards from the date of substantial performance of the work, as set out in the certificate of

substantial performance of work, on an ongoing basis for a period of 6 years following substantial performance of work. Coverage shall consist of a comprehensive policy of public liability and property damage insurance, with all applicable coverage extensions/ endorsements, in an amount of not less than \$10,000,000 per occurrence. Such insurance shall name the **Waterloo Region District School Board** and any other person or party identified in the contract documents, as an **additional insured** with a cross liability endorsement and severability of interests' provision. The policy SIR/deductible shall not exceed \$100,000 per claim and if the policy has an aggregate limit, the amount of the aggregate shall be double the required per occurrence limit. A combination of primary coverage plus umbrella or excess liability insurance may be used.

- ii. **Owned and Non-Owned Automobile Liability Insurance:** The Vendor/Contractor shall maintain liability insurance on all Owned, Non-Owned and Leased Automobiles used in the performance of this work to a limit of \$2,000,000 per occurrence throughout the term of this Agreement from the date of commencement of work and until one (1) year after the date of substantial performance of work.
- iii. **Broad Form Contractor's Equipment Insurance:** The General Contractor shall provide and maintain during the term of the Agreement, coverage for construction machinery and equipment used by the Contractor for the performance of the work. Such insurance shall be in a form acceptable to the Board and shall not allow subrogation claims by the Insurer against the Board.
- iv. **If applicable**, the General Contractor shall provide and maintain during the term of the Agreement an **All Risk Installation Floater Insurance** policy covering the installation of any machinery and equipment associated with the construction project. Coverage shall be in an amount equal to the value of the machinery and/or equipment and shall include coverage while it is in transit to, while stored at a temporary location, and awaiting installation at the work site.
- v. **If applicable**, the General Contractor shall **ensure** its professional consultants, architects, landscape architects, planners, and engineers providing a professional service in connection with the contract, maintain until three (3) years after the Agreement, **Professional Liability Insurance** to a limit not less than \$1,000,000 per claim providing coverage for acts, errors and omissions arising from their professional services performed under this Agreement. The policy SIR/deductible shall not exceed \$100,000 per claim and if the policy has an aggregate limit, the amount of the aggregate shall be double the required per claim limit. Certificates evidencing such coverage shall be supplied to the Board prior to the completion of the project and in accordance with the provisions stated above.

- vi. **If applicable, (i.e., for projects with environmental liability concerns)** the General Contractor shall take out and keep in force **Contractor's Pollution Liability (CPL)** coverage to ensure that its work does not exacerbate any pre-existing environmental condition during construction. Coverage shall be in an amount of not less than \$2,000,000 per claim or per occurrence, or such greater amount as the Board may from time to time require, naming the Board as an additional insured, whose coverage shall be maintained in force for 1 year following the termination of the Contract. The policy SIR/deductible shall not exceed \$100,000 per claim and if the policy has an aggregate limit, the amount of the aggregate shall be double the required per occurrence limit.

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

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

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

viii. **Third Party Claims Process:**

- a. The Board's claims process for Third Party claims is to refer the claimant directly to the Vendor/Contractor and to leave the resolution of the claim with the Vendor/Contractor. This applies regardless of whether or not it is an insured loss.

- b. As the Board has a responsibility to the taxpayers, we must ensure that claimants are dealt with in a fair and efficient manner. Claims reported to the Vendor/Contractor, either directly by a third party or through the Board shall be promptly investigated by the Vendor/Contractor. The Vendor/Contractor shall contact the third party claimant within 48 hours of receipt of notice of a claim. The Vendor/Contractor shall initiate an

investigation of the claim immediately upon notice, and advise the third party claimant in writing, with a copy to the Board, of its position regarding the claim within 21 calendar days of the notice. The Vendor/Contractor shall include in its response the reasons for its position.

- c. Should this position not resolve the claim and be accepted by the third party claimant, the Vendor/Contractor shall immediately report the claim to its Insurer for further review. (Insurer for this purpose is defined as either the Claims Department of the Vendor/Contractor's Insurance Company or the Claims Administrator at the Vendor/Contractor's Insurance Broker.) The Vendor/Contractor's Insurer upon receipt of this claim shall advise the third party claimant by letter, with a copy to the Board, that it is now investigating the claim. When a final position on the claim has been determined, the Vendor/Contractor's Insurer shall advise the third party claimant by letter, with a copy to the Board. Failure to follow this procedure shall permit the Board to investigate and resolve any such claims.
- d. Nothing herein shall limit the right of the Board to investigate and resolve any such claims notwithstanding the response of the Vendor/Contractor and/or its Insurer and to seek indemnification from the Vendor/Contractor or to exercise any other rights under the Contract.
- e. The Board may, without breaching this contract, retain from the funds owing to the Vendor/Contractor an amount that, as between the Board and the Vendor/Contractor, is equal to the balance in the Board's favour of all outstanding debts, claims or damages, whether or not related to this contract.

29. Invoice Requirements, Proper Invoice and Payment Terms

Except for Credit Card payments, all invoices shall be sent to finance-ap@wrdsb.ca for payment at the completion of the Work or after receipt of goods, unless otherwise stated.

- 29.1** In advance of invoicing, upon request, contracted Vendors will provide:
 - i. necessary company information to set up a WRDSB account and
 - ii. banking information if they wish to receive payment by Electronic Funds Transfer (EFT).
- 29.2** Requests to change company information, such as a name change due to a merger or acquisition, must be submitted in writing accompanied with a legal document/letter signed by a lawyer on the law firm's letterhead.
- 29.3** Invoices, not subject to the Construction Act, must contain the following information, where applicable, in order to be deemed complete:
 - i. Purchase Order Number
 - ii. Work Order Number
 - iii. Invoice Date

- iv. Unique Invoice Number
- v. Vendor name and address
- vi. Contract reference (RFT #, RFQ# etc.)
- vii. A description, including quantity where appropriate, month of service for ongoing contracts, and location of work
- viii. The amount payable for the services or materials that were supplied, including
 - unit price (where applicable)
- ix. HST amount shown as a separate line item
- x. Payment Terms
- xi. Board Project Lead/ Contact and
- xii. Confirmation of completion of order and all Work as described in this Bid Solicitation Document.

29.4 Construction Act – Proper Invoice

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

- i. the Vendor/Contractor's name, address, telephone number and mailing address.
- ii. the date of the Proper Invoice and the period during which the services or materials for which payment is being applied for were supplied.
- iii. information identifying the authority, whether in the contract or otherwise, under which the services or materials were supplied.
- iv. a description, including quantity where appropriate, of the services or materials that were supplied during the payment period.
- v. the amount payable for the services or materials that were supplied during the payment period, with a clear identification of the portions of the amount that are holdbacks, and HST.
- vi. the name, title, telephone number and mailing address of the person to whom payment is to be sent.
- vii. the payment terms as specified by the Board in the Contract.
- viii. the invoice number and if applicable, the revision number.
- ix. the Vendor/Contractor's HST number.
- x. invoices and time sheets from all subtrades whose work is included in the Proper Invoice, if required in the Contract.
- xi. backup documentation to support any cash allowances and extra work claimed in the Proper Invoice.
- xii. a schedule of values indicating:

- a. for lump sum contracts, the percentage of work completed per division with each division further subdivided to show the percentage of work completed for each subtrade,
 - b. for unit price contracts, the tender quantity, unit of measure, previous quantity, current quantity, to-date quantity,
 - c. an updated list of change orders, showing the percentage of work completed under each change order, and
 - d. an updated cash allowance list, showing the percentage of work completed in respect of each cash allowance, if required by the Contract.
- xiii. a Statutory Declaration where required by the Contract attesting to the truth of the statements made therein.

29.5 Payment Terms

The payment terms shall be net twenty-eight days (28) days after receipt of proper invoice where the Construction Act is applicable, unless otherwise agreed by the Board in writing. All other payment terms will reflect Net 30. An early payment discount, if offered, may be considered on a mutual agreement basis. Payment may be delayed if the invoice is incorrect or the goods, equipment and/or services are not acceptable to the Board. The Board will not pay any interest, penalty, or late fee for delayed payments. The Board preferred payment method is Credit Card or EFT, however alternate payment methods may be approved. Vendors are required to invoice promptly, without delay.

30. Licenses and Permits

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

31. Locates, if applicable

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

The successful Bidder will obtain all utility locates in advance of work and all cost(s) associated with obtaining the utility locates will be the Vendor/Contractor's responsibility.

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

32. Materials - Specifications

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

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

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

34. Mathematical Errors (Unit Prices Prevail)

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

35. No Branding

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

36. No Collusion

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

37. No Lobbying

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

- i. any elected or appointed officer.
- ii. any staff of the Board except the Single Point of Contact as identified in the Bid Solicitation Document; or
- iii. any other person connected in any way with the procurement.

38. No Smoking and Scent-Free Environment

The Province of Ontario has legislated under the Smoke Free Ontario Act that smoking is not permitted on any 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.

39. Non-Assignment

No assignment by the Vendor/Contractor shall relieve the Vendor/Contractor of any responsibility for the full performance of all its' obligations under this contract.

The Vendor/Contractor shall not change its corporate name without the prior written approval of the Board.

40. Non-Disclosure Agreement (NDA)

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

41. Ownership of Work

For the purposes of this paragraph:

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

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

“ **Personnel** ” means employees, representatives, agents and subcontractors.

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

- i. Except as set out in paragraph (b) below, the Bidder hereby assigns and agrees to assign to the Board all right, title and interest, including all Intellectual Property Rights, in and to each Deliverable from the moment of creation, and will cause its Personnel to assign the same. The Bidder will cause its Personnel to waive all moral rights they may have in each Deliverable.
- ii. To the extent that a Deliverable contains or utilizes the intellectual property of the Bidder or a third party (“Retained Materials”), and the Bidder expressly identifies such Retained Materials, the Bidder and the applicable third party will, subject to the following sentence, retain all their respective right, title and interest, including all Intellectual Property Rights, which each may have in such Retained Materials. To the extent that a Deliverable contains or utilizes Retained Materials, the Bidder hereby grants to each of the Board a royalty-free, irrevocable, perpetual, world-wide, non-exclusive license to make, use, sell, modify, prepare derivative works, disclose, publish, sublicense, copy and communicate by electronic means such Retained Materials.
- iii. The Vendor/Contractor agrees to always cooperate fully, and will cause its

Personnel to cooperate fully at all times, with respect to signing such documents and doing such acts and other things reasonably requested by the Board to confirm the transfer of ownership rights in the Deliverables.

42. Patent, Copyright and Other Proprietary Rights

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

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

43. Performance

- i. Where the Vendor/Contractor is in default in carrying out any of its obligations under the contract, the Board may issue a verbal warning outlining the deficiency in supply or other aspects of performance and requiring the Vendor/Contractor to correct those deficiencies within such period of time as stated.
- ii. If the deficiency is not corrected within the time specified, or there is a further instance of deficient performance, the Board may issue a written notice to the Vendor/Contractor, identifying the deficiency in performance and setting a final date or time period for its correction.
- iii. If corrective steps are not taken by the final date or within that time, the Board may terminate the Contract and take corrective action.
- iv. Termination of any Contract can be immediate depending on the severity of the default.
- v. The Vendor/Contractor shall have no right to perform the services contemplated under this agreement beyond the time when such services become unsatisfactory to the Board; and in the event that Vendor/Contractor shall be discharged before all the services contemplated hereunder have been completed, or the services are for any reason terminated, stopped or discontinued because of the inability of the Vendor/Contractor to serve under this agreement they shall be paid only for that portion of the Work which shall have been satisfactorily completed at the time of termination.
- vi. Where deemed appropriate, a performance evaluation shall be completed by the Board. The evaluation report shall be reviewed with Procurement Services, and a copy of the completed evaluation forwarded to the Vendor for their records. Dependent on the evaluation scoring, the Board may request a corrective action plan

and/or project size/value may be affected on future bid opportunities for your company.

44. Permits and Licenses

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

45. Proceedings Against the Board

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

46. Protection of Board Assets

The successful Bidder (the contractor / subcontractor) shall be informed of and protect all Board assets including existing structures and vehicles, to the satisfaction of the Board. Any damage shall be reported to the Board and subsequently repaired and/or replaced by the Vendor/Contractor, at their expense, to the satisfaction of the Board. The Vendor/Contractor shall not cause any inconvenience to Board operations, staff, public or users of the Board facilities, within reason. Communication between the successful Vendor/Contractor and the school (or Board representative if school contact is not available) must be timely and effective to ensure all stakeholders are considered / aware of work to be completed.

47. Public Health Safety Protocol

Best practices include but not limited to wearing a medical grade mask and maintaining physical distancing (2m/6.5ft).

Recommended practices are subject to change at any time For information and updates, refer to the following resources and website: [Waterloo Region District School Board](#) and [Regional of Waterloo Public Health Services](#)

48. Records, Inspection, Audits

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

49. Reserved Rights of the Board

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

- i. Reject any Bid received from a Bidder which is party to any potential, current, past or existing suits, actions, and litigation proceedings, arbitrations, alternative dispute resolutions, investigations, Bidder performance evaluations that are below expectations, or claims by or against or otherwise involving either of the Board and the Bidder.
- ii. waive formalities and accept Bids which substantially comply with the requirements of this tender.
- iii. accept any Bid in whole or in part.
- iv. accept, reject, or cancel any or all Supplementary pricing.
- v. discuss with any Bidders different or additional terms to those contemplated in this Bid Solicitation Document or in any Bid submission.
- vi. make public the names of any or all Bidders.
- vii. accept or reject equivalent or alternative brand names.
- viii. check references other than those provided by any Bidder.
- ix. reject any, or any part of, any or all Bids, or cancel the bidding process at any stage and/or issue a new Bid call for the same or similar deliverables.
- x. disqualify any Bidder:
 - a. whose Bid contains misrepresentations or any other, inaccurate, or misleading information, or any qualifications within its Bid,
 - b. who has engaged in conduct prohibited by the Bid Solicitation Document,
 - c. with inadequate credentials or due to unsatisfactory past performance,
- xi. reject Bid(s) from Bidder who has engaged in lobbying or has contravened any of the terms of the Bid Solicitation Document.
- xii. reject a Bid based on:
 - a. information provided by references or credit check or other due diligence efforts,
 - b. the information provided by a Bidder pursuant to the Board exercising its clarification rights under the procurement process, or
 - c. other relevant information that arises during the procurement process.
- xiii. choose to reject a Bid if only a single Bid is received and cancel the bidding process or enter into direct negotiations with the sole Bidder.
- xiv. accept a Bid other than the lowest or highest scoring and/or to not accept any Bid for any reason whatsoever.
- xv. award the contract as split-order, lump sum or individual-item basis, or such combination as shall best serve the interests of the Board
- xvi. negotiate in circumstances permitted for in the Bid document or by relevant policies, or directives, and include additional terms and conditions during the process of negotiations.
- xvii. no longer consider a Bidder if a satisfactory outcome is not reached as part of

- negotiation, as determined by the Board in their sole discretion and move to the next highest ranked Bid in such event.
- xviii. select a Bidder other than the Bidder whose Bid reflects the lowest cost to the Board and/or award the Contract to any Bidder.
 - xix. award any business/Work described in this Bid Solicitation to more than one (1) Bidder.
 - xx. not award the Contract if the costs of completing the Work exceed budget funding; or
 - xxi. do not respond to all requirements or do not represent fair market value or where necessary internal approvals are not obtained.

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

50. Responsibilities of the Vendor

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

The Vendor shall:

- i. perform the Contract in accordance with the specifications, terms and conditions under which it is awarded.
- ii. act in a professional manner at all times when dealing with Board staff, with the public, and while working on site.
- iii. not, except with the consent of the Board in writing, release information relating to any subsequent order for advertising, promotional or technical purposes or otherwise give it publicly in any fashion, nor shall the name of either of the Board be used for, or in connection with, any advertising or promotional purpose of the Vendor.
- iv. treat information gained while working with the Board confidentially and not use it for any other project and return it to the Board if requested.
- v. submit to Finance – Accounts Payable, an invoice for payment at the completion of the Work, unless otherwise stated. All applicable taxes including HST are to be itemized separately on invoices. Include the purchase order number on each invoice; and
- vi. provide necessary information if they wish to receive payment by Electronic Funds Transfer (EFT).

51. Site and Work Examination

- i. Bidders will accept the site conditions, and the requirements of the Work, as is. No modifications to the Bid will be accepted after the Closing Time.
- ii. No claim for extras will be allowed for Work or difficulties encountered due to conditions of the site which were visible, knowable, or reasonably inferable, prior to the time of submission of Bid. Bidders shall accept sole responsibility for any error or neglect on their part in this regard.
- iii. Before submitting a Bid, each Bidder shall:
 - a. carefully examine this entire Bid Solicitation Document to determine the extent of the Work, and various provisions including the maps, drawings, reports and specifications.
 - b. immediately report all discrepancies between the various documents and site conditions.
 - c. provide subcontractors, sub-consultants, and suppliers to whom the Bidder intends to sublet a portion or portions of the Work with complete information as to the requirements of the Work. This is to include maps, drawings, reports, specifications, and all requirements of the Bid Solicitation Document including any addenda.
- iv. In the event of discrepancies between the maps, drawings, reports, and the specifications with regard to quantity or quantities of materials or items, and in the absence of Addenda in clarification of said discrepancies, the Bidder is to include for the larger quantity or quantities.
- v. No additional payments will be made for any costs incurred through failure of the Bidder to abide by provisions stipulated in all of the articles and sub-articles of this item.
- vi. Any soils investigation, environmental, geotechnical or other reports prepared or obtained with respect to the Place of the Work (collectively the "Reports") are available from the Consultant. Where the Work involves existing buildings, structures, facilities, plant or equipment, any reports, data or as-built drawings concerning such buildings, structures, facilities, plant or equipment (collectively the "Data") are available from the Consultant. The Reports should not be considered a representation of the site conditions of the entire Place of the Work, and the Reports and Data are provided for general information and guidance purposes only. Neither the Owner nor the Consultant guarantees the accuracy or completeness of the Reports or the Data, nor does either assume any responsibility for any interpretations or conclusions that bidders may make or draw from the Reports or the Data.
- vii. Each Bidder is solely responsible, at its own cost and expense, to 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. The

Bidders' obligations set out in this paragraph apply irrespective of any Reports, Data or any information contained in the Bid Documents.

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

52. Site Existing Services, if applicable

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

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

53. Site Inspection and Control

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

54. Site Investigation

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

The Bidder assumes all risk of conditions, existing or arising, in the course of the work, which might or could make the work or any items therefore more expensive in character, or more onerous to fulfill, than was contemplated or known when the Bid was made, or the Contract signed.

55. Site Safety and Clean Up

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

Repair work will be carried out by skilled workers acceptable to the Board Representative, under the liability of the Vendor/Contractor.

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

56. Site Traffic/Pedestrian Safety

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

57. Site Use and Traffic Control

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

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

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

Should the Vendor/Contractor be unable to carry out the required remedial measures, the Board may carry out the necessary maintenance and the costs for the work shall be deducted from payments due to the Vendor/Contractor.

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

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

58. Suspension of Bidders

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

59. 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.

60. Termination

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

- i. The Board may terminate the contract without further notice, and exercise its rights to the Contract security provided by the Vendor/Contractor.
- ii. The Board may withhold any payment due to the Vendor/Contractor hereunder until the Vendor/Contractor has remedied its failure.
- iii. The Board may engage the services of another Bidder to remedy the Vendor/Contractor's failure, and obtain reimbursement therefore from the Vendor/Contractor. The said reimbursement may be obtained either through deduction from any amounts owing to the Vendor/Contractor hereunder, or through any other legal means available to the Board; or
- iv. The Board may assert any other remedy available to it in law or equity.

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

61. Termination for Convenience

The Board may terminate the Contract, in whole or in part, whenever the Board determine that such termination is in the best interests of the Board without showing cause, upon providing written notice to the Vendor/Contractor. The Board shall pay all reasonable costs incurred by the Vendor/Contract up to the date of termination considering the Work performed and/or services were provided in accordance with the Contract and to the complete satisfaction of the Board. Payment shall be in accordance with prices as per Contract. However, in no event shall the Vendor/Contractor be paid an

amount, which exceeds the Total Bid Price. The Vendor/Contractor will not be reimbursed for any profits which may have been anticipated but which have not been earned up to the date of termination.

62. Termination for Lack of Funding

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 Vendor/Contractor receives thirty (30) days written notice of such termination from the Board.

63. Tools and Equipment

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

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

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

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

It is the Vendor/Contractor's responsibility to ensure that the equipment and the operator, are licensed in accordance with the Ministry of Transportation. The Board may, at their discretion, require the Vendor/Contractor to provide proof that the equipment has passed a recent (within the last 12 months) government safety inspection and that the operators are suitably licensed prior to commencement of the contract. All vehicles, tools, equipment, and voltage rated gloves requiring dielectric testing shall have current certification and all applicable documentation.

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

64. Usage Reports

The Board, at no additional cost, may request usage reports to be provided annually or upon request.

65. Variation of Bid Prices

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

66. Volume and Exclusivity

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

67. Waiver

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

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

68. Warranty and Maintenance

The Vendor/Contractor, 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 (2) year time frame. The Vendor/Contractor is responsible for all required maintenance complete with materials and labour during the

warranty period.

69. Work Continuity

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

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

70. Work Requirements

The Vendor/Contractor shall perform entire work with minimal to no disturbance to the routine operations of the respective facility. Further, the Vendor/Contractor shall ensure safety of WRDSB assets, students, staff as well as public at all times.

71. Workplace Safety Insurance Board (WSIB) Certificate

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

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

WSIB Certificate evidencing renewal or replacement of Certificates shall be uploaded through the Bidding System within 72 hours of the expiration or replacement of the current certificate, without demand by the Board.

END OF SECTION

00 73 00 "The Supplementary Conditions"

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

(the "Supplementary Conditions")

**AGREEMENT, DEFINITIONS, AND
GENERAL CONDITIONS**

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

AGREEMENT BETWEEN OWNER AND CONTRACTOR

ARTICLE A-1 – THE WORK

| | | |
|--------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC17.1 | A-1.3 | <p><u>Amend</u> Article A-1.3 by <u>deleting</u> all of the words after “<i>Contract Documents</i>” and <u>replace</u> them with the following”</p> <p>“attain</p> <p>.1 <i>Substantial Performance of the Work</i> by the <u>_26_</u> day of <u>__</u> August <u>_</u> in the year 2024. .2 (if applicable) <i>Occupancy</i> by the <u>_30_</u> day of <u>__</u> August <u>__</u> in the year 2024 <u>_</u>, and .3 <i>Ready-for-Takeover</i> by the <u>_3_</u> day of September <u>__</u> in the year 2024.”</p> |
| SC1.1 | | |

ARTICLE A-3 – CONTRACT DOCUMENTS

| | | |
|-------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC2.1 | A-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 CCDC 2-2020 Stipulated Price Subcontract, May 2022 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>) if applicable • Labour and Material Payment Bond (Form 31 – Labour and Material Payment Bond under Section 85.1 of the <i>Act</i>), if applicable |
|-------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

ARTICLE A-4 – CONTRACT PRICE

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

ARTICLE A-5 – PAYMENT

| | | |
|-------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC4.1 | A-5.1 | <p><u>Delete</u> Article A- 5.1 in its entirety including all subparagraphs and <u>replace</u> it with the following:</p> <p>“5.1 Subject to the provisions of the <i>Contract Documents</i> and the <i>Construction Act</i>, the <i>Owner</i> shall:</p> |
|-------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>.1 make progress payments to the <i>Contractor</i> on account of the <i>Contract Price</i> when due together with such <i>Value Added Taxes</i> as may be applicable to such payments,</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>Construction Act</i>, there being no claims for lien registered against the title to the <i>Place of the Work</i> and no written notices of lien delivered to the <i>Owner</i>, pay the <i>Contractor</i> the unpaid balance of the 10% 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> <p>.3 after <i>Ready-for-Takeover</i> has been achieved in accordance with the <i>Contract Documents</i> and the <i>Work</i> is complete, there being no claims for lien registered against the title to the <i>Place of the Work</i> and no written notices of lien delivered to the <i>Owner</i>, pay the <i>Contractor</i> any unpaid balance of the <i>Contract Price</i> in accordance with GC 5.5 – FINAL PAYMENT, excluding <i>Deficiency Holdback</i>, together with such <i>Value Added Taxes</i> as may be applicable to such payment.”</p> |
| SC 4.2 | A-5.2.1 | <p><u>Delete</u> subparagraph 5.2.1 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> |

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

| | | |
|-------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC3.1 | 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 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</i> and <i>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</p> |
|-------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>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 or Supplier</i> against the <i>Contractor</i>, where the payment to the <i>Subcontractor or 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 or 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 or Supplier</i> and the <i>Contractor</i> has been found liable for those claims.</p> <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> |
|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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

| | | |
|-------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC6.1 | 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, Occupancy</i> (if applicable), and <i>Ready-for-Takeover</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 <i>Substantial Performance, Occupancy</i> (if applicable), and <i>Ready-for-Takeover</i>. The <i>Contractor</i> agrees that time is of the essence of this <i>Contract</i>."</p> <p>10.3 The Contractor shall pay to the Owner compensation for all additional costs and damages borne by the Board to cover costs incurred due to delay beyond contract timelines, until Ready-for-Takeover is achieved and certified pursuant to the terms of the Contract. Liquidated damages will be assessed as incurred and amounts will be payable directly to the Board. Additional costs may include, but are not limited to: temporary classrooms, temporary washrooms, additional staff, etc.</p> |
| SC6.2 | | |

DEFINITIONS

| <i>Revisions to Existing Definitions</i> | | |
|------------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 | Payment Legislation/Construction Act | <p><u>Delete</u> the Definition of <i>Payment Legislation</i> and replace it with “<i>Construction Act</i>” as follows:</p> <p>“Construction Act</p> <p><i>Construction 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 enforceable as of the date of execution of this <i>Contract</i>. For certainty, the first procurement process for the <i>Project</i> (<i>i.e.</i>, the “improvement” as that term is defined in the <i>Construction Act</i>) commenced on or after October 1, 2019.”</p> |
| SC5.3 | Ready-for-Takeover | <p><u>Amend</u> the Definition of <i>Ready-for-Takeover</i> by deleting all the words after “as verified” and replacing them with “and approved by the <i>Owner</i>.”</p> |
| <i>New Definitions</i> | | |
| | Adjudication | <p><u>Add</u> the following definition:</p> <p>“Adjudication</p> <p><i>Adjudication</i> means construction dispute interim adjudication as defined under the <i>Construction Act</i>.”</p> |
| | Close-Out Documentation | <p><u>Add</u> the following new definition:</p> <p>“Close-Out Documentation</p> <p><i>Close-Out Documentation</i> has the meaning given to it under GC 5.4.2.”</p> |
| | Confidential Information | <p><u>Add</u> the following definition:</p> <p>“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> <ol 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; |

| | | |
|--|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>.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</p> <p>.4 is independently developed by the <i>Contractor</i> without use of any <i>Confidential Information</i>.”</p> |
| | Construction Schedule | <p><u>Add</u> the following definition:</p> <p>“Construction Schedule <i>Construction Schedule</i> means the schedule for the performance of the <i>Work</i> provided by the <i>Contractor</i>, and approved by the <i>Owner</i>, pursuant to GC 3.4.1, including any amendments to the <i>Construction Schedule</i> made pursuant to the <i>Contract Documents</i>.”</p> |
| | Construction Schedule Update | <p><u>Add</u> the following definition:</p> <p>“Construction Schedule Update <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 original digital file of the <i>Construction Schedule</i> (e.g., .mpp format files for Microsoft Project).”</p> |
| | Deficiency Holdback | <p><u>Add</u> the following definition:</p> <p>Deficiency Holdback - a value applied to the total contract value to cover the cost of completing deficiencies in, or correcting defects in The Work.</p> |
| | Direct Costs | <p><u>Add</u> the following definition:</p> <p>“Direct Costs <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> |
| | EFT | <p><u>Add</u> the following definition:</p> <p>“EFT <i>EFT</i> has the definition given to it under GC 5.3.2.”</p> |

| | | |
|--|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Excess Soil | <p><u>Add</u> the following definition:</p> <p>“Excess Soil <i>Excess Soil</i> means “excess soil” as that term is defined under section 3 of the <i>Excess Soil Regulation</i>.”</p> |
| | Excess Soil Regulation | <p><u>Add</u> the following Definition:</p> <p>“Excess Soil Regulation <i>Excess Soil Regulation</i> means O. Reg. 406/19: On-Site and Excess Soil Management to the <i>Environmental Protection Act</i>, R.S.O. 1990, c. E.19.”</p> |
| | Final Pre-Invoice Submission Meeting | <p><u>Add</u> the following ne definition:</p> <p>“Final Pre-Invoice Submission Meeting <i>Final Pre-Invoice Submission Meeting</i> has the meaning given to it in GC 5.5.1.”</p> |
| | Force Majeure | <p><u>Add</u> the following definition:</p> <p>“Force Majeure</p> <p><i>Force Majeure</i> means any cause, unknown at the effective date of the <i>Contract</i> and beyond either party’s control, other than financial difficulties, bankruptcy or insolvency, which prevents the performance by a party, or both, of any of their respective obligations under the <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 third-party licences, permits, agreements, or approvals (excluding approvals of any <i>Subcontractors</i> or <i>Suppliers</i> of any tier); civil disturbance; emergency acts, orders, legislation, regulations or directives or revoking of funding from any government or other public authority; acts of a public enemy; war; riot; sabotage; blockage; embargo; lightning; earthquake; adverse weather conditions but only if substantially beyond the weather norms of the <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> |
| | Install | <p><u>Add</u> the following definition:</p> <p>“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> |
| | Labour Dispute | <p><u>Add</u> the following definition:</p> <p>“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> |
| | Notice of Non-Payment | <p><u>Add</u> the following definition:</p> |

| | | |
|--|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>“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> |
| | OHSA | <p><u>Add</u> the following definition:</p> <p>“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> |
| | Overhead | <p><u>Add</u> the following definition:</p> <p>“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> |
| | Payment Period | <p><u>Add</u> the following definition:</p> <p>“Payment Period</p> <p><i>Payment Period</i> has the definition given to it under GC 5.2.1.”</p> |
| | Pre-Invoice Submission Meeting | <p><u>Add</u> the following definition:</p> <p>“Pre-Invoice Submission Meeting</p> <p><i>Pre-Invoice Submission Meeting</i> has the definition given to it under GC 5.2.1.”</p> |
| | Proper Invoice | <p><u>Add</u> the following definition:</p> <p>“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> |
| | Proper Invoice Submission Date | <p><u>Add</u> the following definition:</p> <p>“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> |
| | Request for Information (RFI) | <p><u>Add</u> the following definition:</p> <p>“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 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>.”</p> |

| | | |
|--|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | |
| | Restricted Period | <p><u>Add</u> the following definition:</p> <p>“Restricted Period</p> <p><i>Restricted Period</i> means the (inclusive) period of time between December 1 to January 8 and August 15 to September 15 of any given year throughout the duration of the <i>Contract</i>.”</p> |

GENERAL CONDITIONS OF THE STIPULATED PRICE CONTRACT

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

PART 1 GENERAL PROVISIONS

GC 1.1 CONTRACT DOCUMENTS

| | | |
|-------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC5.1 | 1.1.3 | <p><u>Delete</u> GC 1.1.3 in its entirety and <u>replace</u> it with the following:</p> <p>“1.1.3 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 GC 3.13.1. Except for its obligation to make such a 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 GC 1.1.3, the <i>Contractor</i> shall not be liable for damage or costs resulting from such errors, inconsistencies, or 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.”</p> |
| SC5.2 | 1.1.4 | <p><u>Delete</u> GC 1.1.4 in its entirety and <u>replace</u> it with the following:</p> <p>“1.1.4 Except for the obligation to complete the review prescribed in GC 1.1.3, and report the results as set out in this GC 1.1.4, the <i>Contractor</i> is not responsible for errors, omissions or inconsistencies in the <i>Contract Documents</i>. If there are errors, omissions or inconsistencies discovered by or made known to the <i>Contractor</i> as part of its review under GC 1.1.3 or at any time during the performance of the <i>Work</i>, 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 shall not proceed with the <i>Work</i> affected until the <i>Contractor</i> has received corrected or additional information from the <i>Consultant</i>. The <i>Contractor</i> shall not be liable for damage or costs resulting from such errors, inconsistencies, or omissions in the <i>Contract Documents</i>, which the <i>Contractor</i> could not reasonably have discovered through the exercise of care and skill described in GC 3.13.”</p> |
| | 1.1.5.1 | <p><u>Delete</u> GC 1.1.5.1 and <u>replace</u> 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"> .1 Supplementary Conditions; .2 the Agreement between the Owner and the Contractor; .3 the Definitions; .4 the General Conditions; .5 Division 01 of the <i>Specifications</i> |

| | | |
|--|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>.6 technical <i>Specifications</i>;</p> <p>.7 material and finishing schedules; and</p> <p>.8 the <i>Drawings</i>.</p> |
| | 1.1.5.5 | <p><u>Delete</u> GC 1.1.5.5 and <u>replace</u> with the following:</p> <p>“.5 Noted materials and annotations on the <i>Drawings</i> shall govern over the graphic representation of the <i>Drawings</i>.”</p> |
| | 1.1.5.6 to 1.1.5.8 | <p><u>Add</u> the following new GC 1.1.5.6 to 1.1.5.8 as follows:</p> <p>“.6 Finishes in the room finish schedules shall govern over those shown on the <i>Drawings</i>.</p> <p>.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>.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> |
| | 1.1.9 | <p><u>Add</u> the following to the end of GC 1.1.9:</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, outlets and other elements. 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 proceeding with the <i>Work</i>. Where site conditions require reasonable minor changes where the change requires only the additional labour two hours 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>Contract Documents</i>, wherever located and whenever issued, which compile information of similar content and may consist of drawings, tables and/or lists.”</p> |
| | 1.1.13 | <p><u>Add</u> new paragraphs 1.1.13 as follows:</p> <p>1.1.13 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>.”</p> |

GC 1.3 RIGHTS AND REMEDIES

| | | |
|-------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC6.1 | 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 6.4.1, 6.5.4, 6.6.1 and 8.3.2, no...”</p> |
|-------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

***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 and further represents and 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 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>. 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, more onerous to fulfill 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 prior to commencement of the <i>Work</i>, where in tendering for the <i>Work</i> and in entering into this <i>Contract</i>, the <i>Contractor</i> relied 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>, the <i>Contractor</i> shall review to the standard specified in GC 3.14.1, the accuracy of the information furnished by the <i>Owner</i>. If a condition is materially different than what is stated in the information furnished by the <i>Owner</i>, the <i>Contractor</i> shall, no later than five (5) <i>Working Days</i> after the first observation of such condition(s), deliver to the <i>Owner</i> and to the <i>Consultant</i> a <i>Notice in Writing</i> specifying the materially different condition and the <i>Contractor</i> shall not proceed with the affected part of the <i>Work</i> until receiving written direction from the <i>Owner</i> or the <i>Consultant</i>. Where the <i>Contractor</i> fails to provide prompt <i>Notice in Writing</i> in accordance with this GC 1.5.2, the <i>Contractor</i> 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> |
|-------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

PART 2 ADMINISTRATION OF THE CONTRACT

GC 2.2 ROLE OF THE CONSULTANT

| | | |
|--------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC11.1 | 2.2.5 | <p><u>Delete</u> paragraph 2.2.4 and <u>replace</u> it with the following:</p> <p>“2.2.4 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 - PAYMENT, GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK, and GC 5.5 - 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</i></p> |
|--------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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

GC 2.3 REVIEW AND INSPECTION OF THE WORK

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

GC 2.4 DEFECTIVE WORK

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

| | | |
|--|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | |
| | 2.4.2 | <u>Delete</u> paragraph 2.4.2 in its entirety and <u>replace</u> it with the following: "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." |
| | 2.4.4 | <u>Add</u> new paragraph 2.4.4 as follows: "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." |

PART 3 EXECUTION OF THE WORK

GC 3.1 CONTROL OF THE WORK

| | | |
|--------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC12.1 | 3.1.2 | Amend paragraph 3.1.2 by <u>inserting</u> the words "Construction Schedule" after the word "sequences". |
| SC12.2 | 3.1.3 & 3.1.4 | <u>Add</u> new paragraphs 3.1.3 and 3.1.4 as follows: "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> . 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." |

GC 3.2 CONSTRUCTION BY OWNER OR OTHER CONTRACTORS

| | | |
|--------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC13.1 | 3.2.2.1 | <u>Delete</u> subparagraph 3.2.2.1 and <u>replace</u> it with "[Intentionally left blank]". |
| | 3.2.3.2 | <u>Delete</u> subparagraph 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, including where other contractors or the <i>Owner's</i> own forces are used after the <i>Owner</i> and the <i>Contractor</i> cannot reach agreement on the value of a change, with the <i>Work</i> of the <i>Contractor</i> and connect as specified or shown in the <i>Contract Documents</i> ." |
| | 3.2.3.4 | <u>Delete</u> the period at the end of subparagraph 3.2.3.4 and <u>replace</u> it with a semicolon. |
| | 3.2.3.5 | <u>Add</u> new subparagraph 3.2.3.5 as follows: ".5 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> .” |
|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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> ”. |
|--------|-------|------------------------------------------------------------------------------------------------------------------------|

GC 3.4 CONSTRUCTION SCHEDULE

| | | |
|--------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC17.1 | 3.4.1 | <p><u>Delete</u> GC 3.4.1 in its entirety and <u>replace</u> it with the following:</p> <p>“3.4.1 The <i>Contractor</i> shall:</p> <ol style="list-style-type: none"> 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> 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 original digital file format (<i>e.g.</i>, .mpp format for Microsoft Project), portable data file (PDF) 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”; .2 provide the expertise and resources, such resources including manpower equipment and tools, as are necessary on a best efforts basis to maintain progress under the accepted baseline <i>Construction Schedule</i> or revised construction schedule accepted by the <i>Owner</i> pursuant to GC 3.4 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, .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 3.4 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 |
|--------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>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 3.4.1.2, the <i>Contractor</i> forms the opinion that the slippage in schedule reported in paragraph 3.4.1.3 cannot be recovered by the <i>Contractor</i>, it shall, in the same notice provided under paragraph 3.4.1.3, 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> <p>.5 ensure that the <i>Contract Price</i> shall include all costs required to phase or stage the <i>Work</i>.”</p> |
| | 3.4.2 | <p><u>Add</u> new GC 3.4.2 and GC 3.4.3 as follows:</p> <p>“3.4.2 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 GC 3.4.1.3, 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 GC 3.4.1.3, take appropriate steps to cause the actual progress of the <i>Work</i> to conform to the schedule or minimize the resulting delay. Within 5 calendar days of the request by the <i>Owner</i> or the <i>Consultant</i> or the notice being given pursuant to GC 3.4.1.3, 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 recover the performance of the <i>Work</i> to align with the currently approved <i>Construction Schedule</i>.</p> <p>3.4.3 The <i>Contractor</i> shall not amend the <i>Construction Schedule</i> without the prior written consent of the <i>Owner</i>.. Any revisions to the <i>Construction Schedule</i> approved by the <i>Owner</i> shall not be deemed to be an extension of the <i>Contract Time</i>. All requests by the <i>Contractor</i> for a revision to the <i>Construction Schedule</i> that include an extension to the <i>Contract Time</i> must be approved by the <i>Owner</i> through an executed <i>Change Order</i>.”</p> |

GC 3.5 SUPERVISION

| | | |
|--------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC17.1 | 3.5.1 | <p><u>Delete</u> GC 3.5.1 and <u>replace</u> it with the following:</p> <p>“3.5.1 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 the 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’s</i> 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 superintendent referred to in this GC 3.5.1 and other responsible persons who may be contacted for emergency and other reasons during non-working hours. .”</p> |
|--------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 3.5.2 | <p><u>Delete</u> GC 3.5.2 and <u>replace</u> it with the following:</p> <p>“3.5.2 The superintendent, and any project manager appointed by the <i>Contractor</i>, shall represent the <i>Contractor</i> at the <i>Place of the 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> |
| | 3.5.3 to 3.5.6 | <p><u>Add</u> new GC 3.5.3, 3.5.4, 3.5.5 and 3.5.6 as follows:</p> <p>“3.5.3 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>3.5.4 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>3.5.5 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>3.5.6 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> |

GC 3.6 SUBCONTRACTORS AND SUPPLIERS

| | | |
|--------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC18.1 | 3.6.1.1 | <p>In paragraph 3.6.1.1 <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>.”</p> |
| | 3.6.1.2 | <p>In subparagraph 3.6.1.2 after the words “the <i>Contract Documents</i>” <u>add</u> the words “including any required surety bonding”.</p> |
| | 3.6.2 | <p><u>Delete</u> paragraph 3.6.2. in its entirety and <u>replace</u> it with the following:</p> <p>“3.6.2 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.”</p> |
| | 3.6.7, 3.6.8, | <p><u>Add</u> new paragraphs 3.6.7, 3.6.8, 3.6.9, and 3.6.10 as follows:</p> |

| | |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.6.9 & 3.6.10 | <p>“3.6.7 The <i>Contractor</i> represents and warrants that it has confirmed the availability of its <i>Subcontractors</i> for the <i>Project</i> and, in particular, for the performance of their respective portions of the <i>Work</i> to ensure completion of the <i>Project</i> within the <i>Contract Price</i> and the <i>Contract Time</i>.</p> <p>3.6.8 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>.</p> <p>3.6.9 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.</p> <p>3.6.10 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.”</p> |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

GC 3.7 LABOUR AND PRODUCTS

| | | |
|--------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC19.1 | 3.7.1 | <u>Amend</u> paragraph 3.7.1 by <u>adding</u> the words, “..., agents, <i>Subcontractors</i> and <i>Suppliers</i> ...” after the word “employees” in the first line. |
| SC19.2 | 3.7.2 | <p><u>Delete</u> paragraph 3.7.2 and <u>substitute</u> with the following:</p> <p>“3.7.2 <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.”</p> |
| | 3.7.4 to 3.7.8 | <p><u>Add</u> new paragraphs 3.7.4, 3.7.5, 3.7.6, 3.7.7, and 3.7.8 as follows:</p> <p>“3.7.4 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</p> |

| | | |
|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>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 request, the <i>Contractor</i> shall make arrangements to appoint an acceptable replacement.</p> <p>3.7.5 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>3.7.6 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>3.7.7 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>3.7.8 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. 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>."</p> |
|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

GC 3.8 SHOP DRAWINGS

| | | |
|--------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC21.1 | 3.8.1 | <p><u>Delete</u> paragraph 3.8.1 in its entirety and <u>replace</u> with the following:</p> <p>"3.8.1 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."</p> |
| | 3.8.3 | <p><u>Delete</u> paragraph 3.8.3 and <u>replace</u> it with the following:</p> <p>"3.8.3 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</i></p> |

| | | |
|--|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <i>Drawings schedule shall be submitted by the Contractor to the Consultant and the Owner for approval. The draft Shop Drawings schedule shall clearly indicate the phasing of Shop Drawings submissions. The Contractor shall periodically re-submit the Shop Drawings schedule to correspond to changes in the Construction Schedule."</i> |
| | 3.8.5 | <u>Delete</u> paragraph 3.8.5 in its entirety and <u>substitute</u> the following: "3.8.5 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." |
| | 3.8.8 to 3.8.12 | <u>Add</u> new paragraphs 3.8.8, 3.8.9, 3.8.10, 3.8.11, and 3.8.12 as follows: "3.8.8 Reviewed <i>Shop Drawings</i> shall not authorize a change in the <i>Contract Price</i> and/or the <i>Contract Time</i> . 3.8.9 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> . 3.8.10 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. 3.8.11 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> . 3.8.12 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." |

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

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

| | | |
|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>or force that will endanger the safety of the <i>Work</i>.</p> <p>3.9.3 The <i>Owner</i> shall have the right to enter or occupy the <i>Place of the 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 <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> or in any way relieves the <i>Contractor</i> from its responsibility to complete the <i>Contract</i>."</p> |
|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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

| | | |
|--------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC23.1 | GC 3.10 | <p><u>Add</u> new GC 3.10 – CUTTING AND REMEDIAL WORK as follows:</p> <p>"GC 3.10 CUTTING AND REMEDIAL WORK</p> <p>3.10.1 The <i>Contractor</i> shall perform the cutting and remedial work required to make the affected parts of the <i>Work</i> come together properly. Such cutting and remedial work shall be performed by specialists familiar with the <i>Products</i> affected and shall be performed in a manner to neither damage nor endanger the <i>Work</i>.</p> <p>3.10.2 The <i>Contractor</i> shall coordinate the <i>Work</i> to ensure all cutting and remedial work required is kept to a minimum.</p> <p>3.10.3 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>3.10.4 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> |
|--------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

***NEW* GC 3.11 CLEAN UP**

| | | |
|--------|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC24.1 | 3.11.1, 3.11.2, 3.11.3, 3.11.4, 3.11.5 & 3.11.6 | <p>Add new paragraphs 3.11.1, 3.11.2, 3.11.3, 3.11.4, 3.11.5, and 3.11.6 as follows:</p> <p>"3.11.1 The <i>Contractor</i> shall maintain the <i>Work</i> in a safe and tidy condition and free from the accumulation of waste products and debris, other than that caused by the <i>Owner</i>, other contractors or their employees. 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> <p>3.11.2 Before applying for <i>Substantial Performance of the Work</i>, the <i>Contractor</i> shall remove waste products and debris, other than that resulting from the work of the <i>Owner</i>, other contractors or their employees, and shall leave the <i>Place of the Work</i> clean and suitable for use or occupancy by the <i>Owner</i>. The <i>Contractor</i> shall remove products, tools, materials,</p> |
|--------|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p><i>Construction Equipment, and Temporary Work</i> not required for the performance of the remaining work.</p> <p>3.11.3 As a condition precedent to submitting its application for final payment, the <i>Contractor</i> shall remove any remaining products, tools, materials, <i>Construction Equipment, Temporary Work</i>, and waste products and debris, other than those resulting from the work of the <i>Owner</i>, other contractors or their employees.</p> <p>3.11.4 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 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>3.11.5 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, Subcontractors</i> or <i>Suppliers</i>, if not repaired before final payment.</p> <p>3.11.6 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> |
|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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

| | | |
|--------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC25.1 | GC 3.12 | <p>Add new GC 3.12 – EXCESS SOIL MANAGEMENT as follows:</p> <p>“GC 3.12 EXCESS SOIL MANAGEMENT</p> <p>3.12.1 The <i>Contractor</i> shall be solely responsible for the proper management of all <i>Excess Soil</i> at the <i>Place of the Work</i> and for performance of the <i>Work</i> in compliance with the rules, regulations and practices required by the <i>Excess Soil Regulation</i> until such time as <i>Ready-for-Takeover</i> is achieved. Without restricting the generality of the previous sentence, the <i>Contractor’s</i> responsibility under this GC 3.12 includes the designation, transportation, tracking, temporary and/or final placement, record keeping, and reporting of all <i>Excess Soil</i> in connection with the <i>Work</i> all in compliance with the <i>Excess Soil Regulation</i>.</p> <p>3.12.3 The <i>Contractor</i> shall indemnify and save harmless the <i>Owner</i>, their agents, officers, directors, administrators, employees, consultants, successors and assigns from and against the consequences of any and all health and safety infractions committed directly by the <i>Contractor</i>, or those for whom it is responsible at law, under the <i>Excess Soil Regulation</i>, or any environmental protection legislation, including the payment of legal fees and disbursements on a substantial indemnity basis. Such indemnity shall apply to the extent</p> |
|--------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--|--|---------------------------------------------------------|
| | | to which the <i>Owner</i> is not covered by insurance.” |
|--|--|---------------------------------------------------------|

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

| | | |
|--------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC25.1 | 3.13 | <p><u>Add</u> a new GC 3.13 – CONTRACTOR STANDARD OF CARE as follows:</p> <p>“GC 3.13 CONTRACTOR STANDARD OF CARE</p> <p>“3.13.1 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>3.13.2 The <i>Contractor</i> further represents, covenants and warrants to the <i>Owner</i> that:</p> <ol style="list-style-type: none"> .1 the personnel it assigns to the <i>Project</i> are appropriately experienced; .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 .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>.” |
|--------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

PART 4 ALLOWANCES

GC 4.1 CASH ALLOWANCES

| | | |
|--------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC27.1 | 4.1.3 | In GC 4.1.3 <u>delete</u> the words “through the <i>Consultant</i> ” and <u>replace</u> them with “in writing.” |
| | 4.1.4 | <p><u>Delete</u> GC 4.1.4 in its entirety and <u>replace</u> it with the following:</p> <p>“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, by the <i>Consultant</i> at the <i>Owner’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>.”</p> |

| | | |
|--|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | |
| | 4.1.7 | <u>Delete</u> GC 4.1.7 in its entirety and <u>replace</u> it with the following: "4.1.7 The net amount of any unexpended cash allowances, after providing for any reallocations as contemplated in paragraph 4.1.4, shall be deducted from the <i>Contract Price</i> by <i>Change Order</i> without any adjustment for the <i>Contractor's</i> overhead and profit on such amount." |
| | 4.1.8 and 4.1.9 | <u>Add</u> new GC 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> 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

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> . |
|--------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|

GC 5.2 APPLICATIONS FOR PAYMENT

| | | |
|--------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC29.1 | 5.2.1 | <u>Delete</u> GC 5.2.1 and <u>replace</u> it with the following: "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: .1 a copy of the draft application for payment; |
|--------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>.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</p> <p>.3 any other documents reasonably requested, in advance, by the <i>Owner</i> or the <i>Consultant</i>."</p> |
| SC29.2 | 5.2.2 | <p><u>Delete</u> GC 5.2.2 in its entirety and <u>replace</u> it with the following:</p> <p>"5.2.2 Applications for payment shall be given in accordance with the following requirements:</p> <p>.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:</p> <p>.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>.</p> <p>.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 email address:</p> <p style="text-align: center;">facilities_cap@wrdsb.ca</p> <p>.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.</p> <p>.4 No applications for payment shall be accepted by the <i>Owner</i> prior to the <i>Proper Invoice Submission Date</i>.</p> <p>.5 All applications for payment shall include all of the requirements for a <i>Proper Invoice</i> prescribed by the <i>Construction Act</i> and this <i>Contract</i> and be dated the last day of the applicable <i>Payment Period</i>;"</p> |
| SC29.3 | 5.2.3 | <p><u>Delete</u> GC 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 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</p> |

| | | |
|--------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | 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 GC 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 GC 5.2.5 <u>add</u> the words “or the <i>Owner</i> ”. |
| | | |
| SC29.6 | 5.2.9 | <u>Add</u> new 5.2.9 as follows: “5.2.9 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.” |

GC 5.3 PAYMENT

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

| | | |
|--|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>(b) in the amount stated in the certificate for payment less such amount stated in the <i>Owner's Notice of Non-Payment</i> issued pursuant to GC 5.3.3,</p> <p>on the 28th calendar day after receipt of a <i>Proper Invoice</i>, unless such 28th calendar day lands on a day that is other than a <i>Working Day</i>, in which case payment shall be made on the next <i>Working Day</i> after such 28th day."</p> |
| | <p>5.3.2 to 5.3.7</p> | <p><u>Add</u> new paragraphs 5.3.2, 5.3.3, 5.3.4, 5.3.4, 5.3.5, 5.3.6, and 5.3.7 as follows:</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 first application for payment, the <i>Owner</i> and the <i>Contractor</i> shall exchange such information as is necessary to facilitate <i>EFT</i> payments.</p> <p>5.3.3 In the event that the application for payment delivered by the <i>Contractor</i> pursuant to GC 5.2 - APPLICATIONS FOR PAYMENT does not include the requirements for a <i>Proper Invoice</i> or where the <i>Owner</i> disputes the amount claimed as payable in the <i>Proper Invoice</i>, then the <i>Owner</i> shall within 14 calendar days of receipt of the application for payment, issue a <i>Notice of Non-Payment</i> (Form 1.1).</p> <p>5.3.4 Where the <i>Owner</i> has delivered a <i>Notice of Non-Payment</i>, the <i>Owner</i> and the <i>Contractor</i> shall first engage in good faith negotiations to resolve the dispute. If within 5 calendar days following the issuance of a <i>Notice of Non-Payment</i>, despite good faith efforts by both parties and the assistance of the <i>Consultant</i>, the <i>Owner</i> and the <i>Contractor</i> cannot resolve the dispute, either party may commence an <i>Adjudication</i> in accordance with the procedures set out in the <i>Construction Act</i>. 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 GC 5.3.1.2.</p> <p>5.3.5 Provided that the <i>Owner</i> complies with its obligations under the <i>Construction Act</i>, and subject to any interim determination of an adjudicator in accordance with any <i>Adjudication</i>, and where applicable, a final determination made in accordance with the dispute resolution processes prescribed by this <i>Contract</i>, the <i>Owner</i> shall be entitled to claim in a <i>Notice of Non-Payment</i> a right to deduct from or, set off against, any payment of the <i>Contract Price</i>:</p> <ol style="list-style-type: none"> .1 any amount expended by the <i>Owner</i> in exercising the <i>Owner's</i> rights under this <i>Contract</i> to perform any of the <i>Contractor's</i> obligations that the <i>Contractor</i> has failed to perform; .2 any damages, costs or expenses (including, without limitation, reasonable legal fees and expenses) incurred by the <i>Owner</i> as a result of the failure of the <i>Contractor</i> to perform any of its obligations under the <i>Contract</i>; .3 any other amount owing from the <i>Contractor</i> to the <i>Owner</i> under this <i>Contract</i>. <p>5.3.6 The amounts disputed and described under the <i>Notice of Non-Payment</i> shall be held by the</p> |

| | | |
|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p><i>Owner</i> until all disputed amounts of the <i>Proper Invoice</i> have been resolved pursuant to PART 8 – DISPUTE RESOLUTION.</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>Construction 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>Construction Act</i> including, without limitation, section 8.1 of the <i>Construction Act</i>. Evidence of the <i>Contractor's</i> compliance under this GC 5.3.7, including evidence demonstrating that all <i>EFTs</i> 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> |
|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

GC 5.4

SUBSTANTIAL PERFORMANCE OF THE WORK- AND PAYMENT OF HOLDBACK

| | | |
|--------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC32.1 | GC 5.4 | <p><u>Delete</u> GC 5.4 – SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK in its entirety and <u>replace</u> it with the following:</p> <p>“GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK</p> <p>5.4.1 When the <i>Contractor</i> considers that <i>Substantial Performance of the Work</i> has been achieved, the <i>Contractor</i> shall prepare and submit to the <i>Consultant</i> and the <i>Owner</i> a comprehensive deficiency list of items to be completed or corrected, including any incomplete <i>Close-Out Documentation</i>, and apply for a review by the <i>Consultant</i> and the <i>Owner</i> to establish <i>Substantial Performance of the Work</i>. Failure to include an item on the list does not alter the responsibility of the <i>Contractor</i> to complete the <i>Contract</i>.</p> <p>5.4.2 Prior to, or as part of its written application for <i>Substantial Performance of the Work</i> the <i>Contractor</i> shall submit to the <i>Consultant</i> submit to the <i>Consultant</i> all closeout documentation required by the <i>Contract Documents</i>, including but not limited to, warranties, manuals, guarantees, as-built drawings, warranty cards and all other relevant literature from suppliers and manufacturers including, but not limited to, where applicable (the “Close-Out Documentation”):</p> <ol style="list-style-type: none"> .1 equipment, maintenance, and operations manuals; .2 equipment specifications, data sheets and brochures, parts lists and assembly drawings, performance curves and other related data; .3 line drawings, value charts and control sheets sequences with description of the sequence of operations; .4 warranty documents; .5 guarantees; .6 certificates; .7 service and maintenance reports; .8 <i>Specifications</i>; .9 <i>Shop Drawings</i>; .10 coordination drawings; |
|--------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>.11 testing and balancing results and reports;</p> <p>.12 <i>Commissioning</i> and quality assurance documentation;</p> <p>.13 distribution system diagrams;</p> <p>.14 spare parts;</p> <p>.15 samples;</p> <p>.16 existing reports and correspondence from authorities having jurisdiction in the <i>Place of the Work</i>;</p> <p>.17 inspection certificates;</p> <p>.18 red-lined record drawings from the construction trailer in two copies and</p> <p>.19 other materials or documentation required to be submitted under the <i>Contract</i>.</p> <p>5.4.3 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, including any incomplete or unsubmitted <i>Close-Out Documentation</i>. Each item shall have an indicated value for correction or completion and the determination of the total value of such items shall be determined pursuant to GC 5.8 – DEFICIENCY HOLDBACK. The final deficiency list complete with values is to be included with the <i>Consultant's</i> draft verification and shall be reviewed with the <i>Owner</i> prior to the <i>Consultant</i> rendering a determination in accordance with GC 5.4.3.2</p> <p>.2 having completed the requirements set out in GC 5.4.3.1,</p> <p>(a) 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>(b) 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> <p>5.4.4 Following the issuance of the certificate of <i>Substantial Performance of the Work</i> referenced in subparagraph 5.4.3.2(b):</p> <p>.1 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(b) within seven (7) calendar 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>.2 The <i>Contractor</i> shall complete the <i>Work</i> within forty (40) calendar days of the date certified as the date of <i>Substantial Performance of the Work</i>;</p> <p>.3 Notwithstanding any other provisions of the <i>Contract</i>, no payments will be processed between <i>Substantial Performance of the Work</i> and <i>Ready-for-Takeover</i>;</p> <p>.4 The <i>Owner</i> reserves the right to contract out any or all unfinished <i>Work</i> if it has not been completed within forty (40) days of <i>Substantial Performance of the Work</i> using,</p> |
|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>without limitation, the funds retained in accordance with GC 5.8 - DEFICIENCY HOLDBACK, without prejudice to any other right or remedy and without affecting the warranty period. The cost to the <i>Owner</i> 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> <p>5.4.5 After publication of the certificate of the <i>Substantial Performance of the Work</i>, and provided that the <i>Contractor</i> has completed performance of the <i>Work</i> within the 40 calendar days following certification of <i>Substantial Performance of the Work</i>, the <i>Contractor</i> may submit an application for payment of the outstanding <i>Construction Act</i> holdback amount, which application for payment shall:</p> <ul style="list-style-type: none">.1 include all of the requirements listed in EXHIBIT "1" - PROJECT SPECIFIC REQUIREMENTS FOR A PROPER INVOICE, as applicable to the application for payment of the holdback amount; and.2 include a statement that the <i>Contractor</i> has not received any written notices of lien or any claims for liens from any <i>Subcontractor</i> or <i>Supplier</i>. <p>5.4.6 The <i>Construction Act</i> holdback amount shall become due and payable the day immediately following the expiration of the holdback period prescribed by the <i>Construction Act</i> (in most cases being the 61st calendar day following the publication of the certificate of <i>Substantial Performance of the Work</i> referred to in GC 5.4.4.1), subject to the occurrence of any of the following:</p> <ul style="list-style-type: none">.1 the preservation of a lien in respect of the <i>Project</i> that has not been satisfied, discharged or otherwise provided for in accordance with the <i>Construction Act</i>;.2 receipt by the <i>Owner</i> of a written notice of lien that has not been satisfied, discharged or otherwise provided for in accordance with the <i>Construction Act</i>; or.3 prior to the expiry of 40 calendar days following the publication of the certificate of <i>Substantial Performance of the Work</i>, the <i>Owner</i> publishes a <i>Notice of Non-Payment</i> of holdback in accordance with the <i>Construction Act</i> (Form 6), setting out the amount of holdback that will not be paid, which may include non-payment to secure the correction of deficiencies and/or the completion of the <i>Work</i>. <p>5.4.7 Notwithstanding the <i>Owner's</i> obligation to make payment of the holdback amount in accordance with GC 5.4.6, the processing of such payment remains subject to the <i>Owner's</i> internal <i>EFT</i> timing limitations. The <i>Owner</i> covenants, and the <i>Contractor</i> agrees, that payment of the holdback shall be made by <i>EFT</i> at the first opportunity during the <i>Owner's</i> normal processing of <i>EFTs</i> upon the holdback becoming due in accordance with GC 5.4.6..</p> |
|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

GC 5.5 FINAL PAYMENT

| | | |
|--------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC35.1 | GC 5.5 | <p><u>Delete</u> GC 5.5 in its entirety, including all subparagraphs thereunder and <u>replace</u> it with the following:</p> <p>“5.5.1 When <i>Ready-for-Takeover</i> has been achieved in accordance with GC 12.1 – READY-FOR-TAKEOVER and the <i>Contractor</i> considers the <i>Work</i> is complete, and after the <i>Contractor</i>, the <i>Owner</i>, and the <i>Consultant</i> have attended a <i>Pre-Invoice Submission Meeting</i> analogous to the requirement in GC 5.2.1 (the “Final Pre-Invoice Submission Meeting”), the <i>Contractor</i> may submit an application for final payment to the <i>Owner</i> and to the <i>Consultant</i>, which application for payment shall:</p> <ul style="list-style-type: none"> .1 include all of the requirements set out in GC 5.2.2, including without limitation those requirements listed in APPENDIX “1” - PROJECT SPECIFIC REQUIREMENTS FOR A PROPER INVOICE that are specific to an application for final payment; and .2 if applicable, (a) a certificate from the <i>Consultant</i> or written confirmation from the <i>Owner</i> that the deficiencies or incomplete <i>Work</i> waived by the <i>Owner</i> pursuant to GC 12.1.2 have been fully rectified as of the date of the <i>Contractor’s</i> application for final payment, and/or (b) written confirmation, signed by the <i>Owner</i> and the <i>Contractor</i>, that the <i>Contract Price</i> has been reduced by a specified amount in exchange for the <i>Owner</i> releasing the <i>Contractor</i> of its obligation to rectify the certain outstanding deficiencies and/or incomplete <i>Work</i> waived by the <i>Owner</i> pursuant to GC 12.1.2, as detailed in such written confirmation. <p>5.5.2 No later than 5 calendar days prior to the <i>Final Pre-Invoice Submission Meeting</i>, the <i>Contractor</i> will, if not already provided, submit to the <i>Consultant</i> all <i>Close-Out Documentation</i>.</p> <p>5.5.3 Delivery of all <i>Close-Out Documentation</i> is a requirement for the <i>Proper Invoice</i> for final payment.</p> <p>5.5.4 After receipt by the <i>Owner</i> and the <i>Consultant</i> of an application for payment submitted by the <i>Contractor</i> that is a <i>Proper Invoice</i> and by no later than 10 calendar days after the receipt of the <i>Proper Invoice</i>:</p> <ul style="list-style-type: none"> .1 the <i>Consultant</i> will either: <ul style="list-style-type: none"> (a) issue to the <i>Owner</i> with a copy to the <i>Contractor</i>, a progress payment certificate in the amount applied for by the <i>Contractor</i> in the <i>Proper Invoice</i>, or (b) deliver a finding to the <i>Owner</i> with reasons why an amount other than what is claimed in the <i>Proper Invoice</i> is properly due to the <i>Contractor</i>, which finding the <i>Owner</i> may accept or amend prior to issuing a <i>Notice of Non-Payment</i> (Form 1.1), if any, in accordance with GC 5.5.2; .2 the <i>Owner</i> shall make payment to the <i>Contractor</i> on account as provided in Article A-5 PAYMENT, <ul style="list-style-type: none"> (a) in the amount stated in the certificate for payment, or |
|--------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>(b) in the amount stated in the certificate for payment less such amount stated in the <i>Owner's Notice of Non-Payment</i> issued pursuant to GC 5.5.5,</p> <p>on the 28th calendar day after receipt of a <i>Proper Invoice</i>, unless such 28th calendar day lands on a day that is other than a <i>Working Day</i>, in which case payment shall be made on the next <i>Working Day</i> after such 28th day.</p> <p>5.5.5 In the event that the application for final payment delivered by the <i>Contractor</i> does not include the requirements of GC 5.5.1 (including the requirements for a <i>Proper Invoice</i>) and GC 5.5.2 or where the <i>Owner</i> disputes the amount claimed as payable in the <i>Proper Invoice</i>, then the <i>Owner</i> shall within 14 calendar days of receipt of the application for payment, issue a <i>Notice of Non-Payment</i>. Where the <i>Owner</i> has delivered a <i>Notice of Non-Payment</i>, as specified under this GC 5.5.5, the <i>Owner</i> and the <i>Contractor</i> shall first engage in good faith negotiations to resolve the dispute. If within 5 calendar days following the issuance of a <i>Notice of Non-Payment</i>, despite good faith efforts by both parties with the assistance of the <i>Consultant</i>, the <i>Owner</i> and the <i>Contractor</i> cannot resolve the dispute, either party may commence an <i>Adjudication</i> in accordance with the procedures set out in the <i>Construction Act</i>. 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 GC 5.5.4.2.</p> <p>5.5.6 Subject to the provisions of the <i>Construction Act</i> and any other rights conferred on the <i>Owner</i> at law or under this <i>Contract</i> to withhold payment or back charge or set-off against payment, the <i>Owner</i> shall pay the amount payable under a <i>Proper Invoice</i> for final payment in accordance with the <i>Construction Act</i>.</p> <p>5.5.7 When the <i>Consultant</i> issues a certificate of completion in accordance with GC 5.5.4.1, the <i>Consultant</i> shall also issue a certificate for release of any holdback for finishing work amount. In accordance with the <i>Construction Act</i>, the <i>Owner</i> may retain any amounts which are required by law to satisfy any liens against the <i>Work</i>, in respect of any third party claims made to the <i>Owner</i> in respect of the <i>Contract</i> or the <i>Work</i>, and in respect of any claims the <i>Owner</i> may have against the <i>Contractor</i>. Subject to the foregoing, the <i>Owner</i> shall release the holdback in accordance with the <i>Construction Act</i>."</p> |
|--|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

GC 5.6 DEFERRED WORK

| | | |
|--------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC33.1 | 5.6.1 | <p><u>Delete</u> paragraph 5.6.1 and <u>replace</u> with the following:</p> <p>"5.6.1 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>Construction 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 5.8.1."</p> |
|--------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

NEW GC 5.8

DEFICIENCY HOLDBACK

| | | |
|--------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC34.1 | 5.8.1 | <p><u>Add</u> new GC 5.8 – DEFICIENCY HOLDBACK as follows:</p> <p>“GC 5.8 DEFICIENCY HOLDBACK</p> <p>5.8.1 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 retain a <i>Deficiency Holdback</i>, In addition to the Construction Act holdback. The <i>Deficiency Holdback</i> in the value of 2% shall be applied against the total Contract value and shall be applied to each progress payment. The <i>Deficiency Holdback</i> shall be payable to the Contractor upon the confirmation of completion of all deficiencies and defects in work by the Consultant and the Owner.</p> <p>5.8.2 In performing the calculation under GC 5.8.1,</p> <p>.1 no individual deficiency will be valued at less than five hundred dollars (\$500.00); and</p> <p>.2 for any <i>Close-Out Documentation</i> not submitted in advance of or as part of the <i>Contractor’s</i> application for <i>Substantial Performance of the Work</i>, an amount shall be retained by the <i>Owner</i> as part of the deficiency holdback that is equal to the estimated time and material costs to retain a third-party to re-create the applicable <i>Close-Out Documentation</i>, as determined by the <i>Consultant</i>, until such time as the applicable <i>Close-Out Documentation</i> is submitted and approved.</p> <p>5.8.3 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> and confirmed to be corrected, there being no claims for lien registered against the title to the <i>Place of the Work</i> issued in accordance with the <i>Construction Act</i>, and less any amounts disputed under an <i>Owner’s Notice of Non-Payment</i> (Form 1.1).”</p> |
|--------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

PART 6 CHANGES IN THE WORK

GC 6.1

OWNER’S RIGHT TO MAKE CHANGES

| | | |
|--------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC37.1 | 6.1.2 | <p><u>Add</u> the following to the end of GC 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>, an increase to the <i>Contract Price</i>, or a claim for any extension of the <i>Contract Time</i>.”</p> |
|--------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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, scheduling, site surface 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 Changes to the contract shall be quoted to permit the work to be executed within the <i>Contract Time</i> unless approved by the <i>Consultant</i> and the <i>Owner</i>.</p> <p>6.1.8 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>6.1.9 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> |
| | | |

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</p> |
|--------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|----------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | 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> .” |
| 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> <p>.1 by estimate and acceptance of a lump sum;</p> <p>.2 by negotiated unit prices which include the <i>Contractor’s</i> overhead and profit, or;</p> <p>.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:</p> <p>.1 Contractor on work of their own forces, 5% overhead, 5% profit.</p> <p>.2 Subcontractor on work of their own forces, 5% overhead, 5 % profit</p> <p>.3 Contractor on work of Subcontractor, 5% overhead only.</p> <p>6.2.4 All quotations shall include <i>Direct Costs</i> and be submitted in a complete manner listing:</p> <p>.1 quantity of each material,</p> <p>.2 unit cost of each material,</p> <p>.3 man hours involved,</p> <p>.4 cost per hour,</p> <p>.5 <i>Subcontractor</i> quotations submitted listing items 1 to 4 above and item 6 below.</p> <p>.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> |
| | | |

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 Contractors work by their own forces - 5% overhead and 5% profit, Subcontractor work by their own forces – 5% overhead and 5% profit, Contractors on Subcontractors work – 5% overhead only.</p> |
| | 6.3.6.2 | <p><u>Delete</u> paragraph 6.3.6.2 and <u>replace</u> it with the following:</p> |

| | | |
|--|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | “.2 If a change in the <i>Work</i> results in a net decrease in the <i>Contract Price</i> , the amount of the credit shall be the net cost, without deduction for <i>Overhead</i> or profit.” |
| | 6.3.7.1(4) | <u>Delete</u> GC 6.3.7.1(4). |
| | 6.3.7.7 | Amend GC 6.3.7.7 by <u>deleting</u> the words “described in paragraph 6.3.7.1” and <u>replacing</u> them with “approved by the <i>Owner</i> in writing and in advance of any such expenses being incurred;” |
| | 6.3.7.9 | Amend GC 6.3.7.9 by <u>adding</u> the following to the end of the paragraph: “...when specifically requested by the <i>Owner</i> or as directed by the <i>Consultant</i> ;”. |
| | 6.3.7.10 | Amend GC 6.3.7.10 by <u>adding</u> the following to the end of the paragraph: “, provided that such amounts are not caused by negligent acts, omissions, or default of the <i>Contractor</i> or <i>Subcontractor</i> ;”. |
| | 6.3.7.13 | <u>Delete</u> GC 6.3.7.13. |
| | 6.3.7.15 | <u>Delete</u> GC 6.3.7.15. |
| | 6.3.7.17 | <u>Delete</u> GC 6.3.7.17 in its entirety including all subparagraphs. |
| | 6.3.11 | <u>Delete</u> GC 6.3.11 and <u>replace</u> it with the following: “6.3.11 The value of the <i>Work</i> performed as a result of a <i>Change Directive</i> shall not be eligible to be included in progress payments until the amount, including the method for determining the amount, of such <i>Change Directive</i> has been determined.” |

GC 6.4 CONCEALED OR UNKNOWN CONDITIONS

| | | |
|--------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC40.1 | 6.4.1 | <u>Delete</u> paragraph 6.4.1 in its entirety and <u>replace</u> with the following: “6.4.1.1 Prior to the submission of the bid on which the Contract was awarded, the Contractor confirms that it carefully investigated the Place of the Work insofar as the Place of Work was available for investigation and, in doing so, applied to that investigation the degree of care and skill required by paragraph 3.14.1 6.4.1.2 No claim by the <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> .” |
| | 6.4.2 | <u>Amend</u> paragraph 6.4.2 by <u>adding</u> a new first sentence as follows: “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 |

| | | |
|--|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>the <i>Contract Documents</i> and 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> |
| | 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> |
| | 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> |

GC 6.5 DELAYS

| | | |
|--------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC41.1 | 6.5.1 | <p>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).”</p> |
| | 6.5.2 | <p><u>Delete</u> GC 6.5.2 in its entirety and <u>replace</u> it with the following:</p> <p>“6.5.2 If the <i>Contractor</i> is delayed in the performance of the <i>Work</i> by a stop work order issued by a court or other public authority and providing that such order was issued on account of a direct breach, violation, contravention, or a failure to abide by any laws, ordinances, rules, regulations, or codes by the <i>Owner</i>, <i>Other Contractor(s)</i>, or the <i>Consultant</i>, and relating to the <i>Work</i> or the <i>Place of the Work</i>, then the <i>Contract Time</i> shall be extended for such reasonable time as the <i>Consultant</i> may determine. The <i>Contractor</i> shall be reimbursed by the <i>Owner</i> for 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> |
| | 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.</p> |

| | | |
|--|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>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> |
| | 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 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.”</p> |
| | 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 by the <i>Contractor</i> 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> ." |
|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

PART 7 DEFAULT NOTICE

GC 7.1

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

| | | |
|--------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC43.1 | 7.1.2 | In GC 7.1.2, <u>delete</u> the words "and if the <i>Consultant</i> has given a written statement to the <i>Owner</i> and <i>Contractor</i> which provides the detail of such neglect to perform the <i>Work</i> properly or such failure to comply with the requirements of the <i>Contract</i> to a substantial degree". |
| SC43.2 | 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> ." |
| | 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> ." |
| | 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> ." |
| | 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" |
| | 7.1.6 to 7.1.10 | <u>Delete</u> GC 7.1.6 and <u>replace</u> it with new paragraphs 7.1.6, 7.1.7, 7.1.8, 7.1.9 and 7.1.10 as follows: "7.1.6 In addition to its right to terminate the <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 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. 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 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 |

| | | |
|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>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 continue after such termination of the <i>Contract</i> or suspension of the <i>Work</i>."</p> |
|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

GC 7.2

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

| | | |
|--------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC44.1 | 7.2.2 | <p><u>Delete</u> paragraph 7.2.2 and <u>replace</u> it with the following:</p> <p>"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."</p> |
| SC44.2 | 7.2.3.1 | <u>Delete</u> subparagraph 7.2.3.1 in its entirety. |
| | 7.2.3.2 | <u>Delete</u> subparagraph 7.2.3.2 in its entirety. |
| | 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". |
| | 7.2.5 | <p><u>Delete</u> paragraph 7.2.5 and <u>replace</u> it with the following:</p> <p>"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:</p> <p>.1 commences correction of the default within the specified time;</p> |

| | | |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>.2 provides the <i>Contractor</i> with an acceptable schedule for such correction; and,</p> <p>.3 completes the correction in accordance with such schedule.”</p> |
| 7.2.6 to 7.2.9 | <p><u>Add</u> new paragraphs 7.2.6, 7.2.7, 7.2.8 and 7.2.9 as follows:</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> <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, 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> | |

PART 8 DISPUTE RESOLUTION

GC 8.1 AUTHORITY OF THE CONSULTANT

| | | |
|--------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC45.1 | 8.1.3 | <p><u>Delete</u> paragraph 8.1.3 in its entirety and <u>substitute</u> as follows:</p> <p>“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.”</p> |
|--------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

GC 8.2 ADJUDICATION

| | | |
|--------|----------------|-----------------------------------------------------------------------------------|
| SC45.2 | 8.2.2 to 8.2.7 | <p><u>Add</u> new GC 8.2.2, 8.2.3, 8.2.4, 8.2.5, 8.2.6, and 8.2.7 as follows:</p> |
|--------|----------------|-----------------------------------------------------------------------------------|

| | |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>“8.2.2 Save and except where the <i>Contractor</i> has given an undertaking, in accordance with the <i>Act</i>, to refer a dispute to <i>Adjudication</i>, 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 with at least one in-person meeting with the <i>Owner’s</i> representative, the <i>Consultant’s</i> representative, and the <i>Contractor’s</i> representative. The parties agree that such steps will be taken to resolve any disputes in a timely and cost-effective manner.</p> <p>8.2.3 Notwithstanding any other provisions in PART 8 DISPUTE RESOLUTION, the parties shall engage in <i>Adjudication</i> proceedings as required by, and in accordance with, the <i>Construction Act</i>.</p> <p>8.2.4 The following procedures shall apply to any <i>Adjudication</i> the parties engage in under the <i>Construction Act</i>:</p> <ol style="list-style-type: none"> .1 any hearings shall be held at a venue within the jurisdiction of the <i>Place of the Work</i> or such other venue as the parties may agree and which is acceptable to the adjudicator; .2 the <i>Adjudication</i> shall be conducted in English; .3 each party may be represented by counsel throughout an <i>Adjudication</i>; .4 there shall not be any oral communications with respect to issues in dispute that are the subject of an <i>Adjudication</i> between a party and the adjudicator unless it is made in the presence of both parties or their legal representatives; and .5 a copy of all written communications between the adjudicator and a party shall be given to the other party at the same time. <p>8.2.5 Any documents or information disclosed by the parties during an <i>Adjudication</i> are confidential and the parties shall not use such documents or information for any purpose other than the <i>Adjudication</i> in which they are disclosed and shall not disclose such documents and information to any third party, unless otherwise required by law, save and except the for the adjudicator.</p> <p>8.2.6 If the <i>Contractor</i> fails to comply with any of the notice requirements set out in the <i>Contract</i>, including the time limits set out in any of the following:</p> <ol style="list-style-type: none"> .1 GC 6.4 – CONCEALED OR UNKNOWN CONDITIONS; .2 GC 6.5 – DELAYS; .3 GC 6.6 – CLAIMS FOR A CHANGE IN CONTRACT PRICE; .4 PART 8 DISPUTE RESOLUTION .5 GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES .6 GC 9.3 – ARTIFACTS AND FOSSILS; or .7 GC 9.5 - MOULD <p>in respect of any claim or dispute, the <i>Contractor</i> shall have no entitlement whatsoever (including to an increase in the <i>Contract Price</i>, or an extension of <i>Contract Time</i>) in the context of an <i>Adjudication</i> under the <i>Construction Act</i> and waives the right to make any such claims or disputes in an <i>Adjudication</i>. This GC 8.2.6 shall operate conclusively as an estoppel and bar in the event such claims or disputes are brought in an <i>Adjudication</i> and the <i>Owner</i> may rely on this GC 8.2.6 as a complete defence to any such claims or disputes.</p> <p>8.2.7 The parties hereby acknowledge and agree,</p> |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>.1 that counterclaims, claims of set-off or the exercise or use of other contractual rights that permit the <i>Owner</i> to withhold, deduct or retain from monies otherwise owed to the <i>Contractor</i> under the <i>Contract</i> may be referred to, and included as part of, <i>Adjudications</i> under the <i>Construction Act</i>;</p> <p>.2 that disputes related to the termination or abandonment of the <i>Contract</i>, as well as any disputes that arise or are advanced following the termination or abandonment of the <i>Contract</i>, shall not be referred to <i>Adjudication</i> under the <i>Construction Act</i>;</p> <p>.3 that notice(s) of <i>Adjudication</i>, with respect to any dispute or claim relating to the <i>Project</i>, shall not be given, and no <i>Adjudication</i> shall be commenced following <i>Contract</i> completion, <i>Contract</i> abandonment, or termination of the <i>Contract</i>;</p> <p>.4 that any <i>Adjudication</i> between the <i>Contractor</i> and a <i>Subcontractor</i> or a supplier that relates to an <i>Adjudication</i> between the <i>Owner</i> and the <i>Contractor</i> shall be joined together to be adjudicated by a single adjudicator, provided that the adjudicator agrees to do so, and the <i>Contractor</i> shall include a provision in each of its contracts that contain an equivalent obligation to this GC 8.2.7.4; and</p> <p>.5 that, other than where the <i>Contractor</i> is obliged to commence an <i>Adjudication</i> pursuant to an undertaking under the <i>Construction 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>8.2.8 The parties acknowledge and agree that no <i>Adjudication</i>, arbitration, action, suit or other proceeding may be brought by the <i>Contractor</i> against the <i>Owner</i> in respect of a claim for an increase to the <i>Contract Price</i> as set out in GC 6.6, before the <i>Consultant</i> has issued its findings in respect of same, pursuant to GC 6.6.5. For greater clarity and without limiting the foregoing, the amount applied for in each <i>Proper Invoice</i> shall not include any amounts pertaining to the <i>Contractor's</i> claim for an increase in <i>Contract Price</i> unless and until the <i>Consultant</i> has issued a written notice to the <i>Contractor</i> regarding the validity of such claim, as provided for in GC 6.6.5. However, nothing in this GC 8.2.8 shall prevent a <i>Contractor</i> from commencing an <i>Adjudication</i> where, pursuant to the <i>Construction Act</i>, the <i>Contractor</i> is required to give an undertaking to a <i>Subcontractor</i> to commence an <i>Adjudication</i> following delivery of a <i>Notice of Non-Payment</i>."</p> |
|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

GC 8.3 NEGOTIATION, MEDIATION AND ARBITRATION

| | | |
|--------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC46.1 | 8.3.1 | <u>Amend</u> paragraph 8.3.1 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." |
| | 8.3.4 | <u>Amend</u> paragraph 8.3.4 by changing part of the second line from "the parties shall request the <i>Project Mediator</i> " to "and subject to paragraph 8.3.1 the parties may request the <i>Project Mediator</i> ". |
| | 8.3.6 to 8.3.9 | <p><u>Delete</u> paragraphs 8.3.6, 8.3.7 and 8.3.8 in their entirety and <u>replace</u> them with the following new GCs 8.3.6, 8.3.7, 8.3.8, and 8.3.9:</p> <p>"8.3.6 The dispute may be finally resolved by arbitration under the Rules for Arbitration of Construction Disputes as provided in CCDC 40 in effect at the time of bid closing, provided that both the <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>.</p> <p>8.3.7 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</p> |

| | | |
|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>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> <p>8.3.8 Other than where the <i>Contractor</i> is obliged to commence an <i>Adjudication</i> pursuant to an undertaking under the <i>Construction 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>8.3.9 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>Construction Act</i> and the regulations thereto shall govern the <i>Adjudication</i>."</p> |
|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

PART 9 PROTECTION OF PERSONS AND PROPERTY

GC 9.1 PROTECTION OF WORK AND PROPERTY

| | | |
|--------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC47.1 | 9.1.1.1 | <p><u>Delete</u> subparagraph 9.1.1.1 in its entirety and <u>substitute</u> the following:</p> <p>“.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> |
| | 9.1.2 | <p><u>Delete</u> paragraph 9.1.2 in its entirety and <u>substitute</u> as follows:</p> <p>“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> |
| | 9.1.5 | <p><u>Add</u> new paragraph 9.1.5 as follows:</p> <p>“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> |

GC 9.2 TOXIC AND HAZARDOUS SUBSTANCES

| | | |
|--------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC48.1 | 9.2.1 | <p>Amend GC 9.2.1 by <u>inserting</u> the following to the end of the paragraph:</p> <p>“For the purposes of GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES, <i>Excess Soil</i> shall not be considered a ‘toxic and hazardous substance’.”</p> |
|--------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC48.2 | 9.2.5.5 | <p>Add a new subparagraph 9.2.5.5 as follows:</p> <p>“.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.”</p> |
| | 9.2.6 | <p><u>Amend</u> GC 9.2.6 by <u>adding</u> the following words after the word “responsible” in the second line:</p> <p>“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,”.</p> |
| | 9.2.8 | <p><u>Amend</u> GC 9.2.8 by <u>adding</u> the following words after the word “responsible” in the second line:</p> <p>“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,”.</p> |
| | 9.2.10 | <p><u>Add</u> new paragraph 9.2.10 as follows:</p> <p>“9.2.10 The <i>Contractor, Subcontractors</i> and <i>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>.”</p> |

GC 9.4 CONSTRUCTION SAFETY

| | | |
|--------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC49.1 | 9.4.1 | <p><u>Delete</u> GC 9.4.1 in its entirety and <u>replace</u> it with the following:</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>. The <i>Contractor’s</i> health and safety program documentation shall be made available for review by the <i>Owner</i> or <i>Consultant</i> immediately upon request. Without limiting the foregoing, the <i>Contractor</i> shall be solely responsible for</p> |
|--------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>construction safety in respect of the <i>Consultant, Subcontractors and Suppliers</i>, the <i>Owner's</i> own forces, <i>Other Contractors</i>, and all persons attending the <i>Place of the Work</i> during the course of the <i>Project</i>.”</p> |
| | 9.4.2 | <p>Amend GC 9.4.2 by <u>adding</u> the following words after “and the <i>Contractor</i>”: “, <i>Subcontractors and Suppliers</i>”.</p> |
| | 9.4.3 | <p>Amend GC 9.4.3 by <u>adding</u> the following words after “and the <i>Contractor</i>”: “, <i>Subcontractors and Suppliers</i>”.</p> |
| | 9.4.4 | <p><u>Delete</u> GC 9.4.4 and replace it with the following: “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> |
| | 9.4.5 | <p><u>Delete</u> GC 9.4.5 in its entirety and <u>replace</u> it with the following: “9.4.5 Prior to the commencement of the <i>Work</i>, the <i>Contractor</i> shall submit to the <i>Owner</i>:</p> <ol style="list-style-type: none"> .1 a current WSIB clearance certificate; .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 naming itself as “constructor” under the <i>OHSA</i>; and .5 copies of any documentation or notices to be filed or delivered to the authorities having jurisdiction for the regulation of occupational health and safety at the <i>Place of the Work</i>.” |
| | 9.4.6 to 9.4.12 | <p><u>Add</u> new GC 9.4.6, 9.4.7, 9.4.8, 9.4.9, 9.4.10, 9.4.11, and 9.4.12 as follows:</p> <p>“9.4.6 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 <i>OHSA</i> and any other occupational health and safety legislation in force at the <i>Place of the Work</i> including the payment of legal fees and disbursements on a solicitor and client basis. Such indemnity shall apply to the extent to which the <i>Owner</i> is not covered by insurance.</p> <p>9.4.7 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</p> |

| | | |
|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p><i>Contractor, any Subcontractor or any other contractors to perform such remedial measures.</i></p> <p>9.4.8 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>9.4.9 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>9.4.10 The <i>Contractor</i> shall provide a copy of the safety program described in GC 9.4.9 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> <p>9.4.11 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>9.4.12 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> |
|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

PART 10 GOVERNING REGULATIONS

GC 10.1 TAXES AND DUTIES

| | | |
|--------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC50.1 | 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> |
| | 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</p> |

| | | |
|--|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | 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.” |
|--|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

GC 10.2 LAWS, NOTICES, PERMITS, AND FEES

| | | |
|--------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC51.1 | 10.2.5 | <u>Amend</u> paragraph 10.2.5 by <u>adding</u> the words “Subject to paragraph 3.4” at the beginning of the paragraph. -and- <u>Add</u> the following to the end of the second sentence: “...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> .” |
| | 10.2.6 | <u>Amend</u> paragraph 10.2.6 by <u>adding</u> the following sentence to the end of the paragraph: “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> .” |
| | 10.2.7 | <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”. |
| | 10.2.8 | <u>Add</u> new paragraph 10.2.8 as follows: “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.” |

GC 10.4 WORKERS’ COMPENSATION

| | | |
|--------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC52.1 | 10.4.1 | <u>Delete</u> paragraph 10.4.1 and <u>replace</u> with the following: “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.” |
|--------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

GC 11.1 INSURANCE

| | | |
|--------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC53.1 | 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</u> insureds, with limits of not less than \$5,000,000.00 inclusive per occurrence for bodily injury, death, and damage to property, including loss of use thereof, for itself and each of its employees, <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, umbrella, or excess liability insurance may be used. All liability coverage shall be maintained for completed operations hazards from the date of <i>Ready-for-Takeover</i>, as set out in the certificate of <i>Ready-for-Takeover</i>, on an ongoing basis for a period of 6 years following <i>Ready-for-Takeover</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>Intentional Deleted. Not Applicable</p> <p>.4 Property and Boiler and Machinery Insurance</p> <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</p> |
|--------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>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 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 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> |
|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

***NEW* GC 11.2 CONTRACT SECURITY**

| | | |
|--------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC52.1 | GC 11.2 | <p><u>Add</u> new GC 11.2 – CONTRACT SECURITY as follows:</p> <p>“GC 11.2 CONTRACT SECURITY</p> <p>11.2.1 The <i>Contractor</i> shall, prior to the execution of the <i>Contract</i>, furnish a performance bond and labour and material payment bond which meets the requirements under paragraph 11.2.2.</p> <p>11.2.2 The performance bond and labour and material payment bond 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>Construction Act</i>; .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>; .5 extends protection to <i>Subcontractors, Suppliers</i>, and any other persons supplying labour or materials to the <i>Project</i>; and |
|--------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>.6 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> <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> <p>11.2.4 Without limiting the foregoing in any way, the bonds shall indemnify and hold harmless the <i>Owner</i> for and against costs and expenses (including legal and <i>Consultant</i> services and court costs) arising out of or as a consequence of any default of the <i>Contractor</i> under this <i>Contract</i>.</p> <p>11.2.4 The <i>Contractor</i> shall be responsible for notifying the surety company of any changes made to the <i>Contract</i> during the course of construction.</p> <p>11.2.5 The premiums for bonds required by the <i>Contract Documents</i> shall be included in the <i>Contract Price</i>.</p> <p>11.2.6 Should the <i>Owner</i> require additional bonds by the <i>Contractor</i> or any of his <i>Subcontractors</i>, after the receipt of bids for the <i>Work</i>, the <i>Contract Price</i> shall be increased by all direct costs attributable to providing such bonds. The <i>Contractor</i> shall promptly provide the <i>Owner</i>, through the <i>Consultant</i>, with any such bonds that may be required."</p> |
|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

PART 12 OWNER TAKEOVER

GC 12.1 READY-FOR-TAKEOVER

| | | |
|--------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC55.1 | 12.1.1 | <p><u>Delete</u> GC 12.1.1 in its entirety and <u>replace</u> it with the following:</p> <p>"12.1.1 <i>Ready-for-Takeover</i> shall be achieved when all of the following has occurred, as verified and approved by the <i>Owner</i>:</p> <p>.1 <i>Substantial Performance of the Work</i> has been achieved, as certified by the <i>Consultant</i>;</p> <p>.2 a permit for occupancy of the <i>Place of the Work</i> has been obtained from the authorities having jurisdiction;</p> <p>.3 the <i>Work</i> to be performed under the <i>Contract</i> has satisfied the requirements for deemed completion in accordance with Section 2(3) of the <i>Construction Act</i>,</p> <p>.4 final cleaning and waste removal, as required by the <i>Contract Documents</i>;</p> <p>.5 the <i>Contractor</i> has delivered to the <i>Consultant</i> and the <i>Owner</i> all inspection certificates from authorities having jurisdiction with respect to any component of the <i>Work</i> which has been completed;</p> <p>.6 subject only to GC 12.1.2, the entire <i>Work</i> has been completed to the requirements of the <i>Contract Documents</i>, including completion of all items on the punch list prepared at the time of <i>Substantial Performance of the Work</i> and the <i>Work</i> is being used for its intended purpose, and is so certified by the <i>Consultant</i>;</p> |
|--------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>.7 subject only to GC 12.1.2, the <i>Contractor</i> has submitted to the <i>Owner</i> and the <i>Consultant</i> in a collated and organized matter, all <i>Close-Out Documentation</i> and any other materials or documentation required by the <i>Contract Documents</i>;</p> <p>.8 subject only to GC 12.1.2, all <i>Products</i>, systems and components of the <i>Project</i> have been commissioned and certified for operation and accepted by the <i>Owner</i> and <i>Consultant</i>, and</p> <p>9 subject only to GC 12.1.2, the <i>Contractor</i> has submitted to the <i>Owner</i> and the <i>Consultant</i> full and complete as-built drawings and <i>Specifications</i> revised by the <i>Contractor</i> to reflect the as-built state of the <i>Work</i>, clearly showing changes to the <i>Drawings</i> and <i>Specifications</i> from the original <i>Contract Documents</i>, all of which have been approved by the <i>Owner</i> acting reasonably.”</p> |
| SC55.2 | 12.1.2 | <p><u>Delete</u> GC 12.1.2 in its entirety and <u>replace</u> it with the following:</p> <p>“12.1.2 The <i>Owner</i> may, in its sole, absolute, and unfettered discretion, waive compliance with a requirement, or a part thereof, for achieving <i>Ready-for-Takeover</i> set out in GC 12.1.1.6 to 12.1.1.9 (inclusive). Where the <i>Owner</i> exercises the discretion afforded under this GC 12.1.2, the <i>Contractor</i> shall be required to comply with GC 5.5.1.2 as part of its application for final payment and the <i>Owner</i> and the <i>Contractor</i>, in consultation with the <i>Consultant</i>, shall establish a reasonable date for completing the <i>Work</i>.”</p> |
| SC55.3 | 12.1.3 | <p><u>Delete</u> GC 12.1.3 in its entirety and <u>replace</u> it with the following:</p> <p>“12.1.3 When the <i>Contractor</i> considers the <i>Work Ready-for-Takeover</i>, it shall submit a written application to the <i>Owner</i> and the <i>Consultant</i> for review.”</p> |
| SC55.4 | 12.1.4 | In GC 12.1.4, <u>delete</u> the words “list and” from the second line. |
| SC55.5 | 12.1.5 | <p><u>Delete</u> GC 12.1.5 in its entirety and <u>replace</u> it with the following:</p> <p>“12.1.5 Following the confirmation of the date of <i>Ready-for-Takeover</i> by the <i>Consultant</i> and as confirmed by the <i>Owner</i>, the <i>Contractor</i> may submit a final application for payment in accordance with GC 5.5 – FINAL PAYMENT.”</p> |
| SC55.6 | 12.1.6 | <u>Delete</u> GC 12.1.6 in its entirety. |

GC 12.2 EARLY OCCUPANCY

| | | |
|--------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC56.1 | GC 12.2 | <p><u>Delete</u> GC 12.2 – EARLY OCCUPANCY BY THE OWNER in its entirety, including all subparagraphs thereunder and <u>replace</u> it with the following:</p> <p>“12.2.1 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 have reached Substantial Performance of the <i>Work</i>. Where the <i>Work</i> extends beyond the <i>Contract Time</i>, progress and completion of the <i>Work</i> shall not unduly interfere with the delivery of scheduled school programs. 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</p> |
|--------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>acceptance of the Work or Project nor shall it relieve the Contractor of any of its obligations under the Contract.</p> <p>12.2.2 Whether the Project contemplates Work by way of renovations in buildings which will be in use or be occupied during the course of the Work or where the Project involves Work that is adjacent to a structure which is in use or is occupied, the Contractor, without in any way limiting its responsibilities under this Contract, shall take all reasonable steps to avoid interference with fire exits, building access and egress, continuity of electric power and all other utilities, to suppress dust and noise and to avoid conditions likely to propagate mould or fungus of any kind and all other steps reasonably necessary to promote and maintain the safety and comfort of the users and occupants of such structures or adjacent structures.”</p> |
|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

GC 12.3 WARRANTY

| | | |
|--------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC57.1 | 12.3.1 | <u>Delete</u> from the first line of paragraph 12.3.1 the words “one year” and <u>replace</u> it with the words “two years” |
| | 12.3.2 | <u>Delete</u> from the first line of paragraph 12.3.2 the word “The” and <u>replace</u> it with the words “Subject to GC 1.1.3, the...” |
| | 12.3.7 to 12.3.12 | <p><u>Add</u> new paragraphs 12.3.7 to 12.3.12 as follows:</p> <p>“12.3.7 Where required by the <i>Contract Documents</i>, the <i>Contractor</i> shall provide a maintenance bond as security for the performance of the <i>Contractor’s</i> obligations as set out in GC 12.3 WARRANTY.</p> <p>12.3.8 The <i>Contractor</i> shall provide fully and properly completed and signed copies of all warranties and guarantees required by the <i>Contract Documents</i>, containing:</p> <ul style="list-style-type: none"> .1 the proper name of the <i>Owner</i>; .2 the proper name and address of the <i>Project</i>; .3 the date the warranty commences, which shall be at the “<i>Ready-for-Takeover</i>” unless otherwise agreed upon by the <i>Consultant</i> in writing. .4 a clear definition of what is being warranted and/or guaranteed as required by the <i>Contract Documents</i>; and .5 the signature and seal (if required by the governing law of the <i>Contract</i>) of the company issuing the warranty, countersigned by the <i>Contractor</i>. <p>12.3.9 Should any <i>Work</i> need to be repaired or replaced during the time period for which it is covered by the specified warranty, a new warranty shall be provided under the same conditions and for the same period as specified herein before. The new warranty shall commence at the completion of the repair or replacement.</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</p> |

| | | |
|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>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> |
|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

PART 13 INDEMNIFICATION AND WAIVER

GC 13.1 INDEMNIFICATION

| | | |
|--------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC58.1 | GC 13.1 | <p><u>Delete</u> GC 13.1 – INDEMNIFICATION in its entirety and <u>replace</u> it with the following:</p> <p>"13.1.1 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> <p>13.1.2 The <i>Owner</i> shall indemnify and hold the <i>Contractor</i>, its agents and employees harmless from and against claims, demands, losses, costs, damages, actions, suits or proceedings arising out of the <i>Contractor's</i> performance of the <i>Contract</i> which are attributable to a lack of or defect in title or an alleged lack of or defect in title to the <i>Place of the Work</i>.</p> <p>13.1.3 The provisions of GC 13.1 - 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 13.1</p> <p>13.1.4 Notwithstanding the provisions of GC1.1 - CONTRACT DOCUMENTS, GC 1.1.6, GC13.1 - INDEMNIFICATION shall govern over the provisions of GC 1.3.1 of GC1.3 – RIGHTS AND</p> |
|--------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | |
|--|--|------------|
| | | REMEDIES.” |
|--|--|------------|

GC 13.2 WAIVER OF CLAIMS

| | | |
|--|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 13.2.1 | In paragraph 13.2.1 in the third 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 “Ready-for-Takeover” in the fourth line. |
| | 13.2.1.1 | In subparagraph 13.2.1.1, in each instance change the word “claims” to “Claims” and change the word “claim” to “Claim”. |
| | 13.2.1.2 | In subparagraph 13.2.1.2 change the word “claims” to “Claims”. |
| | 13.2.1.3 | <u>Delete</u> subparagraph 13.2.1.3 in its entirety. |
| | 13.2.1.4 | In paragraph 13.2.1.4 change the word “claims” to “Claims”. |
| | 13.2.2.1 | In paragraph 13.2.2.1 <u>delete</u> the words “in paragraphs 13.2.1.2 and 13.2.1.3” and <u>replace</u> them with “in paragraph 13.2.1.2” -and- change the word “claims” to “Claims” in both instances and change the word “claim” to “Claim”. |
| | 13.2.3 | <u>Delete</u> paragraph 13.2.3 in its entirety. |
| | 13.2.4 | <u>Delete</u> paragraph 13.2.4 in its entirety. |
| | 13.2.5 | <u>Delete</u> paragraph 13.2.5 in its entirety. |
| | 13.2.6 | In paragraph 13.2.6 change the word “claim” to “Claim” in all instances in the paragraph. |
| | 13.2.8 | In paragraph 13.2.8 change “The party” to “The Contractor” -and- change the word “claim” to “Claim” in all instances in the paragraph. |
| | 13.2.9 | In paragraph 13.2.9 <u>delete</u> the words “under paragraphs 13.2.1 or 13.2.3” and <u>replace</u> them with “under paragraph 13.2.1” |

| | | |
|--|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | -and- change both instances of the words “the party” to “the <i>Contractor</i> ”. Change the word “claim” to “Claim” in all instances in the paragraph. |
|--|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------|

***NEW* PART 14 OTHER PROVISIONS**

| | | |
|--------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SC58.1 | 14.1 | <p><u>Add</u> new PART 14 – OTHER PROVISIONS as follows:</p> <p>“PART 14 OTHER PROVISIONS</p> <p>GC 14.1 OWNERSHIP OF MATERIALS</p> <p>14.1.1 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> |
| | 14.2 | <p><u>Add</u> new GC 14.2 – CONSTRUCTION LIENS as follows:</p> <p>“GC 14.2 LIENS</p> <p>14.2.1 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>14.2.2 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 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 |

| | | |
|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | <p>subsequent action commenced in respect of the lien, at the <i>Contractor's</i> sole expense;</p> <p>.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</p> <p>.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> <p>14.2.3 In the event that the <i>Contractor</i> fails or refuses to comply with its obligations pursuant to paragraph 14.2.2, 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>14.2.4 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> <p>14.2.5 Nothing in this GC 14.2 serves to preclude the <i>Contractor</i> from preserving and perfecting its lien in the event of non-payment by the <i>Owner</i>."</p> |
|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**APPENDIX 1
to the Supplementary Conditions**

Project-specific requirements for a "Proper Invoice"

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

- .1 the written bill or request for payment must be in writing;
- .2 the *Contractor's* name and current address;
- .3 the *Contractor's* HST registration number;
- .4 the date the application for payment was prepared by the *Contractor*;
- .5 the period of time in which the services or materials were supplied to the *Owner*;
- .6 the purchase order number provided by the *Owner*;

- .7 reference to the provisions of the *Contract* under which payment is being sought (e.g. GC 5.3 –PAYMENTS for progress payments, GC 5.4 – SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK GC 5.5 – FINAL PAYMENT for final payment, etc.);
- .8 a description, including quantities where appropriate, of the services or materials, or a portion thereof, that were supplied and form the basis of the *Contractor's* request for payment;
- .9 the amount the *Contractor* is requesting to be paid by the *Owner*, set out in a statement based on the schedule of values approved under GC 5.2.4, separating out any statutory or other holdbacks, set-offs and HST;
- .10 a sworn Statutory Declaration in the form CCDC 9A-2018, only for second and subsequent progress payments;
- .11 a current Workplace Safety Insurance Board clearance certificate;
- .12 a pre-approved schedule of values, supplied by the *Contractor*, for Divisions 1 through 14 of the *Specifications* (or equivalent Construction Specifications Institute Masterformat) of the *Work*, aggregating the total amount of the *Contract Price*, including all supporting invoicing;
- .13 a separate pre-approved schedule of values, supplied by each *Subcontractor*, for each of Division 15, 16, and 17 of the *Specifications* (or equivalent Construction Specifications Institute Masterformat) of the *Work*, aggregating the total amount of the *Contract Price*, including all supporting invoicing;
- .14 invoices and other supporting documentation for all claims against the cash allowance;
- .15 a current, acceptable, and up to date *Construction Schedule Update*;
- .16 if requested by the *Owner*, a current and valid certificate(s) of insurance as required under GC 11.1 – INSURANCE;
- .17 the name, title, telephone number and mailing address of the person at the place of business of the *Contractor* to whom payment is to be directed;
- .18 a current, up to date, and approved *Shop Drawing* log;
- .19 in the case of the *Contractor's* application for final payment, in addition to the foregoing requirements (as applicable):
 - (a) any *Close-Out Documentation*, together with complete and final as-built drawings;
 - (b) the *Contractor's* written request for release of the deficiency holdback, including a statement that no written notices of lien have been received by it;
 - (c) the *Contractor's* written certification that there are no outstanding claims, pending claims or future claims from the *Contractor* or their *Subcontractors* or *Suppliers*; and
 - (d) sufficient evidence of the *Contractor's* compliance with GC 3.11.

END OF AMENDMENTS TO CCDC 2 - 2020

DIVISION 01 - GENERAL REQUIREMENTS

01 14 00 – Work Restrictions

1.0 GENERAL

1.1. SECTION INCLUDES

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

1.2. RELATED SECTIONS

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

1.3. EXISTING SERVICES

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

1.2. AFTER HOURS WORK

- .1 Schedule Work with school staff through the Board's contact so as to limit disruption to school operations. Include for any overtime, to ensure orderly and continuous progression of Work and operation of school.
- .2 Direct calls from Contractors to Board staff to adjust alarms and to arrange for access will not be accepted. All correspondence must be through the Project Manager.
- .3 Arrange 48 hours in advance with the Board to obtain an access card and adjust security alarms for after hours Work.

- .4 Bidders are cautioned that the Board will be compensated by the Contractor for false alarms. Any costs associated with each false alarm will be levied against the Contractor for false fire alarm activation or security alarm activation. These costs may include, but are not limited to:
 - .1 Fines or penalties imposed by the local Fire Services,
 - .2 Fines or penalties imposed by the local Police Services,
 - .3 Overtime costs borne by the Board.
- .5 Contractors are responsible for ensuring doors and windows are secured prior to leaving school.
- .6 Unless specifically stated otherwise school activities take precedence over Contractor's activities.

1.3. SPECIAL REQUIREMENTS

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

END OF SECTION

01 19 00 – Specifications and Documents

1.0 GENERAL

1.1. RELATED DOCUMENTS

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

1.2. WORDS AND TERMS

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

1.3. COMPLEMENTARY DOCUMENTS

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

1.4. PRECEDENCE OF DOCUMENTS

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

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

1.5. SPECIFICATION GRAMMAR

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

END OF SECTION

01 21 00 – Allowances

1.0 GENERAL

1.1. RELATED SECTIONS

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

1.2. GENERAL

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

1.3. CASH ALLOWANCES

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

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

1.4. ALLOWANCES SCHEDULE

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

| | | |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 1 | Designated Substance Removal. (Additional removal not already identified in the ACM Summary report) | \$5,000 |
| 2 | Independent Testing & Inspection (soil, concrete, structural steel, paving, painting) (As directed by the Consultant) | \$5,000 |
| 3 | Window coverings (Additional window coverings not addressed elsewhere in the specification) | \$7,500 |
| 7 | Data cabling installation, network equipment, and Soundfield System supply and installation (Including terminations) | \$12,000 |
| 8 | Exterior Work – concrete area adjacent to Special Education Classroom entrance (Refer to details #4 and #5, sheet A101): Work to include all labour, supervision, materials, and machinery for demolition (including removal and disposal), supply and installation of all items shown in drawing (including, | \$100,000 |

| | | |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| | but not limited to): in-ground garbage containers, bollards, removal of existing dumpster fence, re-location of existing seacan storage container to north side of site, barrier-free parking stalls including linepaint, walkways, precast curbs, and signage, as shown in drawing. Refer to schematic drawing included – allow for a 150 mm thick concrete slab with 200mm granular ‘A’ base compacted to 100% SPMDD. | |
| 9 | Hardware Supply and Installation | \$15,000 |
| 10 | Special Education Classroom Furniture (as directed by owner) | \$20,000 |
| Total of All Allowances: | | \$162,000 |

END OF SECTION

01 31 00 – Project Managing And Coordination

1.0 GENERAL

1.1. RELATED SECTIONS

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

1.2. PROJECT COORDINATION

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

1.3. SITE SUPERVISOR AND PROJECT MANAGER

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

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

1.4. PERMITS

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

1.5. CONSTRUCTION DOCUMENTS

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

1.6. PRE-CONSTRUCTION MEETING

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

1.7. ON-SITE DOCUMENTS

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

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

1.8. SCHEDULES

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

1.9. CONSTRUCTION PROGRESS MEETINGS

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

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

1.10. SUBMITTALS

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

- .5 Process substitutions through Consultant.
- .6 Process change orders through Consultant.
- .7 Deliver closeout submittals for review and preliminary inspections, for transmittal to Consultant.

1.11. RECORD (AS-BUILT) DOCUMENTS AND SAMPLES

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

1.12. CLOSEOUT PROCEDURES

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

END OF SECTION

01 32 00 – Construction Progress Documentation

1.0 GENERAL

1.1. RELATED SECTIONS

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

1.2. SCHEDULES

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

1.3. CONSTRUCTION PROGRESS SCHEDULING

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

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

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

1.4. PROGRESS PHOTOGRAPHS

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

1.5. SHOP DRAWING SUBMITTAL SCHEDULE

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

END OF SECTION

01 33 00 – Submittal Procedures

1.0 GENERAL

1.1 RELATED SECTIONS

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

1.1 ADMINISTRATIVE

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

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

1.2 SHOP DRAWINGS AND PRODUCT DATA

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

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

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

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

1.3 SAMPLES

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

1.4 MOCK-UP

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

1.5 ` CERTIFICATES AND TRANSCRIPTS

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

END OF SECTION

01 35 17 – Fire Safety Procedures

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 14 00 – Work Restrictions.
- .2 Section 01 31 00 - Project Managing and Coordination.
- .3 Section 01 33 00 - Submittal Procedures.
- .4 Section 01 35 23 – Health and Safety
- .5 This section describes requirements applicable to all Sections within Divisions 02 to 49.
- .6 Appendix 01 35 17A Contractor Hot Work Permit

1.2. FIRE SAFETY PLAN

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

1.3. FIRE PROTECTION

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

1.4. HOT WORK

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

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

1.5. HOT WORK PERMIT

- .1 **A sample Hot Work Permit is attached to the specifications – refer to attached Appendix 01 35 17-A**
- .2 Each permit is valid for seven (7) days only and must be renewed prior to its expiration date
- .3 The contractor must obtain Hot Work Permits from the School Board's representative prior to the start of work.

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

1.6. FIRE PROTECTION SYSTEMS

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

1.7. FIRE ALARM SHUT-DOWN PROCEDURE

- .1 Plan the operation such that the required work minimizes system down time to the least amount possible. Do not shut the system down or engage silence mode when the building is occupied by students. Only shut the system down when necessary.
- .2 For the purposes of this section, unoccupied shall mean when the school is not occupied by students.
- .3 Wherever possible, shut down only the zone needing work,
- .4 and schedule down time in unoccupied school hours.
- .5 Contractor(s) shall ensure all costs are included in their bid price for work related to the fire alarm system outside of regular hours and/or during unoccupied school hours. This shall include evening and weekend work.
- .6 A fire alarm system must remain active when the building is not occupied by school or contractor's forces and should never be offline overnight.
- .7 Procedure
The following procedure shall be followed when a fire alarm system is completely or partially affected by maintenance, shutdown, bypass, silence, loss of power, or any other nomenclature that affects the proper operation of the complete system.
 - .1 Inform both the principal and head custodian whenever the fire alarm system is to be disabled prior to any partial or whole system shut down. Where

- school staff are not available, ensure that the Project Coordinator and/or area supervisor are informed.
- .2 Ensure that the school or building administration has advised all staff when the fire alarm system is disabled and/or when it is back online. This will include instructions to call 911 if they detect smoke or a fire.
 - .3 Immediately prior to alarm system shutdown and upon restoring the fire alarm system, the person supervising the shutdown must:
 - 1.7.7.1.3.1. obtain the school account number, located on a red decal attached to the fire alarm panel. This number will be formatted as 20-9xxx, with the xxx being the school location code,
 - 1.7.7.1.3.2. contact Direct Detect at 519-741-2494 (the fire alarm monitoring company), to inform them of the state of the fire alarm and the approximate amount of time the fire alarm will be offline. They will require the building name and account number, the contact name, the contractor name as well as any other information they request, and
 - 1.7.7.1.3.3. contact Bestell at 519-741-2494 (the current security monitoring company), to inform them of the state of the fire alarm and the approximate amount of time the fire alarm will be offline. They may require the building name and account number as well as any other information they request.
 - .4 A fire watch, at the Contractor's expense, shall be undertaken by a person with the sole and express purpose of completing the following tasks and in the event of the detection of smoke, fire, or any other emergency, notifying the fire department, and the building occupants. The fire watch patrol shall:
 - 1.7.7.1.4.1. patrol all halls and high-risk areas affected,
 - 1.7.7.1.4.2. have access to a phone and call 911 if they see or detect smoke or fire,
 - 1.7.7.1.4.3. report any other problems they encounter,
 - 1.7.7.1.4.4. notifying the building occupants in the event of an emergency and
 - 1.7.7.1.4.5. remain on patrol until the fire alarm system is reactivated and fully operational.
 - .5 Contact Direct Detect, Bestell, and school administration to inform them that the fire alarm is back online.
 - .6 In the event that a fire alarm system is activated, whether by smoke, fire or accidentally, the system must not be reset until authorized by the Fire

Department (verbally or in person) and the cause of the alarm has been investigated.

1.8. FIRE PROTECTION EQUIPMENT IMPAIRMENT

- .1 Fire Protection Equipment referred to in this section includes sprinkler systems, special fire suppression systems, and kitchen hood suppression systems.
- .2 The Contractor will take all precautions including restrict all Hot Work operations and shut down hazardous processes during all Fire protection equipment impairment.
- .3 Do not shut the Fire protection equipment down unless necessary. Plan the operation required to reduce system impairment time to the least amount possible.
- .4 Wherever possible, shut down only the Fire protection equipment needing Work and schedule this impairment time for unoccupied school hours. Allow for this in your bid pricing.
- .5 Discuss the possible down time with the head custodian and principal prior to any partial or whole system impairment.
- .6 The school administration shall advise all staff of Fire protection equipment shut down. This will include instructions to call 911 if they see a fire and when system is back online
- .7 The Contractor will plan to use temporary protection such as extra extinguishers, charged hose lines and temporary sprinkler protection during all Fire protection equipment impairment.
- .8 If the sprinkler system is restorable, either in whole or in part, the Contractor or subcontractor shall assign someone to restore the system promptly in the event of a fire.
- .9 A fire patrol may need to be established and will include the following at the Contractor's expense:
 - .1 Patrol all halls and high-risk areas affected.
 - .2 Fire patrol shall have access to a phone and call 911 if they see a fire.
 - .3 Report all other problems they encounter.
 - .4 Remain on patrol until the system is back on.
- .10 The Contractor shall inform all sub trades that the Board has a Red Tag Permit System and it shall be used for all Fire protection equipment impairment.
- .11 For ease of use, a Factory Mutual hanging wall kit has been put in place at all Board Fire protection equipment locations. Supplies of Red Tag Permits are provided there.

1.9. FIRE ALARM MODIFICATIONS AND MAINTENANCE

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

1.10. INSTALLATION AND/OR REPAIR OF ROOFING

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

1.11. FIRE DEPARTMENT ACCESS

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

1.12. SMOKING PRECAUTIONS

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

1.13. FLAMMABLE LIQUIDS

- .1 The handling and storage on site of flammable liquids are to be governed by the current National Fire Code of Canada.
- .2 Flammable liquids such as gasoline, kerosene and naphtha may be kept for ready use in quantities not exceeding 10 imperial gallons provided they are stored in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval.
- .3 Transfer of flammable liquids is prohibited within buildings.
- .4 Transfer of flammable liquids must not be carried out in the vicinity of open flame or any type of heat producing devices.
- .5 Flammable liquids having a flashpoint below 100° F (37.7°C) such as naphtha or gasoline must not be used as solvents or cleaning agents.
- .6 Flammable waste liquids, for disposal, must be stored in approved containers located in a safe ventilated area. Quantities are to be kept to a minimum.

END OF SECTION

Appendix 013517-A Contractor Hot Work Permit



Appendix - 013517-A

Facility Services

CONTRACTOR HOT WORK PERMIT

STOP!

Avoid hot work or seek an alternative method if possible.

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

A SEPARATE PERMIT IS REQUIRED FOR EACH AREA

Board Supervisor/ Manager/Proj. Coordinator Responsibilities:

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

Contractor Responsibilities:

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

PART 1

Section A Indicate Precautions Taken

Available sprinklers, hose streams, and extinguishers available and in service

Within 35' or 11m of hot work

Flammable liquid, dust, lint and oily deposits removed

Explosive atmosphere in area eliminated

Floors swept clean

All wall and floor openings covered

Combustible floors covered with fire resistant sheets

Protect or shut down ducts that might carry sparks/smoke

Hot work on walls, ceiling or roofs

Construction is noncombustible and without combustible covering or insulation

Combustible materials on other side of walls, ceilings or roofs moved away

Combustible structure wetted down

Hot work on enclosed equipment

Enclosed equipment cleaned of all combustible material

Containers purged of flammable liquid/vapour

Pressurized vessels, piping & equipment removed from service, isolated & vented

Fire watch/hot work and monitoring

Fire watch will be provided during and for 1 hour after work including break

Fire watch is trained and supplied with suitable extinguishers

Fire watch is trained in the use of sounding fire alarm

Fire watch conducted in adjoining areas, above and below the space where appropriate

Monitor hot work area for an additional 2 hours after fire watch

Other precautions taken (please detail):

Section B Authorization Granted

Board Supervisor/Manager/Proj. Coordinator: _____

Print Name _____ Signature _____

Permit Valid from / to: (max. 7 days) _____

From this Date _____ to this Date _____

(Maximum 7 days or until end of hot work whichever is sooner)

Section C Contractor and Location Affected

| Dates: (max 7 days) | Name of Contractor (including hot work) | Name & signature of Individual assigned to fire watch | Name & signature of Individual assigned to fire monitoring |
|---------------------|-----------------------------------------|-------------------------------------------------------|------------------------------------------------------------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

School: _____

Room/Area: _____

Nature of Job: _____

I verify the above location has been examined each day, the precautions listed in Section A have been taken each day, and permission is authorized for this work.

I further acknowledge that if activity is during school operational hours, that appropriate notification has been given to school administration.

Hot Works Contractor: _____ Signature _____

School Administrator notified: _____ Print Name _____

In Case of Emergency call: 911 - Then call: 519-570-0003 Ext. 4123

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

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

1.4. TEMPORARY WORK

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

1.5. RESPONSIBILITY

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

1.6. SUBMITTALS

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

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

1.7. SAFETY ACTIVITIES

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

1.8. HEALTH AND SAFETY COORDINATOR

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

1.9. POSTING OF DOCUMENTS

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

1.10. CORRECTION OF NON-COMPLIANCE

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

1.11. PROJECT/SITE CONDITIONS

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

1.15. OVERHEAD LIFTING

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

1.16. WARNING SIGNS AND NOTICES

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

1.17. FIRE PROTECTION

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

1.18. SCENT-FREE ENVIRONMENT

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

END OF SECTION

01 35 43 – Hazardous Materials

1.0 GENERAL

1.1. RELATED SECTIONS

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

1.2. REFERENCES

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

1.3. ASBESTOS and OTHER REGULATED SUBSTANCES

- .1 An Asbestos Audit, as prepared by 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.

1.4. 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 form 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 contactor 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.

1.5. 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

1.6. ACKNOWLEDGEMENT

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

END OF SECTION

Appendix 01 35 43A Asbestos Audit Report



This report is provided for tender purposes and must be viewed in colour and in its entirety. An original copy is available at the school office along with annual inspection and abatement letters, if applicable.

Elmira District Secondary School

2023 Asbestos Audit Update Report

Project Location:

4 University Avenue, Elmira, ON

Prepared for:

Waterloo Region District School Board
51 Ardelt Avenue
Kitchener, ON N2C 2R5

Prepared by:

MTE Consultants
520 Bingemans Centre Drive
Kitchener, ON N2B 3X9

February 27, 2023

Revised: September 5, 2023

MTE File No.: C34532-941

For Tender Purposes



February 27, 2023

Revised: September 5, 2023

MTE File No.: C34532-941

Waterloo Region District School Board
51 Ardelt Avenue
Kitchener, ON N2C 2R5

**RE: 2023 Asbestos Audit Update – Elmira District Secondary School
4 University Avenue, Elmira, Ontario**

1.0 Introduction

MTE Consultants Inc. (MTE) was authorized by the Waterloo Region District School Board (WRDSB) to conduct the 2023 Asbestos Audit Update for the subject building.

The purpose of the assignment was to re-assess and document the location, type, and condition of identified asbestos-containing materials (ACM) present within the building and make appropriate recommendations for management, abatement or remedial activities, as required.

The audit was conducted in accordance with the Ontario Ministry of Labour, *Regulation 278/05- Designated Substance-Asbestos on Construction Projects and in Buildings and Repair Operations* (O. Reg. 278/05). This report shall replace previous audit reports.

2.0 Scope of Work

The Scope of Work for this assessment was completed by MTE and included the following activities:

- Review of existing and historical reports and documentation pertaining to ACM within the building;
- Visual inspection to assess the condition of previously identified ACM, excluding portable structures;
- Collection of building material samples that are suspect ACM, as applicable;
- Submission of samples to an accredited laboratory, as applicable;
- Photographic log of damaged materials; and
- Preparation of this report with findings and recommendations.

3.0 Methodology and Assessment Criteria

This inspection was conducted by visual and laboratory identification methods for the assessment of ACM and their corresponding location, use, condition, and friability. The areas outlined in Section 2.0 were inspected limited to building components, materials and service connections. Notwithstanding that reasonable attempts were made to identify all ACMs, the possibility of concealed material exists and may not become visible until substantial demolition has occurred and therefore are currently undocumented and did not include the following.

- Locations that may be hazardous to the surveyor, such as electrical equipment;
- Where invasive inspection could cause consequential damage to the property or impair the integrity of the equipment, such as roof systems, underground services or components of mechanical equipment;
- Locations concealed by building finishes that require substantial demolition or removal for access or determination of quantities;
- Materials that is present in such an inconsistent fashion that without complete removal of finishes, the extent cannot be determined.
- Non-permanent items or personal contents, furnishings; and
- Settled dust or airborne agents unless otherwise stated.

3.1 Condition of ACM

During the audit process the general condition of ACMs were observed and noted. Materials which are damaged can pose an increased exposure risk to workers, building occupants and the public. While assessing damage can be subjective, abatement items were grouped into two categories to aid in remedial prioritization.

Monitor Annually

These are items which display minor isolated damage; however, do not pose an immediate risk to workers from exposure to asbestos fibres due to the current condition of the material and/or location. No remediation is required at this time; however, these items should be monitored on a yearly basis for evidence of continued degradation. Should the condition of the material change, an evaluation should be completed by a competent person to determine remedial action.

Abatement Action Required

These are items which display damage and may pose potential risk to workers from exposure to asbestos fibres due to the physical condition and/or location of the material. Clean-up, repair or removal of these materials is required as soon as reasonably possible.

4.0 Findings

An inspection of the building was conducted by MTE on February 13, 2023. The three-storey school was constructed in 1953 with additions in 1953, 1959, 1962, 1964 and 1966. The inspection did not include areas of post 1990 construction or renovation (where all building finishes have been removed and replaced), as applicable.

The Asbestos Management Database is provided in **Appendix A** and associated Figures are provided in **Appendix B**. These together provide a current summary of the ACM identified throughout the building.

A summary of the damaged ACM identified at the time of the inspection is provided in **Appendix C**.

The bulk asbestos sample location and analytical summary is provided in **Appendix C**.

4.1 Analytical Results

During this inspection, no samples were collected.

Refer to Appendix C, Table 3 for a detailed summary of the analytical results for each sampled material.

4.2 Removed ACM

A summary of ACM that has been removed since the previous audit/inspection is provided below:

WRDSB Room 20, 21, 22, 23, 24, 25, 117, 120, 121, 122, 123, 124, 219, 903, and 904.

- Asbestos caulking around window frames

WRDSB Room 3, 201.

- 9' x 9' Vinyl floor tiles

WRDSB Room 905, 906, 55, 56, 57, 58, 59, 37, 4, 909F G H.

- Asbestos ceiling tiles
- Asbestos pipe insulation and fittings
- Boiler room insulation and texture coat ceilings

WRDSB Room 46.

- Asbestos ceiling tiles

4.3 Discovery of Additional ACM

No additional ACM or suspect ACM was identified.

4.4 Damaged ACM

Damaged ACM was identified. Refer to **Appendix C, Tables 1 and 2** for a detailed summary of required actions, specific to each material. At the time of the audit, all other ACM at the building was noted to be in good condition.

For Tender Purposes

5.0 Recommendations

5.1 Remedial

Damaged ACM was identified. Refer to Appendix C, Tables 1 and 2 for a detailed summary of required actions, specific to each material. At the time of the audit, all other ACM at the building was noted to be in good condition.

Type 1 abatement Operations may be conducted internally by trained and qualified WRDSB staff. All other abatement work must be conducted by certified asbestos contractors trained and qualified to conduct the type of work required.

All asbestos work must be conducted by staff and/or contractors who are trained and experienced in the type of asbestos operations required, and should be overseen by a qualified third party Health, Safety and Environmental professional. In order to conduct Type 3 asbestos operations, contractors must be certified as Asbestos Abatement Workers AAW (Trade code 253W) and Asbestos Abatement Supervisors AAS (Trade code 253S) by The Ministry of Training, Colleges and Universities (Ministry of Advanced Education and Skills Development) as prescribed by Section 20 of O. Reg. 278/05.

5.2 Long Term Management

This audit was conducted for the long term management of ACM within the building. Prior to future construction or renovation projects, additional assessments and/or sampling may be required.

There are no requirements under current legislation to remove ACM from a building simply because it is present. However, O. Reg. 278/05 requires that an Asbestos Management Plan be implemented and maintained. Asbestos awareness training should be provided for staff that may come in contact with ACM during routine duties or in emergency situations.

ACM that will be disturbed, or will likely be disturbed, during building maintenance, renovations, construction, or demolition activities must be handled and disposed of in accordance with the procedures prescribed by O. Reg. 278/05.

ACM may also be present in concealed locations. If any construction, renovation, alteration, or maintenance activities are required or planned, invasive inspections of concealed locations for potential ACM must be performed prior to such activities. Should any suspect ACM be discovered, work should cease and the materials should not be disturbed. Suspect ACM must be treated as asbestos-containing or sampled and proven to not contain asbestos. Any activities that require disturbance of ACM must be performed in accordance with O. Reg. 278/05.

6.0 Limitations

Services performed by **MTE Consultants Inc.** (MTE) were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the Environmental Engineering & Consulting profession. No other representation expressed or implied as to the accuracy of the information, conclusions or recommendations is included or intended in this report.

This report was completed for the sole use of MTE and the Client. It was completed in accordance with the approved Scope of Work referred to in Section 0. As such, this report may not deal with all issues potentially applicable to the site and may omit issues that are or may be of interest to the reader. MTE makes no representation that the present report has dealt with all-important environmental features, except as provided in the Scope of Work. All findings and conclusions presented in this report are based on site conditions, as they existed during the time period of the investigation. This report is not intended to be exhaustive in scope or to imply a risk-free facility.

Any use which a third party makes of this report, or any reliance on, or decisions to be made based upon it, are the responsibility of such third parties. MTE accepts no responsibility for liabilities incurred by or damages, if any, suffered by any third party as a result of decisions made or actions taken, based upon this report. Others with interest in the site should undertake their own investigations and studies to determine how or if the condition affects them or their plans.

It should be recognized that the passage of time might affect the views, conclusions and recommendations (if any) provided in this report because environmental conditions of a property can change. Should additional or new information become available, MTE recommends that it be brought to our attention in order that we may re-assess the contents of this report.

All of which is respectfully submitted,

MTE Consultants Inc.



Michael Bennett, B.E.S.
Indoor Environments Technologist
519-743-6500 ext. 1459
mbennett@mte85.com



Paul Semeniuk, B.E.S., C.E.T.
Manager, Indoor Environments
519-743-6500 ext. 1324
psemeniuk@mte85.com

MBB: jmm
Attach.

M:\34532\941 - 2023 AAU1 - Reports\FINAL\Elmira District SS\September 2023 Revision\34532-941_2023-09-05_LtrRpt_AAU_Elmira District SS.docx

Asbestos Management Database

For Tender Purposes



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|--------------------|----------------------|------------|-------------------------|---------------------------------|-----------|-------------|-------------------------|
|------------------------------|------------------|----------------|--------------------|----------------------|------------|-------------------------|---------------------------------|-----------|-------------|-------------------------|

| Structure/Additions | | | | | | | | | | |
|---------------------|-------------------|---------------|-------------------------|-------------------|----|---------|------------|-----------------------------------------|-----------|-----------------|
| | Original Building | Structure | Concrete | Concrete | - | Non ACM | - | - | - | - |
| | Original Building | Façade | Brick Veneer | Brick and Mortar | - | Non ACM | - | - | - | - |
| | Original Building | Façade | Concrete | Concrete | - | Non ACM | - | - | - | - |
| | Original Building | Deck | Metal Pan | - | - | Non ACM | - | - | - | - |
| | Original Building | Not Inspected | Not Inspected | Roofing Materials | NF | ACM | Deemed ACM | Sample prior to removal/disturbance | - | - |
| | Original Building | Overhangs | Steel | - | - | Non ACM | - | - | - | - |
| | Original Building | Windows | Interior/Exterior Frame | Grey Sealant | NF | ACM | HM | S01 | 15-Sep-20 | 1% Chrysotile |
| | Original Building | Floor | Mastic | Black Mastic | - | Non ACM | SL | S22ABC | 28-Aug-90 | ND |
| | 1953 Addition | Structure | Concrete | Concrete | - | Non ACM | - | - | - | - |
| | 1953 Addition | Façade | Brick Veneer | Brick and Mortar | - | Non ACM | - | - | - | - |
| | 1953 Addition | Façade | Concrete | Concrete | - | Non ACM | - | - | - | - |
| | 1953 Addition | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| | 1953 Addition | Not Inspected | Not Inspected | Roofing Materials | NF | ACM | Deemed ACM | Sample prior to removal/disturbance | - | - |
| | 1953 Addition | Overhangs | Steel | - | - | Non ACM | - | - | - | - |
| | 1953 Addition | Windows | Interior/Exterior Frame | Silicon | - | Non ACM | - | - | - | - |
| | 1953 Addition | Floor | Mastic | Black Mastic | NF | ACM | SL | S06ABC | 15-Sep-20 | 0.5% Chrysotile |
| | 1959 Addition | Structure | Concrete | Concrete | - | Non ACM | - | - | - | - |
| | 1959 Addition | Façade | Brick Veneer | Brick and Mortar | - | Non ACM | - | - | - | - |
| | 1959 Addition | Façade | Concrete | Concrete | - | Non ACM | - | - | - | - |
| | 1959 Addition | Deck | Metal Pan | - | - | Non ACM | - | - | - | - |
| | 1959 Addition | Not Inspected | Not Inspected | Roofing Materials | NF | ACM | Deemed ACM | Sample prior to removal/disturbance | - | - |
| | 1959 Addition | Overhangs | Steel | - | - | Non ACM | - | - | - | - |
| | 1959 Addition | Windows | Interior/Exterior Frame | Grey Sealant | NF | ACM | SL | S01ABC | 15-Sep-20 | 1% Chrysotile |
| | 1959 Addition | Door | Interior Frame | Brown Sealant | NF | ACM | SL | S03ABC | 15-Sep-20 | 1% Chrysotile |
| | 1959 Addition | Door | Exterior Frame | Grey Sealant | NF | ACM | SL | S02ABC | 15-Sep-20 | 1% Chrysotile |
| | 1959 Addition | Overhangs | Texture Coat | - | NF | ACM | HM | S29_S32 | 3-Apr-09 | 2.5% Chrysotile |
| | 1959 Addition | Floor | Mastic | Black Mastic | NF | ACM | SL | S05ABC | 17-May-13 | 1.4% Chrysotile |
| | 1959 Addition | Structure | Speed Tile | Mortar | - | Non ACM | SL | S14ABC | 6-Jul-21 | ND |
| | 1959 Addition | Structure | Concrete Block | - | - | Non ACM | SL | S01ABC | Add 2022 | ND |
| | 1959 Addition | Structure | Stair Top Layer | - | - | Non ACM | SL | S02ABC | Add 2022 | ND |
| | 1959 Addition | Structure | Stair Filler | - | - | Non ACM | SL | S03ABC | Add 2022 | ND |
| | 1962 Addition | Structure | Concrete | Concrete | - | Non ACM | - | - | - | - |
| | 1962 Addition | Façade | Brick Veneer | Brick and Mortar | - | Non ACM | - | - | - | - |
| | 1962 Addition | Façade | Concrete | Concrete | - | Non ACM | - | - | - | - |
| | 1962 Addition | Deck | Metal Pan | - | - | Non ACM | - | - | - | - |
| | 1962 Addition | Not Inspected | Not Inspected | Roofing Materials | NF | ACM | Deemed ACM | Sample prior to removal/disturbance | - | - |
| | 1962 Addition | Overhangs | Steel | - | - | Non ACM | - | - | - | - |
| | 1962 Addition | Window | Interior/Exterior Frame | Grey Sealant | NF | ACM | SL | S10ABC | 15-Sep-20 | 1% Chrysotile |
| | 1962 Addition | Window | Interior/Exterior Frame | White Sealant | NF | ACM | SL | S12ABC | 15-Sep-20 | 1% Chrysotile |
| | 1962 Addition | Door | Exterior Frame | White Sealant | NF | ACM | SL | S09ABC | 15-Sep-20 | 0.5% Chrysotile |
| | 1962 Addition | Overhangs | Texture Coat | - | NF | ACM | SL | S29ABC | 28-Aug-90 | 2.5% Chrysotile |
| | 1962 Addition | Floor | Mastic | Black Mastic | NF | ACM | Deemed ACM | Additional sampling required to confirm | - | - |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |
| | | Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM. |

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|---------------------------|-----------------------|------------|-------------------------|---------------------------------|-------------------------------------------------------------------|-------------|-------------------------|
| | 1962 Addition | Windows | Window Sill | Parging | - | Non ACM | SL | S06ABC | 6-Jul-21 | ND |
| | 1962 Addition | Columns | Plaster | - | - | Non ACM | SL | S07ABC | 6-Jul-21 | ND |
| | 1964 Addition | Structure | Concrete | Concrete | - | Non ACM | - | - | - | - |
| | 1964 Addition | Façade | Brick Veneer | Brick and Mortar | - | Non ACM | - | - | - | - |
| | 1964 Addition | Façade | Concrete | Concrete | - | Non ACM | - | - | - | - |
| | 1964 Addition | Deck | Metal Pan | - | - | Non ACM | - | - | - | - |
| | 1964 Addition | Not Inspected | Not Inspected | Roofing Materials | NF | ACM | Deemed ACM | Sample prior to removal/disturbance | - | - |
| | 1964 Addition | Overhangs | Steel | - | - | Non ACM | - | - | - | - |
| | 1964 Addition | Windows | Interior Frame | Silicon | - | Non ACM | - | - | - | - |
| | 1964 Addition | Windows | Interior Frame | Soft Grey Sealant | NF | ACM | SL | S17ABC | 6-Jul-21 | 1% Chrysotile |
| | 1964 Addition | Windows | Exterior Frame | Soft Grey Sealant | NF | ACM | SL | S18ABC | 6-Jul-21 | 1% Chrysotile |
| | 1964 Addition | Window | Exterior Frame | Hard Grey Sealant | - | Non ACM | SL | S04ABC | 15-Sep-20 | ND |
| | 1964 Addition | Window | Exterior Pane | White Sealant | NF | ACM | SL | S05ABC | 15-Sep-20 | 0.5% Chrysotile |
| | 1964 Addition | Door | Interior Pane | Black Sealant | - | ACM | SL | S16ABC | 6-Jul-21 | ND |
| | 1964 Addition | Floor | Mastic | Black Mastic | NF | ACM | SL | S17ABC | 28-Aug-90 | 10% Chrysotile |
| | 1964 Addition | Structure | Glass Block | Mortar | - | Non ACM | SL | S13ABC | 6-Jul-21 | ND |
| | 1966 Addition | Structure | Concrete | Concrete | - | Non ACM | - | - | - | - |
| | 1966 Addition | Structure | Concrete Block | Mortar | - | Non ACM | SL | S02ABC | 6-Jul-21 | ND |
| | 1966 Addition | Façade | Brick Veneer | Brick and Mortar | - | Non ACM | - | - | - | - |
| | 1966 Addition | Façade | Concrete | Concrete | - | Non ACM | - | - | - | - |
| | 1966 Addition | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| | 1966 Addition | Deck | Metal Pan | - | - | Non ACM | - | - | - | - |
| | 1966 Addition | Not Inspected | Not Inspected | Roofing Materials | NF | ACM | Deemed ACM | Sample prior to removal/disturbance | - | - |
| | 1966 Addition | Overhangs | Steel | - | - | Non ACM | - | - | - | - |
| | 1966 Addition | Window | Exterior Frame | Beige Sealant | NF | ACM | SL | S13ABC | 15-Sep-20 | 1% Chrysotile |
| | 1966 Addition | Door | Interior Frame | Grey Sealant | - | Non ACM | SL | S15ABC | 15-Sep-20 | ND |
| | 1966 Addition | Door | Exterior Frame | Silicon | - | Non ACM | - | - | - | - |
| | 1966 Addition | Overhangs | Texture Coat | - | NF | ACM | SL | S09ABC | 22-Feb-17 | 0.5% Chrysotile |
| | 1966 Addition | Floor | Mastic | Black Mastic | - | Non ACM | SL | S08ABC | 17-May-13 | ND |
| | 1966 Addition | Ceiling | Ceiling Tile 1 x 1 | Brown Mastic | NF | ACM | Deemed ACM | Sample prior to removal/disturbance - Inaccessible due to height. | - | - |
| | 1966 Addition | Insulation | Insulation Wrap | - | - | Non ACM | SL | S03ABC | 6-Jul-21 | ND |
| | 1966 Addition | Ducting | Duct Insulation | Mastic & Paper | - | Non ACM | SL | S05ABC | 6-Jul-21 | ND |
| Level 1 | | | | | | | | | | |
| 2 | Gym | Floor | Wood | - | - | Non ACM | - | - | - | - |
| 2 | Gym | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 2 | Gym | Deck | Metal Pan | Steel | - | Non ACM | - | - | - | - |
| 2A | Office | Floor | Vinyl Floor Tile 9"x 9" | Beige with Blue Fleck | NF | ACM | SL | S05ABC | 9-Apr-13 | 2.1% Chrysotile |
| 2A | Office | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | SL | S02abc | 3-Apr-09 | ND |
| 2A | Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 2A | Office | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 2B | Office | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 2B | Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 2B | Office | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM. |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|----------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-----------|-------------|-------------------------|
| 2C | Washroom | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 2C | Washroom | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 2C | Washroom | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 2D | Change Room | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 2D | Change Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 2D | Change Room | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 2E | Gym Storage | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 2E | Gym Storage | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 2E | Gym Storage | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 2F | Shower | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 2F | Shower | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 2F | Shower | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 2G | Fan Room | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 2G | Fan Room | Floor | Wood | - | - | Non ACM | - | - | - | - |
| 2G | Fan Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 2G | Fan Room | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 3 | - | Floor | Vinyl Sheet Floor | Grey | - | Non ACM | - | - | - | - |
| 3 | - | Floor | Vinyl Floor Tile 12"x 12" | Grey with White Fleck | NF | ACM | SL | S12ABC | 17-May-13 | 1.4% Chrysotile |
| 3 | - | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 3 | - | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 3 | - | Above Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 4 | - | Floor | Vinyl Floor Tile 9"x 9" | Beige with Blue Fleck | NF | ACM | SL | S05ABC | 9-Apr-13 | 2.1% Chrysotile |
| 4 | - | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 4 | - | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 4 | - | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 5 | Boys Washroom | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 5 | Boys Washroom | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 5 | Boys Washroom | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 6 | Girls Washroom | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 6 | Girls Washroom | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 6 | Girls Washroom | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 6 | Girls Washroom | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 6A | Office | Floor | Vinyl Floor Tile 12" x 12" | Beige Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 6A | Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 6A | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 6A | Office | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 7 | Boiler Room | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 7 | Boiler Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 7 | Boiler Room | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 7A | Electrical Room | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 7A | Electrical Room | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 7A | Electrical Room | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 7B | Custodial | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 7B | Custodial | Wall | Concrete | - | - | Non ACM | - | - | - | - |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |
| | | Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM. |

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|---------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-------------|-------------|-------------------------|
| 7B | Custodial | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 8 | Classroom 8 | Floor | Wood | - | - | Non ACM | - | - | - | - |
| 8 | Classroom 8 | Floor | Vinyl Floor Tile 12"x 12" | Beige with White Fleck | - | Non ACM | SL | S09ABC | 9-Apr-13 | ND |
| 8 | Classroom 8 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 8 | Classroom 8 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 8 | Classroom 8 | Above Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 8A | Kiln Room | Floor | Vinyl Floor Tile 12"x 12" | Beige with Black & White | NF | ACM | SL | S04ABC | 9-Apr-13 | 1.2% Chrysotile |
| 8A | Kiln Room | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 8A | Kiln Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 8A | Kiln Room | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 9 | Office | Floor | Vinyl Floor Tile 12"x 12" | Beige with Black & White | NF | ACM | SL | S10ABC | 17-May-13 | 1.5% Chrysotile |
| 9 | Office | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | SL | S02abc | 3-Apr-09 | ND |
| 9 | Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 9 | Office | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 9 | Office | Above Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 10 | - | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 10 | - | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 10 | - | Above Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 11 | - | Floor | Carpet | - | - | Non ACM | - | - | - | - |
| 11 | - | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 11 | - | Wall | Brick | - | - | Non ACM | - | - | - | - |
| 11 | - | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 11 | - | Above Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 11A | - | Floor | Vinyl Floor Tile 9"x 9" | Red with Black & White Streak | NF | ACM | SL | S04abc | 3-Apr-09 | 10% Chrysotile |
| 11A | - | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 11A | - | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 11A | - | Piping | Pipe Fitting | Parged Cement | F | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| 11A | - | Above Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 12 | Library | Floor | Vinyl Floor Tile 12"x 12" | Yellow Oatmeal | - | Non ACM | - | - | - | - |
| 12 | Library | Floor | Carpet | - | - | Non ACM | - | - | - | - |
| 12 | Library | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 12 | Library | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 12 | Library | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 12 | Library | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 12A | Listening Room | Floor | Carpet | - | - | Non ACM | - | - | - | - |
| 12A | Listening Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 12A | Listening Room | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 12A | Listening Room | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 12B | Study | Floor | Carpet | - | - | Non ACM | - | - | - | - |
| 12B | Study | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 12B | Study | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 12B | Study | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 12B | Study | Above Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 12D | Library Office | Floor | Carpet | - | - | Non ACM | - | - | - | - |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |
| | | Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM. |

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|---------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-----------|-------------|-------------------------|
| 12D | Library Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 12D | Library Office | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 12D | Library Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 12D | Library Office | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 12D | Library Office | Above Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 13 | Mezzanine | Floor | Wood | - | - | Non ACM | - | - | - | - |
| 13 | Classroom 13 | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 13 | Classroom 13 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 13 | Classroom 13 | Ceiling | Ceiling Tile 2' x 4' | Acoustic String Tile | - | Non ACM | - | - | - | - |
| 13A | Finishing Room | Floor | Carpet | - | - | Non ACM | - | - | - | - |
| 13A | Finishing Room | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 13A | Finishing Room | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 14 | - | Floor | Vinyl Floor Tile 12"x 12" | Beige Dense Fleck | - | Non ACM | - | - | - | - |
| 14 | - | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 14 | - | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 14 | - | Above Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 14A | - | Floor | Vinyl Floor Tile 12"x 12" | Beige Dense Fleck | - | Non ACM | - | - | - | - |
| 14A | - | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 14A | - | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 14A | - | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 15 | Classroom 15 | Floor | Vinyl Floor Tile 12"x 12" | White & Blue Streaks | - | Non ACM | HM | S03 | 3-Apr-09 | ND |
| 15 | Classroom 15 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 15 | Classroom 15 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 15A | Classroom 15 | Floor | Ceramic Tile | - | - | Non ACM | HM | S03 | 3-Apr-09 | ND |
| 15A | Classroom 15 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 15A | Classroom 15 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 16 | Audio/Video Room | Floor | Vinyl Floor Tile 12"x 12" | Beige Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 16 | Audio/Video Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 16 | Audio/Video Room | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 16 | Audio/Video Room | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 16A | Audio/Video Room | Floor | Vinyl Floor Tile 12"x 12" | Beige Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 16A | Audio/Video Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 16A | Audio/Video Room | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 16A | Audio/Video Room | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 16B | Staff Room | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 16B | Staff Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 16B | Staff Room | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 16B | Staff Room | Above Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 16C | Work Room | Floor | Vinyl Floor Tile 12"x 12" | Yellow Oatmeal (New) | - | Non ACM | - | - | - | - |
| 16C | Work Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 16C | Work Room | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 16C | Work Room | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 16C | Work Room | Above Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 17 | Book Storage | Floor | Concrete | - | - | Non ACM | - | - | - | - |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |
| | | Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM. |

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|-------------------|----------------|---------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-----------|-------------|-------------------------|
| 17 | Book Storage | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 17 | Book Storage | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 18 | Boys Washroom | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 18 | Boys Washroom | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 18 | Boys Washroom | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 18 | Boys Washroom | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 19 | Classroom 19 | Floor | Wood | - | - | Non ACM | - | - | - | - |
| 19 | Classroom 19 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 19 | Classroom 19 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 19A | Classroom 19A | Floor | Wood | - | - | Non ACM | - | - | - | - |
| 19A | Classroom 19A | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 19A | Classroom 19A | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 20 | Storage/Receiving | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 20 | Storage/Receiving | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 20 | Storage/Receiving | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 20 | Storage/Receiving | Ceiling | Texture Coat | - | NF | ACM | SL | S29abc | 3-Apr-09 | 2.5% Chrysotile |
| 20 | Storage/Receiving | Firespray | Firespray | - | - | Non ACM | - | - | - | - |
| 21 | Room 21 | Floor | Vinyl Floor Tile 9"x 9" | Tan, Brown, & Brown | NF | ACM | SL | S07ABC | 22-Feb-17 | 5.25% Chrysotile |
| 21 | Room 21 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 21 | Room 21 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 21 | Room 21 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 21 | Room 21 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 21B | Room 21 | Floor | Vinyl Floor Tile 9"x 9" | Tan, Brown, & Brown | NF | ACM | SL | S07ABC | 22-Feb-17 | 5.25% Chrysotile |
| 21B | Room 21 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 21B | Room 21 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 21B | Room 21 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 21B | Room 21 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 21C | Room 21 | Floor | Vinyl Floor Tile 9"x 9" | Tan, Brown, & Brown | NF | ACM | SL | S07ABC | 22-Feb-17 | 5.25% Chrysotile |
| 21C | Room 21 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 21C | Room 21 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 21C | Room 21 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 21C | Room 21 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 22 | Classroom 22 | Floor | Vinyl Floor Tile 9"x 9" | Brown, Black, Beige, Streaks | NF | ACM | SL | S08ACB | 22-Feb-17 | 7.2% Chrysotile |
| 22 | Classroom 22 | Floor | Vinyl Floor Tile 12"x 12" | Beige Dense Fleck (New) | - | Non ACM | - | - | - | - |
| 22 | Classroom 22 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 22 | Classroom 22 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 22 | Classroom 22 | Wall | Plaster | - | - | Non ACM | SL | S11A | 15-Sep-20 | ND |
| 22 | Classroom 22 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 22 | Classroom 22 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 23 | Classroom 23 | Floor | Wood | - | - | Non ACM | - | - | - | - |
| 23 | Classroom 23 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 23 | Classroom 23 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 23 | Classroom 23 | Ceiling | Ceiling Tile 1' x 1' | Random Hole | - | Non ACM | SL | S27abc | 3-Apr-09 | ND |
| 24 | Classroom 24 | Floor | Wood | - | - | Non ACM | - | - | - | - |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |
| | | Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM. |

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|---------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-------------------------------------|-------------|-------------------------|
| 24 | Classroom 24 | Floor | Vinyl Floor Tile 12"x 12" | Grey with Black Streak (New) | - | Non ACM | - | - | - | - |
| 24 | Classroom 24 | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | SL | S02abc | 3-Apr-09 | ND |
| 24 | Classroom 24 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 24 | Classroom 24 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 24 | Classroom 24 | Ceiling | Ceiling Tile 1' x 1' | Random Hole | - | Non ACM | HM | S27 | 3-Apr-09 | ND |
| 25 | Classroom 25 | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | SL | S02abc | 3-Apr-09 | ND |
| 25 | Classroom 25 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | SL | S03ABC | 22-Feb-17 | ND |
| 25 | Classroom 25 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 25 | Classroom 25 | Piping | Pipe Fitting | Parqed Cement | F | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| 25 | Classroom 25 | Deck | Metal Pan | Steel | - | Non ACM | - | - | - | - |
| 25A | Tool Crib | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 25A | Tool Crib | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 25A | Tool Crib | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 25B | Shop | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 25B | Shop | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 25B | Shop | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 25B | Shop | Piping | Pipe Fitting | Parqed Cement | F | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| 25B | Shop | Deck | Metal Pan | Steel | - | Non ACM | - | - | - | - |
| 25C | Shop | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 25C | Shop | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 25C | Shop | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 25C | Shop | Deck | Metal Pan | Steel | - | Non ACM | - | - | - | - |
| 26 | Classroom 26 | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 26 | Classroom 26 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 26 | Classroom 26 | Piping | Pipe Fitting | Parqed Cement | F | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| 26 | Classroom 26 | Deck | Metal Pan | Steel | - | Non ACM | - | - | - | - |
| 26A | Tool Crib | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 26A | Tool Crib | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 26A | Tool Crib | Piping | Pipe Fitting | Parqed Cement | F | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| 26A | Tool Crib | Deck | Metal Pan | Steel | - | Non ACM | - | - | - | - |
| 26B | - | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 26B | - | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 26B | - | Ducting | Flex Joint | - | NF | ACM | Deemed ACM | Sample prior to removal/disturbance | - | - |
| 26B | - | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| 26C | Vestibule | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 26C | Vestibule | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 26C | Vestibule | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 27A/B/C/D | Music | Floor | Carpet | - | - | Non ACM | - | - | - | - |
| 27A/B/C/D | Music | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 27A/B/C/D | Music | Wall | Drywall | Drywall Joint Compound | NF | ACM | SL | S14A | 15-Sep-20 | 1% Chrysotile |
| 27A/B/C/D | Music | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 29 | Classroom 29 | Floor | Vinyl Floor Tile 12"x 12" | Olive with White Streak | - | Non ACM | HM | S05ABC | 16-Mar-17 | ND |
| 29 | Classroom 29 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 29 | Classroom 29 | Ceiling | Ceiling Tile 2 x 4 | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |
| | | Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM. |

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|---------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-----------|-------------|-------------------------|
| 29 | Classroom 29 | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 30 | Classroom 30 | Floor | Vinyl Floor Tile 12"x 12" | Olive with White Streak | - | Non ACM | SL | S05ABC | 16-Mar-17 | ND |
| 30 | Classroom 30 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 30 | Classroom 30 | Ceiling | Ceiling Tile 2 x 4 | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 30 | Classroom 30 | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 31 | Classroom 31 | Floor | Vinyl Floor Tile 9"x 9" | Beige with Brown Streak | NF | ACM | HM | S04 | 16-Mar-17 | 0.72% Chrysotile |
| 31 | Classroom 31 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 31 | Classroom 31 | Ceiling | Ceiling Tile 2 x 4 | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 32 | Classroom 32 | Floor | Vinyl Floor Tile 9"x 9" | Beige with Brown Streak | NF | ACM | SL | S04ABC | 16-Mar-17 | 0.72% Chrysotile |
| 32 | Classroom 32 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 32 | Classroom 32 | Ceiling | Ceiling Tile 2 x 4 | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 33 | Classroom 33 | Floor | Wood | - | - | Non ACM | - | - | - | - |
| 33 | Classroom 33 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 33 | Classroom 33 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 33A | Electronics | Floor | Wood | - | - | Non ACM | - | - | - | - |
| 33A | Electronics | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 33A | Electronics | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 33B | Office | Floor | Wood | - | - | Non ACM | - | - | - | - |
| 33B | Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 33B | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 33C | Photograph | Floor | Wood | - | - | Non ACM | - | - | - | - |
| 33C | Photograph | Wall | Drywall | Drywall Joint Compound | NF | ACM | HM | S14 | 15-Sep-20 | 1% Chrysotile |
| 33C | Photograph | Ceiling | Ceiling Tile 1 x 1 | Long Fissure Random Pinhole | - | Non ACM | - | - | - | - |
| 34 | Office | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 34 | Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 34 | Office | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 35 | Washroom | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 35 | Washroom | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 35 | Washroom | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 36 | Washroom | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 36 | Washroom | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 36 | Washroom | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 37 | Office | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 37 | Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 37 | Office | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 39 | Office | Floor | Vinyl Floor Tile 12"x12" | Brown Dense Fleck (New) | - | Non ACM | - | - | - | - |
| 39 | Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 39 | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 39 | Office | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 39A | Office | Floor | Vinyl Floor Tile 12"x12" | Brown Dense Fleck (New) | - | Non ACM | - | - | - | - |
| 39A | Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 39A | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 39A | Office | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 39A | Office | Deck | Metal Pan | Steel | - | Non ACM | - | - | - | - |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |
| | | Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM. |

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|--------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-------------------------------------|-------------|-------------------------|
| 40 | Staff Dining | Floor | Vinyl Floor Tile 9"x 9" | Cream with Brown Fleck | NF | ACM | SL | S06ABC | 16-Mar-17 | 2.08% Chrysotile |
| 40 | Staff Dining | Floor | Vinyl Floor Tile 9"x 9" | Brown with Cream Fleck | NF | ACM | SL | S06ABC | 17-May-13 | 1.2% Chrysotile |
| 40 | Staff Dining | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 40 | Staff Dining | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 41 | Cafeteria | Floor | Vinyl Floor Tile 12"x12" | White with Green Fleck (2013) | - | - | - | - | - | - |
| 41 | Cafeteria | Floor | Vinyl Floor Tile 12"x12" | Green Dense Fleck (2013) | - | - | - | - | - | - |
| 41 | Cafeteria | Floor | Vinyl Floor Tile 12"x12" | Grey Dense Fleck (2013) | - | - | - | - | - | - |
| 41 | Cafeteria | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 41 | Cafeteria | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 41 | Cafeteria | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 41A | Kitchen | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 41A | Kitchen | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 41A | Kitchen | Piping | Pipe Fitting | Parged Cement | F | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| 41A | Kitchen | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| 41B | Kitchen | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 41B | Kitchen | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 41B | Kitchen | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| 41C | Store | Floor | Vinyl Floor Tile 9"x 9" | Beige with Brown Fleck | NF | ACM | SL | S07ABC | 17-May-13 | 1.3 Chrysotile |
| 41C | Store | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 41C | Store | Ducting | Flex Joint | - | NF | ACM | Deemed ACM | Sample prior to removal/disturbance | - | - |
| 41C | Store | Piping | Pipe Fitting | Parged Cement | F | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| 41C | Store | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| 42 | Boys Washroom | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 42 | Boys Washroom | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 42 | Boys Washroom | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 42 | Boys Washroom | Piping | Pipe Fitting | Parged Cement | F | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| 43 | Girls Washroom | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 43 | Girls Washroom | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 43 | Girls Washroom | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 44 | Classroom 44 | Floor | Vinyl Floor Tile 9"x 9" | Brown with Brown Fleck | NF | ACM | SL | S06ABC | 22-Feb-17 | 1.69% Chrysotile |
| 44 | Classroom 44 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 44 | Classroom 44 | Piping | Pipe Fitting | Parged Cement | F | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| 45 | Classroom 45 | Floor | Vinyl Floor Tile 9"x 9" | White with Grey Fleck | - | Non ACM | SL | S07ABC | 16-Mar-17 | ND |
| 45 | Classroom 45 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 45 | Classroom 45 | Ceiling | Ceiling Tile 2 x 4 | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 45 | Classroom 45 | Piping | Pipe Fitting | Parged Cement | F | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| 46 | Classroom 46 | Floor | Vinyl Floor Tile 9"x 9" | Beige with Black & White Streak | NF | ACM | SL | S08ABC | 17-May-13 | 1.1% Chrysotile |
| 46 | Classroom 46 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 46 | Classroom 46 | Ceiling | Ceiling Tile 2 x 4 | Short Fissure Random Pinhole (2023) | - | Non ACM | - | - | - | - |
| 46 | Classroom 46 | Piping | Pipe Fitting | Parged Cement | F | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| 50 | Storage | No-Access | | | | | | | | |
| 51 | Storage | No-Access | | | | | | | | |
| 53 | Storage | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 53 | Storage | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |

Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|---------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-------------------------------------|-------------|-------------------------|
| 53 | Storage | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 53 | Storage | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 54 | Store | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 54 | Store | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 54 | Store | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 54 | Store | Ducting | Flex Joint | - | NF | ACM | Deemed ACM | Sample prior to removal/disturbance | - | - |
| 55 | Storage | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 55 | Storage | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 55 | Storage | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| 56 | Boiler Room | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 56 | Boiler Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 56 | Boiler Room | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| 57 | Pump Room | Floor | Carpet | - | - | Non ACM | - | - | - | - |
| 57 | Pump Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 57 | Pump Room | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| 58 | Washroom | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 58 | Washroom | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 58 | Washroom | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| 59 | Washroom | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 59 | Washroom | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 59 | Washroom | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| 121 | Library Office | Floor | Carpet | - | - | Non ACM | - | - | - | - |
| 121 | Library Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 121 | Library Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 121 | Library Office | Above Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 801 | Corridor | Floor | Vinyl Floor Tile 12"x 12" | Yellow Oatmeal | - | Non ACM | SL | S30abc | 3-Apr-09 | ND |
| 801 | Corridor | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | SL | S02abc | 3-Apr-09 | ND |
| 801 | Corridor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 801 | Corridor | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 801B | Corridor | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 801B | Corridor | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | SL | S02abc | 3-Apr-09 | ND |
| 801B | Corridor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 801B | Corridor | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 801C | Audio/Video Room | Floor | Vinyl Floor Tile 12"x 12" | Beige Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 801C | Audio/Video Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 801C | Audio/Video Room | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 801C | Audio/Video Room | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| 801D | Tech Class | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 801D | Tech Class | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 801D | Tech Class | Piping | Pipe Fitting | Parged Cement | NF | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| 801D | Tech Class | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| 802 | Corridor | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 802 | Corridor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 802 | Corridor | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |
| | | Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM. |

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|--------------------------|----------------|---------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-------------|-------------|-------------------------|
| 802 | Corridor | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 802 | Corridor | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 802A | Corridor | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 802A | Corridor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 802A | Corridor | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 802B | Room 21 | Floor | Vinyl Floor Tile 9"x 9" | Tan, Brown, & Brown | NF | ACM | SL | S07ABC | 22-Feb-17 | 5.25% Chrysotile |
| 802B | Room 21 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 802B | Room 21 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 802B | Room 21 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 802B | Room 21 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 803 | Corridor | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 803 | Corridor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 803 | Corridor | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 803A | Boys Changeroom Corridor | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 803A | Boys Changeroom Corridor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 803A | Boys Changeroom Corridor | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 803B | Corridor | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 803B | Corridor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 803B | Corridor | Ceiling | Ceiling Tile 2 x 2 | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 803C | Corridor | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 803C | Corridor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 803C | Corridor | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 803C | Corridor | Ceiling | Ceiling Tile 2 x 2 | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 803C | Corridor | Piping | Pipe Fitting | Parquet Cement | F | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| 803D | Corridor | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 803D | Corridor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 803D | Corridor | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 803D | Corridor | Ceiling | Ceiling Tile 2 x 2 | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 803E | Corridor | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 803E | Corridor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 803E | Corridor | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 803E | Corridor | Ceiling | Ceiling Tile 2 x 2 | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 803E | Corridor | Piping | Pipe Fitting | Parquet Cement | F | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| 804 | Gym Corridor | Floor | Vinyl Floor Tile 9"x 9" | Beige with Brown Streak | NF | ACM | HM | S04 | 16-Mar-17 | 0.72% Chrysotile |
| 804 | Gym Corridor | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 804 | Gym Corridor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 804 | Gym Corridor | Ceiling | Ceiling Tile 2' x 2' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 804A | Corridor | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 804A | Corridor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 804A | Corridor | Ceiling | Ceiling Tile 2' x 2' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 804B | Gym Corridor | Floor | Vinyl Floor Tile 12"x 12" | Beige with Red & White Streak | NF | ACM | SL | S33abc | 3-Apr-09 | 0.5% Chrysotile |
| 804B | Gym Corridor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 804B | Gym Corridor | Ceiling | Ceiling Tile 2' x 2' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 901 | Stairwell | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |

Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|----------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-------------------------------------------------------------------|-------------|-------------------------|
| 901 | Stairwell | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 901 | Stairwell | Ceiling | Concrete | - | - | Non ACM | - | - | - | - |
| 902 | Stairwell | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | - | - | - | - |
| 902 | Stairwell | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 902 | Stairwell | Ceiling | Concrete | - | - | Non ACM | - | - | - | - |
| 903 | Entrance Lobby | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 903 | Entrance Lobby | Wall | Concrete | Concrete Block | - | Non ACM | - | - | - | - |
| 903 | Entrance Lobby | Ceiling | Ceiling Tile 2 x 2 | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 904 | Stairwell | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 904 | Stairwell | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 904 | Stairwell | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 904 | Stairwell | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 904 | Stairwell | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 905 | Stairwell | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 905 | Stairwell | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 905 | Stairwell | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 905 | Stairwell | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 905 | Stairwell | Ceiling | Plaster | - | - | Non ACM | SL | S04ABC | 22-Feb-17 | ND |
| 905 | Stairwell | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 906 | Boiler Room | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 906 | Stairwell | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 906 | Boiler Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 906 | Stairwell | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 906 | Stairwell | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 906 | Boiler Room | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| 907 | Stairwell | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 907 | Stairwell | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 907 | Stairwell | Ceiling | Concrete | - | - | Non ACM | - | - | - | - |
| G1 | Gym | Floor | Wood | - | - | Non ACM | - | - | - | - |
| G1 | Gym | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| G1 | Gym | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| G1 | Gym | Ceiling | Ceiling Tile 1 x 1 | Medium & Small Pinhole | NF | ACM | Deemed ACM | Sample prior to removal/disturbance - Inaccessible due to height. | - | - |
| G1 | Gym | Ceiling | Ceiling Tile 1 x 1 | Medium Fissure Random Pinhole | NF | ACM | Deemed ACM | Sample prior to removal/disturbance - Inaccessible due to height. | - | - |
| G1 | Gym | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| G1A | P.E.O. Room | Floor | Wood | - | - | Non ACM | - | - | - | - |
| G1A | P.E.O. Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| G1A | P.E.O. Room | Above Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| G1B | P.E.O. IT Room | Floor | Vinyl Floor Tile 12" x 12" | Beige with Brown Spots | - | ACM | SL | S09ABC | 17-May-13 | 1.3% Chrysotile |
| G1B | P.E.O. IT Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| G1B | P.E.O. IT Room | Above Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| G1C | Store | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| G1C | Store | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| G1C | Store | Above Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| G1D | Store | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |
| | | Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM. |

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|-----------------------|----------------|---------------------------|-------------------------------|------------|-------------------------|---------------------------------|-------------------------------------------------------------------|-------------|-------------------------|
| G1D | Store | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| G1D | Store | Ceiling | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| G1D | Store | Above Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| G1E | Boys Changeroom | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| G1E | Boys Changeroom | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| G1E | Boys Changeroom | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| G1E | Boys Changeroom | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| G1F | Washroom | Floor | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| G1F | Washroom | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| G1F | Washroom | Ceiling | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| G1G | Showers | Floor | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| G1G | Showers | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| G1G | Showers | Ceiling | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| G2 | Gym | Floor | Wood | - | - | Non ACM | - | - | - | - |
| G2 | Gym | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| G2 | Gym | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| G2 | Gym | Ceiling | Ceiling Tile 1 x 1 | Medium & Small Pinhole | NF | ACM | Deemed ACM | Sample prior to removal/disturbance - Inaccessible due to height. | - | - |
| G2 | Gym | Ceiling | Ceiling Tile 1 x 1 | Medium Fissure Random Pinhole | NF | ACM | Deemed ACM | Sample prior to removal/disturbance - Inaccessible due to height. | - | - |
| G2 | Gym | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| G2 | Gym | Piping | Pipe Fitting | Parged Cement | F | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| G2A | Stores | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| G2A | Stores | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| G2A | Stores | Ceiling | Ceiling Tile 2 x 4 | Long Fissure Random Pinhole | NF | ACM | HM | S01 | 16-Mar-17 | 5% Amosite |
| G2B | Stores | Floor | Wood | - | - | Non ACM | - | - | - | - |
| G2B | Stores | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| G2B | Stores | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| G2C | Girls Change Entrance | Floor | Vinyl Floor Tile 12"x 12" | Beige With Red & White Streak | NF | ACM | SL | S33abc | 3-Apr-09 | 0.5% Chrysotile |
| G2C | Girls Change Entrance | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| G2C | Girls Change Entrance | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| G2D/E | Landing | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| G2D/E | Landing | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| G2D/E | Landing | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| G2F | Girls Change | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| G2F | Girls Change | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| G2F | Girls Change | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| G2G | Washroom | Floor | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| G2G | Washroom | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| G2G | Washroom | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| G2H | Shower | Floor | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| G2H | Shower | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| G2H | Shower | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |
| G2J | Stores | Floor | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| G2J | Stores | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| G2J | Stores | Ceiling | Texture Coat | - | NF | ACM | HM | S29, S32 | 3-Apr-09 | 2.5% Chrysotile |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |

Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|--------------------|----------------------|------------|-------------------------|---------------------------------|-------------|-------------|-------------------------|
| G2M | Stage | Floor | Wood | - | - | Non ACM | - | - | - | - |
| G2M | Above the Stage | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| G2M | Stage | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| G2M | Above the Stage | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| G2M | Above the Stage | Piping | Pipe Fitting | Parged Cement | F | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| G2M | Stage | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| G2M | Above the Stage | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| G52 | Tech Class | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| G52 | Tech Class | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| G52 | Tech Class | Deck | Concrete | - | - | Non ACM | - | - | - | - |

Level 2

| | | | | | | | | | | |
|------|-----------------|---------|---------------------------|-------------------------------------|----|---------|----|----------|-----------|-----------------|
| 101 | Classroom 101 | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 101 | Classroom 101 | Floor | Vinyl Floor Tile 12"x 12" | Beige with White Brown Streak | - | Non ACM | - | - | - | - |
| 101 | Classroom 101 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 101 | Classroom 101 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 101 | Classroom 101 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 101 | Classroom 101 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 102 | Classroom 102 | Floor | Vinyl Floor Tile 12"x 12" | White & Blue Streaks | - | Non ACM | HM | S03 | 3-Apr-09 | ND |
| 102 | Classroom 102 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 102 | Classroom 102 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 102 | Classroom 102 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 102 | Classroom 102 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 103 | Exercise Floor | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 103 | Exercise Floor | Floor | Rubber Mats | - | - | Non ACM | - | - | - | - |
| 103 | Exercise Floor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 103 | Exercise Floor | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 103 | Exercise Floor | Deck | Metal Pan | Steel | - | Non ACM | - | - | - | - |
| 104 | Classroom 104 | Floor | Vinyl Floor Tile 9"x 9" | Yellow & Brown | NF | ACM | SL | S24abc | 3-Apr-09 | 10% Chrysotile |
| 104 | Classroom 104 | Floor | Vinyl Floor Tile 9"x 9" | Beige with White and Brown Streak | NF | ACM | SL | S13ABC | 17-May-13 | 1.1% Chrysotile |
| 104 | Classroom 104 | Wall | Plaster | - | - | Non ACM | SL | S18e | 3-Apr-09 | ND |
| 104 | Classroom 104 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | SL | S13bc | 3-Apr-09 | ND |
| 104 | Classroom 104 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 104 | Classroom 104 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 104A | Work Room | Floor | Vinyl Floor Tile 12"x 12" | Yellow and Brown | - | Non ACM | - | - | - | - |
| 104A | Work Room | Wall | Plaster | - | - | Non ACM | SL | S18e | 3-Apr-09 | ND |
| 104A | Work Room | Wall | Drywall | Drywall Joint Compound | - | Non ACM | SL | S13bc | 3-Apr-09 | ND |
| 104A | Work Room | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 104A | Work Room | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 105 | Conference Room | Floor | Carpet | - | - | Non ACM | - | - | - | - |
| 105 | Conference Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 105 | Conference Room | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 105 | Conference Room | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 105 | Conference Room | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM. |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable | |
| | F- Friable | |

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|--------------------|----------------|---------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-----------|-------------|-------------------------|
| 105 | Conference Room | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 106 | Office | Floor | Vinyl Floor Tile 9"x 9" | Tan with Beige Streaks | NF | ACM | SL | S21abc | 3-Apr-09 | 1.6% Chrysotile |
| 106 | Office | Wall | Plaster | - | - | Non ACM | SL | S18c | 3-Apr-09 | ND |
| 106 | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 106 | Office | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 107 | General Office 107 | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 107 | General Office 107 | Floor | Carpet | - | - | Non ACM | - | - | - | - |
| 107 | General Office 107 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | SL | S01C | 22-Feb-17 | ND |
| 107 | General Office 107 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 107 | General Office 107 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 107A | Stores | Floor | Vinyl Floor Tile 9"x 9" | Black Burgundy | NF | ACM | SL | S22abc | 3-Apr-09 | 2.0% Chrysotile |
| 107A | Stores | Floor | Vinyl Floor Tile 9"x 9" | Yellow Burgundy | NF | ACM | SL | S23abc | 3-Apr-09 | 6.8% Chrysotile |
| 107A | Stores | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 107A | Stores | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 107A | Stores | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 107B | Principal Office | Floor | Carpet | - | - | Non ACM | - | - | - | - |
| 107B | Principal Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 107B | Principal Office | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 107B | Principal Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 107C | General Office 107 | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 107C | General Office 107 | Floor | Carpet | - | - | Non ACM | - | - | - | - |
| 107C | General Office 107 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | SL | S01C | 22-Feb-17 | ND |
| 107C | General Office 107 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 107C | General Office 107 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 107D | VP | Floor | Carpet | - | - | Non ACM | - | - | - | - |
| 107D | VP | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 107D | VP | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 107D | VP | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 107D | VP | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 107D | VP | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 107E | VP | Floor | Carpet | - | - | Non ACM | - | - | - | - |
| 107E | VP | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 107E | VP | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 107E | VP | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 107E | VP | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 108 | Classroom 108 | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 108 | Classroom 108 | Wall | Plaster | - | - | Non ACM | SL | S18d | 3-Apr-09 | ND |
| 108 | Classroom 108 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 108 | Classroom 108 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 109A | Office | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 109A | Office | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 109A | Office | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 109A | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 109B | Office | Floor | Laminate | - | - | Non ACM | - | - | - | - |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |

Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|---------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-----------|-------------|-------------------------|
| 109B | Office | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 109B | Office | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 109B | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 110 | Career Centre | Floor | Vinyl Floor Tile 12"x 12" | White with Beige Streaks | - | Non ACM | SL | S20abc | 3-Apr-09 | ND |
| 110 | Career Centre | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 110 | Career Centre | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 110 | Career Centre | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 110 | Career Centre | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 110 | Career Centre | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 111 | Office | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 111 | Office | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 111 | Office | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 111 | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 111 | Office | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 111A | Office | Floor | Carpet | - | - | Non ACM | - | - | - | - |
| 111A | Office | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 111A | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 111A | Office | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 112/A | Office | Floor | Vinyl Floor Tile 9"x 9" | White & Brown Streak | NF | ACM | SL | S19abc | 3-Apr-09 | 1.2% Chrysotile |
| 112/A | Office | Floor | Vinyl Floor Tile 9"x 9" | Olive with Beige Streaks | NF | ACM | SL | S09abc | 3-Apr-09 | 10% Chrysotile |
| 112/A | Office | Floor | Vinyl Floor Tile 12"x 12" | Brown Dense Fleck (New) | - | Non ACM | - | - | - | - |
| 112/A | Office | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 112/A | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 112/A | Office | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 112B | Office | Floor | Carpet | - | - | Non ACM | - | - | - | - |
| 112B | Office | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 112B | Office | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 112B | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 112B | Office | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 113 | Custodial Room | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 113 | Custodial Room | Wall | Plaster | - | - | Non ACM | SL | S02B,C | 22-Feb-17 | ND |
| 113 | Custodial Room | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S07 | 15-Sep-20 | ND |
| 113 | Custodial Room | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 113 | Custodial Room | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S07 | 15-Sep-20 | ND |
| 113A | Custodial Room | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 113A | Custodial Room | Wall | Plaster | - | - | Non ACM | SL | S02B,C | 22-Feb-17 | ND |
| 113A | Custodial Room | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S07 | 15-Sep-20 | ND |
| 113A | Custodial Room | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 113A | Custodial Room | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S07 | 15-Sep-20 | ND |
| 114 | Classroom 114 | Floor | Vinyl Floor Tile 12"x 12" | White & Blue Streaks | - | Non ACM | HM | S03 | 3-Apr-09 | ND |
| 114 | Classroom 114 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 114 | Classroom 114 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | SL | S07ABC | 15-Sep-20 | ND |
| 114 | Classroom 114 | Wall | Brick | - | - | Non ACM | - | - | - | - |
| 114 | Classroom 114 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |



School Name
Elmira District Secondary School
Date Built:
 Original: 1938
 Addition(s): 1953, 1959, 1962, 1964, 1966

Legend:
HM - Homogenous Material - homogeneous with previously sampled material
SL - Sample Location - Material Sampled
VC - Visually Confirmed - Material not sampled, deemed ACM
NF - Non-Friable
F- Friable

Notes:
 All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions.
 Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|---------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-------------|-------------|-------------------------|
| 114 | Classroom 114 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S07 | 15-Sep-20 | ND |
| 114A | Work Room | Floor | Vinyl Floor Tile 12"x 12" | White & Blue Streaks | - | Non ACM | HM | S03 | 3-Apr-09 | ND |
| 114A | Work Room | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 114A | Work Room | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S07 | 15-Sep-20 | ND |
| 114A | Work Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 114A | Work Room | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 114A | Work Room | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S07 | 15-Sep-20 | ND |
| 114B | Work Room | Floor | Vinyl Floor Tile 12"x 12" | White & Blue Streaks | - | Non ACM | HM | S03 | 3-Apr-09 | ND |
| 114B | Work Room | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S07 | 15-Sep-20 | ND |
| 114B | Work Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 114B | Work Room | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 114C | Greenhouse | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 114C | Greenhouse | Wall | Glass | - | - | Non ACM | - | - | - | - |
| 114C | Greenhouse | Ceiling | Glass | - | - | Non ACM | - | - | - | - |
| 114C | Greenhouse | Piping | Uninsulated | Copper | - | Non ACM | - | - | - | - |
| 115 | Classroom 115 | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 115 | Classroom 115 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 115 | Classroom 115 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 115 | Classroom 115 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S07 | 15-Sep-20 | ND |
| 115 | Classroom 115 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 115 | Classroom 115 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S07 | 15-Sep-20 | ND |
| 115A | Office | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 115A | Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 115A | Office | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 115A | Office | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S07 | 15-Sep-20 | ND |
| 115A | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 115A | Office | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S07 | 15-Sep-20 | ND |
| 115A | Office | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 115A | Office | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 115A | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 116 | Girls Washroom | Floor | Vinyl Floor Tile 9"x 9" | Red with Black & White Streak | NF | ACM | HM | S04abc | 3-Apr-09 | 10% Chrysotile |
| 116 | Girls Washroom | Wall | Plaster | - | - | Non ACM | SL | S18b | 3-Apr-09 | ND |
| 116 | Girls Washroom | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 116 | Girls Washroom | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 116 | Girls Washroom | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 116 | Girls Washroom | Piping | Pipe Fitting | Parged Cement | F | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| 117 | Classroom 117 | Floor | Vinyl Floor Tile 9"x 9" | Grey, Red, Beige & Brown | NF | ACM | SL | S17abc | 3-Apr-09 | 6.3% Chrysotile |
| 117 | Classroom 117 | Wall | Plaster | - | - | Non ACM | SL | S18a | 3-Apr-09 | ND |
| 117 | Classroom 117 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 117 | Classroom 117 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 117 | Classroom 117 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 117 | Classroom 117 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 118 | Guidance | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 118 | Guidance | Wall | Concrete | - | - | Non ACM | - | - | - | - |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |

Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|----------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-----------|-------------|-------------------------|
| 118 | Guidance | Wall | Plaster | - | - | Non ACM | HM | S06, S18 | 3-Apr-09 | ND |
| 118 | Guidance | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 118 | Guidance | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 118 | Guidance | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 118A | Office | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 118A | Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 118A | Office | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 118A | Office | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 118A | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 118A | Office | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 118B | Office | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 118B | Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 118B | Office | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 118B | Office | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 118B | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 118B | Office | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 118B | Office | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 118B | Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 118B | Office | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 118B | Office | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 118B | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 118B | Office | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 118C | Office | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 118C | Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 118C | Office | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 118C | Office | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 118C | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 118C | Office | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 118D | Office | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 118D | Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 118D | Office | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 118D | Office | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 118D | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 118D | Office | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 119 | Work Room | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 119 | Work Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 119 | Work Room | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 119 | Work Room | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 120 | Classroom 120 | Floor | Vinyl Floor Tile 12" x 12" | Brown Dense Fleck (New) | - | Non ACM | - | - | - | - |
| 120 | Classroom 120 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 120 | Classroom 120 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | SL | S08A | 15-Sep-20 | ND |
| 120 | Classroom 120 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 120 | Classroom 120 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 120 | Classroom 120 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S08A | 15-Sep-20 | ND |
| 121 | Classroom 121 | Floor | Vinyl Floor Tile 9"x 9" | Green & Beige Streaks | NF | ACM | HM | S16 | 3-Apr-09 | 5.2% Chrysotile |
| 121 | Classroom 121 | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 121 | Classroom 121 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 121 | Classroom 121 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 121 | Classroom 121 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 121 | Classroom 121 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |
| | | Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM. |

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|---------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-------------------------------------|-------------|-------------------------|
| 122 | Classroom 122 | Floor | Vinyl Floor Tile 12"x 12" | Oatmeal | - | Non ACM | SL | S16abc | 3-Apr-09 | ND |
| 122 | Classroom 122 | Wall | Plaster | - | - | Non ACM | SL | S05ABC | 22-Feb-17 | ND |
| 122 | Classroom 122 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 123 | Classroom 123 | Floor | Vinyl Floor Tile 9"x 9" | Light Brown, Dark Brown with White | NF | ACM | - | - | - | - |
| 123 | Classroom 123 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 123 | Classroom 123 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 123 | Classroom 123 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 124 | Classroom 124 | Floor | Vinyl Floor Tile 9"x 9" | Grey with Black & Beige | NF | ACM | SL | S12abc | 3-Apr-09 | 7.2% Chrysotile |
| 124 | Classroom 124 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 124 | Classroom 124 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | SL | S13a | 3-Apr-09 | ND |
| 124 | Classroom 124 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 124 | Classroom 124 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 125 | Fan Room | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 125 | Fan Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 125 | Fan Room | Wall | Tar Paper | - | - | Non ACM | SL | S08ABC | 16-Mar-17 | ND |
| 125 | Fan Room | Ducting | Flex Joint | - | NF | ACM | Deemed ACM | Sample prior to removal/disturbance | - | - |
| 125 | Fan Room | Piping | Pipe Fitting | Parged Cement | F | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| 125 | Fan Room | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| 126 | Fan Room | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 126 | Fan Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 126 | Fan Room | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| 127 | Fan Room | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 127 | Fan Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 127 | Fan Room | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| 811 | Corridor | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 811 | Corridor | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 811 | Corridor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 811 | Corridor | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 811 | Corridor | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 811A | Corridor | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 811A | Corridor | Wall | Plaster | - | - | Non ACM | - | - | - | - |
| 811A | Corridor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 811A | Corridor | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 811B | Corridor | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 811B | Corridor | Wall | Plaster | - | - | Non ACM | - | - | - | - |
| 811B | Corridor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 811B | Corridor | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 812 | Corridor | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 812 | Corridor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 812 | Corridor | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 812 | Corridor | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 812 | Corridor | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 813 | Fan Room | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 813 | Fan Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |
| | | Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM. |

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|---------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-----------|-------------|-------------------------|
| 813 | Fan Room | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| 814 | Office | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 814 | Office | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 814 | Office | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 814 | Office | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S07 | 15-Sep-20 | ND |
| 814 | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 814 | Office | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S07 | 15-Sep-20 | ND |
| 902 | Stairwell | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 902 | Stairwell | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 902 | Stairwell | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 903 | Stairwell | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 903 | Stairwell | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 903 | Stairwell | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 904 | Stairwell | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 904 | Stairwell | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 904 | Stairwell | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 904 | Stairwell | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2006) | - | Non ACM | - | - | - | - |
| 907 | Stairwell | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 907 | Stairwell | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 907 | Stairwell | Ceiling | Texture Coat | - | - | Non ACM | SL | S25abc | 3-Apr-09 | ND |
| 908 | Lobby | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 908 | Lobby | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 908 | Lobby | Wall | Brick | - | - | Non ACM | - | - | - | - |
| 908 | Lobby | Wall | Wood Fibre Board | - | - | Non ACM | - | - | - | - |
| 908 | Lobby | Ceiling | Glass | - | - | Non ACM | - | - | - | - |
| 909 | Fan Room | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 909 | Fan Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 909 | Fan Room | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| Level 3 | | | | | | | | | | |
| 201 | Office 201 | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 201 | Office 201 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 201 | Office 201 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 201 | Office 201 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 202 | Classroom 202 | Floor | Vinyl Floor Tile 9"x 9" | Green with Dark Green & Beige | NF | ACM | SL | S11abc | 3-Apr-09 | 10% Chrysotile |
| 202 | Classroom 202 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 202 | Classroom 202 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 202 | Classroom 202 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 202 | Classroom 202 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 202 | Classroom 202 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 203 | Classroom 203 | Floor | Vinyl Floor Tile 12"x 12" | White & Blue Streaks | - | Non ACM | HM | S03 | 3-Apr-09 | ND |
| 203 | Classroom 203 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 203 | Classroom 203 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |
| | | Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM. |

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|---------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-----------|-------------|-------------------------|
| 203 | Classroom 203 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | SL | S06a | 3-Apr-09 | ND |
| 203 | Classroom 203 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 203 | Classroom 203 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 204 | Classroom 204 | Floor | Vinyl Floor Tile 9"x 9" | Tan with Brown & Beige | NF | ACM | SL | S10abc | 3-Apr-09 | 8.0% Chrysotile |
| 204 | Classroom 204 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 204 | Classroom 204 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 204 | Classroom 204 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 204 | Classroom 204 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 204 | Classroom 204 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 205 | Classroom 215 | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 205 | Classroom 215 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 205 | Classroom 215 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 205 | Classroom 215 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | SL | S06d | 3-Apr-09 | ND |
| 205 | Classroom 215 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 205 | Classroom 215 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 206 | Classroom 206 | Floor | Vinyl Floor Tile 9"x 9" | Olive with Beige Streaks | NF | ACM | SL | S09abc | 3-Apr-09 | 10% Chrysotile |
| 206 | Classroom 206 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | SL | S06c | 3-Apr-09 | ND |
| 206 | Classroom 206 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 206 | Classroom 206 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 206 | Classroom 206 | Wall | Plaster | - | - | Non ACM | SL | S05d | 3-Apr-09 | ND |
| 206 | Classroom 206 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 206 | Classroom 206 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 207 | Office 207 | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 207 | Office 207 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 207 | Office 207 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 207 | Office 207 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 207 | Office 207 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 207A | Classroom 215 | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 207A | Classroom 215 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 207A | Classroom 215 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 207A | Classroom 215 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | SL | S06d | 3-Apr-09 | ND |
| 207A | Classroom 215 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 207A | Classroom 215 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 207B | Classroom 215 | Floor | Laminate | - | - | Non ACM | - | - | - | - |
| 207B | Classroom 215 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 207B | Classroom 215 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 207B | Classroom 215 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | SL | S06d | 3-Apr-09 | ND |
| 207B | Classroom 215 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 207B | Classroom 215 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 207 | Office 207 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 208 | Classroom 208 | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 208 | Classroom 208 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 208 | Classroom 208 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 208 | Classroom 208 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |

Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM.

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|---------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-----------|-------------|-------------------------|
| 208 | Classroom 208 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 208A | Lab Storage | Floor | Vinyl Floor Tile 9"x 9" | Brown with Beige Streaks | NF | ACM | SL | S07abc | 3-Apr-09 | 10% Chrysotile |
| 208A | Lab Storage | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 208A | Lab Storage | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 208A | Lab Storage | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 209 | Classroom 209 | Floor | Vinyl Floor Tile 9"x 9" | Green with Blue & Beige Streaks | NF | ACM | SL | S08abc | 3-Apr-09 | 10% Chrysotile |
| 209 | Classroom 209 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 209 | Classroom 209 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 209 | Classroom 209 | Wall | Plaster | - | - | Non ACM | SL | S05c | 3-Apr-09 | ND |
| 209 | Classroom 209 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 209 | Classroom 209 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | SL | S06b | 3-Apr-09 | ND |
| 210 | Classroom 210 | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 210 | Classroom 210 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 210 | Classroom 210 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 210 | Classroom 210 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 210 | Classroom 210 | Countertops | Countertops | - | - | Non ACM | - | - | - | - |
| 211 | Classroom 211 | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 211 | Classroom 211 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 211 | Classroom 211 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 211 | Classroom 211 | Wall | Plaster | - | - | Non ACM | SL | S05c | 3-Apr-09 | ND |
| 211 | Classroom 211 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 211 | Classroom 211 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 211 | Classroom 211 | Piping | Pipe Insulation | Foam Insulation | - | Non ACM | - | - | - | - |
| 212 | Classroom 212 | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 212 | Classroom 212 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 212 | Classroom 212 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 212 | Classroom 212 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 212 | Classroom 212 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 212 | Classroom 212 | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | SL | S06b | 3-Apr-09 | ND |
| 213 | Classroom 213 | Floor | Vinyl Sheet Flooring | Grey (New) | - | Non ACM | - | - | - | - |
| 213 | Classroom 213 | Wall | Drywall | Drywall Joint Compound | - | Non ACM | SL | S06a | 3-Apr-09 | ND |
| 213 | Classroom 213 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 213 | Classroom 213 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 214 | Classroom 214 | Floor | Vinyl Floor Tile 12"x 12" | White & Blue Streaks | - | Non ACM | HM | S03 | 3-Apr-09 | ND |
| 214 | Classroom 214 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 214 | Classroom 214 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 214 | Classroom 214 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 215 | Office | Floor | Vinyl Floor Tile 12"x 12" | White & Blue Streaks | - | Non ACM | HM | S03 | 3-Apr-09 | ND |
| 215 | Office | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 215 | Office | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 215 | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 215A | Office | Floor | Vinyl Floor Tile 12"x 12" | White & Blue Streaks | - | Non ACM | HM | S03 | 3-Apr-09 | ND |
| 215A | Office | Wall | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 215A | Office | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | |
| | | Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM. |

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|------------------------------|------------------|----------------|---------------------------|-------------------------------------|------------|-------------------------|---------------------------------|-----------|-------------|-------------------------|
| 215A | Office | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 216 | Classroom 216 | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 216 | Classroom 216 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 216 | Classroom 216 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 216 | Classroom 216 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 216 | Classroom 216 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 217 | Classroom 217 | Floor | Vinyl Sheet Flooring | Grey (New) | - | Non ACM | - | - | - | - |
| 217 | Classroom 217 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 217 | Classroom 217 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 217 | Classroom 217 | Wall | Plaster | - | - | Non ACM | SL | S05a | 3-Apr-09 | ND |
| 217 | Classroom 217 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 217A | Classroom 217 | Floor | Vinyl Sheet Flooring | Grey (New) | - | Non ACM | - | - | - | - |
| 217A | Classroom 217 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 217A | Classroom 217 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 217A | Classroom 217 | Wall | Plaster | - | - | Non ACM | SL | S05a | 3-Apr-09 | ND |
| 217A | Classroom 217 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 218 | Girls Washroom | Floor | Vinyl Floor Tile 9"x 9" | Red with Black & White Streak | NF | ACM | SL | S04abc | 3-Apr-09 | 10% Chrysotile |
| 218 | Girls Washroom | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 218 | Girls Washroom | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 218 | Girls Washroom | Wall | Plaster | - | - | Non ACM | SL | S05a | 3-Apr-09 | ND |
| 218 | Girls Washroom | Ceiling | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 219 | Classroom 219 | Floor | Vinyl Floor Tile 12"x 12" | White & Blue Streaks | - | Non ACM | SL | S03abc | 3-Apr-09 | ND |
| 219 | Classroom 219 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 219 | Classroom 219 | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 219 | Classroom 219 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 219 | Classroom 219 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 220 | Classroom 220 | Floor | Vinyl Floor Tile 9"x 9" | Grey with Black & White Streak | NF | ACM | SL | S01abc | 3-Apr-09 | 5.6% Chrysotile |
| 220 | Classroom 220 | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 220 | Classroom 220 | Wall | Plaster | - | - | Non ACM | HM | S05, S18 | 3-Apr-09 | ND |
| 220 | Classroom 220 | Wall | Brick | - | - | Non ACM | - | - | - | - |
| 220 | Classroom 220 | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 221 | Custodial Room | Floor | Concrete | - | - | Non ACM | - | - | - | - |
| 221 | Custodial Room | Floor | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 221 | Custodial Room | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 221 | Custodial Room | Deck | Concrete | - | - | Non ACM | - | - | - | - |
| 821 | Corridor | Floor | Vinyl Floor Tile 12"x 12" | Brown Oatmeal | - | Non ACM | HM | S02 | 3-Apr-09 | ND |
| 821 | Corridor | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 821 | Corridor | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 821 | Corridor | Ceiling | Ceiling Tile 2' x 2' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| 821 | Corridor | Ceiling | Drywall | Drywall Joint Compound | - | Non ACM | HM | S06, S13 | 3-Apr-09 | ND |
| 901 | Stairwell | Floor | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 901 | Stairwell | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 901 | Stairwell | Wall | Ceramic Tile | - | - | Non ACM | - | - | - | - |
| 901 | Stairwell | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |



| | | |
|-------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| School Name | Legend: | Notes: |
| Elmira District Secondary School | HM - Homogenous Material - homogeneous with previously sampled material | All quantities provided on Figures, if known. Refer to the Asbestos Audit Update Report for condition of ACM and recommended actions. |
| Date Built: | SL - Sample Location - Material Sampled | |
| Original: 1938 | VC - Visually Confirmed - Material not sampled, deemed ACM | |
| Addition(s): 1953, 1959, 1962, 1964, 1966 | NF - Non-Friable F- Friable | Dates provided in Material Description/Room Description columns indicates date of installation/renovation and confirms the finishes as non-ACM. |

| WRDSB Fixed Reference Number | Room Description | Inspected Item | Inspected Material | Material Description | Friability | Asbestos Classification | Sample / Identification Summary | Sample ID | Sample Date | % Asbestos & Fibre Type |
|--------------------------------------------------------|---------------------|----------------|----------------------|-------------------------------------|------------|-------------------------|---------------------------------|-------------|-------------|-------------------------|
| 902 | Stairwell | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 902 | Stairwell | Wall | Plaster | - | - | Non ACM | HM | S05_S18 | 3-Apr-09 | ND |
| 902 | Stairwell | Ceiling | Ceiling Tile 1' x 1' | Random Pinhole | - | Non ACM | SL | S29abc | 3-Apr-09 | ND |
| 902 | Stairwell | Piping | Pipe Fitting | Parged Cement | F | ACM | HM | 1680.252-02 | 28-Aug-90 | 50-75% Chrysotile |
| 903 | Stairwell | Floor | Terrazzo | - | - | Non ACM | - | - | - | - |
| 903 | Stairwell | Wall | Concrete | - | - | Non ACM | - | - | - | - |
| 903 | Stairwell | Ceiling | Ceiling Tile 2' x 4' | Short Fissure Random Pinhole (2007) | - | Non ACM | - | - | - | - |
| Summary of Potential ACM Hidden or Not Assessed | | | | | | | | | | |
| | Throughout Building | Not Inspected | Not Inspected | Wall Cavity Insulation | | | | | | |
| | Throughout Building | Not Inspected | Not Inspected | Door Core Insulation | | | | | | |

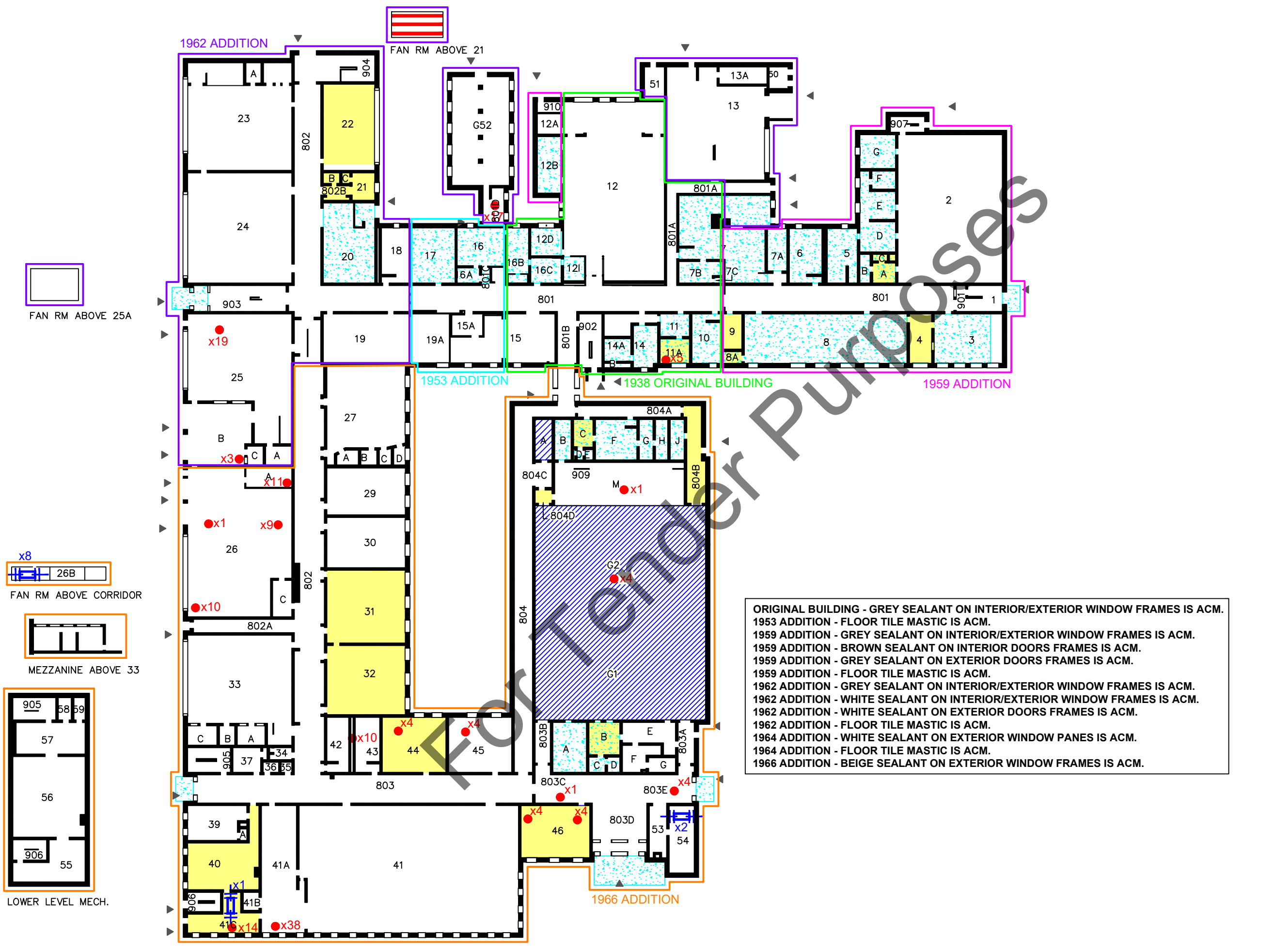
For Tender Purposes

Appendix B

Figures

For Tender Purposes





NOTES:
 ALL DRAWINGS TO BE REFERENCED WITH THE ASSOCIATED REPORT, LOCATIONS AND QUANTITIES ARE APPROXIMATE.
 ALL KNOWN OR SUSPECT ASBESTOS-CONTAINING MATERIALS AND/OR DESIGNATED MATERIALS ARE NOT DEPICTED ON THIS DRAWING. REFER TO THE REPORT FOR A COMPLETE LIST OF IDENTIFIED MATERIALS.
 THIS FIGURE IS COLOUR DEPENDENT. PHOTOCOPIES MAY ALTER INTERPRETATION OF THE FIGURE. ALWAYS REFER TO ORIGINAL DRAWINGS AND REPORT.

Legend
 13 Fixed Reference Number
 No Access
 Post 2011 Construction

- Asbestos-Containing Materials (ACM):**
- Floor Tile
 - Rolled Flooring
 - Ceiling Tile
 - Friable Soft Textured Ceiling
 - Non-Friable Hard Textured Ceiling
 - Spray-On Fire Proofing
 - Transite (Asbestos Cement) Paneling
 - Duct Insulation
 - Pipe Fitting Insulation w Quantity (Brackets Indicate # of Damaged Fittings)
 - Pipe Insulation (Vertical and Horizontal)
 - Transite (Asbestos Cement) Pipe (Vertical and Horizontal)
 - Duct Expansion Joints w Quantity (Brackets Indicate # of Damaged Joints)
 - Friable Debris

ORIGINAL BUILDING - GREY SEALANT ON INTERIOR/EXTERIOR WINDOW FRAMES IS ACM.
 1953 ADDITION - FLOOR TILE MASTIC IS ACM.
 1959 ADDITION - GREY SEALANT ON INTERIOR/EXTERIOR WINDOW FRAMES IS ACM.
 1959 ADDITION - BROWN SEALANT ON INTERIOR DOORS FRAMES IS ACM.
 1959 ADDITION - GREY SEALANT ON EXTERIOR DOORS FRAMES IS ACM.
 1959 ADDITION - FLOOR TILE MASTIC IS ACM.
 1962 ADDITION - GREY SEALANT ON INTERIOR/EXTERIOR WINDOW FRAMES IS ACM.
 1962 ADDITION - WHITE SEALANT ON INTERIOR/EXTERIOR WINDOW FRAMES IS ACM.
 1962 ADDITION - WHITE SEALANT ON EXTERIOR DOORS FRAMES IS ACM.
 1962 ADDITION - FLOOR TILE MASTIC IS ACM.
 1964 ADDITION - WHITE SEALANT ON EXTERIOR WINDOW PANES IS ACM.
 1964 ADDITION - FLOOR TILE MASTIC IS ACM.
 1966 ADDITION - BEIGE SEALANT ON EXTERIOR WINDOW FRAMES IS ACM.



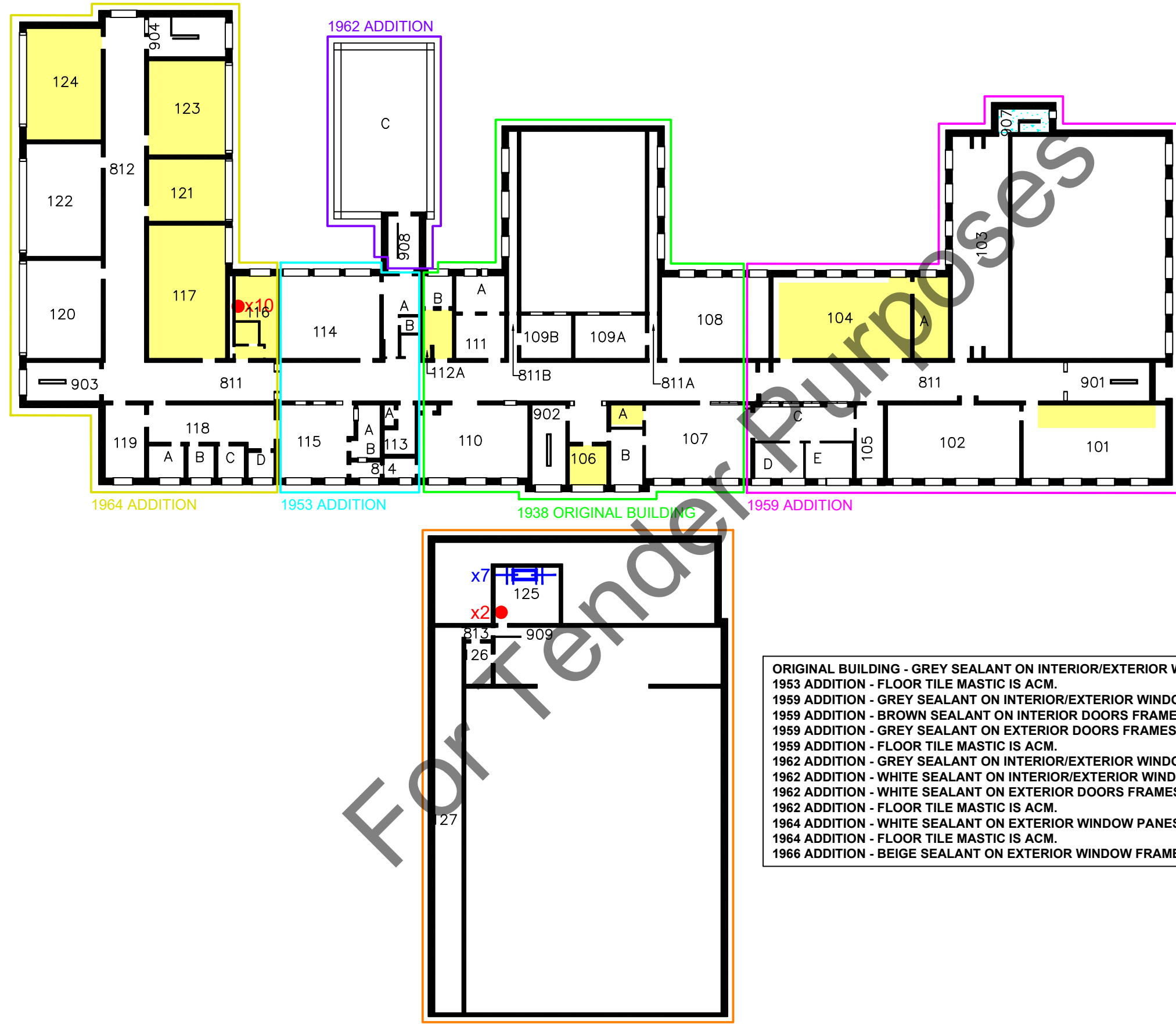
Ph. (519) 743-6500 www.mte85.com

CLIENT
 WATERLOO REGION DISTRICT SCHOOL BOARD

PROJECT
 2023 ASBESTOS AUDIT UPDATE

DRAWING
 ELMIRA DISTRICT SECONDARY SCHOOL
 LEVEL ONE

| | | | |
|-----------------|--------|-------------|----------------|
| Project Manager | PXS | Date | September 2023 |
| Design By | WRDSB | Project No. | 34532-941 |
| Drawn By | SGL | Drawing No. | 1.0 |
| Scale | N.T.S. | | |



NOTES:
 ALL DRAWINGS TO BE REFERENCED WITH THE ASSOCIATED REPORT. LOCATIONS AND QUANTITIES ARE APPROXIMATE.
 ALL KNOWN OR SUSPECT ASBESTOS-CONTAINING MATERIALS AND/OR DESIGNATED MATERIALS ARE NOT DEPICTED ON THIS DRAWING. REFER TO THE REPORT FOR A COMPLETE LIST OF IDENTIFIED MATERIALS.
 THIS FIGURE IS COLOUR DEPENDENT. PHOTOCOPIES MAY ALTER INTERPRETATION OF THE FIGURE. ALWAYS REFER TO ORIGINAL DRAWINGS AND REPORT.

- Legend**
- 13 Fixed Reference Number
 - No Access
 - Post 2011 Construction

- Asbestos-Containing Materials (ACM):**
- Floor Tile
 - Rolled Flooring
 - Ceiling Tile
 - Friable Soft Textured Ceiling
 - Non-Friable Hard Textured Ceiling
 - Spray-On Fire Proofing
 - Transite (Asbestos Cement) Paneling
 - Duct Insulation
 - Pipe Fitting Insulation w Quantity (Brackets Indicate # of Damaged Fittings)
 - Pipe Insulation (Vertical and Horizontal)
 - Transite (Asbestos Cement) Pipe (Vertical and Horizontal)
 - Duct Expansion Joints w Quantity (Brackets Indicate # of Damaged Joints)
 - Friable Debris

ORIGINAL BUILDING - GREY SEALANT ON INTERIOR/EXTERIOR WINDOW FRAMES IS ACM.
 1953 ADDITION - FLOOR TILE MASTIC IS ACM.
 1959 ADDITION - GREY SEALANT ON INTERIOR/EXTERIOR WINDOW FRAMES IS ACM.
 1959 ADDITION - BROWN SEALANT ON INTERIOR DOORS FRAMES IS ACM.
 1959 ADDITION - GREY SEALANT ON EXTERIOR DOORS FRAMES IS ACM.
 1959 ADDITION - FLOOR TILE MASTIC IS ACM.
 1962 ADDITION - GREY SEALANT ON INTERIOR/EXTERIOR WINDOW FRAMES IS ACM.
 1962 ADDITION - WHITE SEALANT ON INTERIOR/EXTERIOR WINDOW FRAMES IS ACM.
 1962 ADDITION - WHITE SEALANT ON EXTERIOR DOORS FRAMES IS ACM.
 1962 ADDITION - FLOOR TILE MASTIC IS ACM.
 1964 ADDITION - WHITE SEALANT ON EXTERIOR WINDOW PANES IS ACM.
 1964 ADDITION - FLOOR TILE MASTIC IS ACM.
 1966 ADDITION - BEIGE SEALANT ON EXTERIOR WINDOW FRAMES IS ACM.



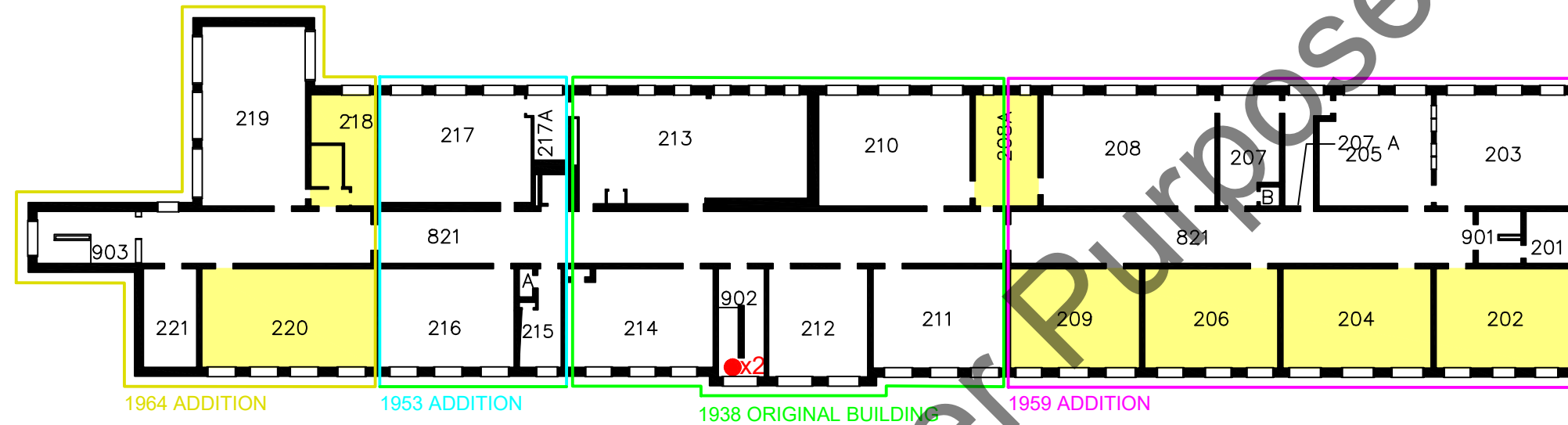
Ph. (519) 743-6500 www.mte85.com

CLIENT
 WATERLOO REGION DISTRICT SCHOOL BOARD

PROJECT
 2023 ASBESTOS AUDIT UPDATE

DRAWING
 ELMIRA DISTRICT SECONDARY SCHOOL
 LEVEL TWO

| | | | |
|-----------------|--------|-------------|--------------|
| Project Manager | PXS | Date | January 2023 |
| Design By | WRDSB | Project No. | 34532-941 |
| Drawn By | SGL | Drawing No. | 1.1 |
| Scale | N.T.S. | | |



ORIGINAL BUILDING - GREY SEALANT ON INTERIOR/EXTERIOR WINDOW FRAMES IS ACM.
 1953 ADDITION - FLOOR TILE MASTIC IS ACM.
 1959 ADDITION - GREY SEALANT ON INTERIOR/EXTERIOR WINDOW FRAMES IS ACM.
 1959 ADDITION - BROWN SEALANT ON INTERIOR DOORS FRAMES IS ACM.
 1959 ADDITION - GREY SEALANT ON EXTERIOR DOORS FRAMES IS ACM.
 1959 ADDITION - FLOOR TILE MASTIC IS ACM.
 1962 ADDITION - GREY SEALANT ON INTERIOR/EXTERIOR WINDOW FRAMES IS ACM.
 1962 ADDITION - WHITE SEALANT ON INTERIOR/EXTERIOR WINDOW FRAMES IS ACM.
 1962 ADDITION - WHITE SEALANT ON EXTERIOR DOORS FRAMES IS ACM.
 1962 ADDITION - FLOOR TILE MASTIC IS ACM.
 1964 ADDITION - WHITE SEALANT ON EXTERIOR WINDOW PANES IS ACM.
 1964 ADDITION - FLOOR TILE MASTIC IS ACM.
 1966 ADDITION - BEIGE SEALANT ON EXTERIOR WINDOW FRAMES IS ACM.

NOTES:

ALL DRAWINGS TO BE REFERENCED WITH THE ASSOCIATED REPORT. LOCATIONS AND QUANTITIES ARE APPROXIMATE.

ALL KNOWN OR SUSPECT ASBESTOS-CONTAINING MATERIALS AND/OR DESIGNATED MATERIALS ARE NOT DEPICTED ON THIS DRAWING. REFER TO THE REPORT FOR A COMPLETE LIST OF IDENTIFIED MATERIALS.

THIS FIGURE IS COLOUR DEPENDENT. PHOTOCOPIES MAY ALTER INTERPRETATION OF THE FIGURE. ALWAYS REFER TO ORIGINAL DRAWINGS AND REPORT.

Legend

13 Fixed Reference Number

No Access

Post 2011 Construction

Asbestos-Containing Materials (ACM):

- Floor Tile
- Rolled Flooring
- Ceiling Tile
- Friable Soft Textured Ceiling
- Non-Friable Hard Textured Ceiling
- Spray-On Fire Proofing
- Transite (Asbestos Cement) Paneling
- Duct Insulation
- Pipe Fitting Insulation w Quantity (Brackets Indicate # of Damaged Fittings)
- Pipe Insulation (Vertical and Horizontal)
- Transite (Asbestos Cement) Pipe (Vertical and Horizontal)
- Duct Expansion Joints w Quantity (Brackets Indicate # of Damaged Joints)
- Friable Debris



Ph. (519) 743-6500 www.mte85.com

CLIENT
WATERLOO REGION DISTRICT SCHOOL BOARD

PROJECT
2023 ASBESTOS AUDIT UPDATE

DRAWING
ELMIRA DISTRICT SECONDARY SCHOOL
LEVEL THREE

| | | | |
|-----------------|--------|-------------|--------------|
| Project Manager | PXS | Date | January 2023 |
| Design By | WRDSB | Project No. | 34532-941 |
| Drawn By | SGL | Drawing No. | 1.2 |
| Scale | N.T.S. | | |

Appendix C

Tables

For Tender Purposes



TABLE 1 - INTERNAL ABATEMENT MANAGEMENT

Elmira District Secondary School

| Material | WRDSB Fixed Reference Number | Material Description | Approximate Quantity | Photograph - Context | Photograph - Detail | Required Action |
|----------------------|------------------------------|----------------------------|----------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------|
| Asbestos Friable | 41A | Insulation on Pipe Fitting | 1 |  |  | Monitor Annually |
| Asbestos Non-Friable | G1C | Hard Texture Coat | 0.25 m ² |  |  | Monitor Annually |
| Asbestos Non-Friable | 903 | Hard Texture Coat | 0.5 m ² |  |  | Monitor Annually |
| Asbestos Non-Friable | 7B | Hard Texture Coat | 0.5 m ² |  |  | Monitor Annually |
| Asbestos Non-Friable | 2G | Hard Texture Coat | 0.5 m ² |  |  | Monitor Annually |

TABLE 1 - INTERNAL ABATEMENT MANAGEMENT

Elmira District Secondary School

| Material | WRDSB Fixed Reference Number | Material Description | Approximate Quantity | Photograph - Context | Photograph - Detail | Required Action |
|----------------------|------------------------------|------------------------------------------------------------------------------------|----------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Asbestos Non-Friable | 32 | 9" x 9" Vinyl Floor Tile - Beige with Black and White | 18 tiles |  |  | Monitor Annually |
| Asbestos Non-Friable | 31 | 9" x 9" Vinyl Floor Tile - Beige with Black and White | <1 m ² |  |  | Monitor Annually |
| Asbestos Non-Friable | 11A | 9" x 9" Vinyl Floor Tile - Red | 4 m ² |  |  | Repair/Removal in accordance with O. Reg. 278/05 as a Type 1 Operation |
| Asbestos Non-Friable | 4, 3 | 9" x 9" Vinyl Floor Tiles - Beige with Black and White, Green with Black and White | 3 tiles |  |  | Monitor Annually |
| Asbestos Non-Friable | 106 | 9" x 9" Vinyl Floor Tile - Beige with White and Brown | 1 tile |  |  | Monitor Annually |

TABLE 1 - INTERNAL ABATEMENT MANAGEMENT

Elmira District Secondary School

| Material | WRDSB Fixed Reference Number | Material Description | Approximate Quantity | Photograph - Context | Photograph - Detail | Required Action |
|----------------------|------------------------------|------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------|
| Asbestos Non-Friable | 104 | 9" x 9" Vinyl Floor Tile - Beige with White and Brown | ~22 tiles |  |  | Monitor Annually |
| Asbestos Non-Friable | 104 | 9" x 9" Vinyl Floor Tile - Beige with White and Brown | ~22 tiles |  |  | Monitor Annually |
| Asbestos Non-Friable | 22 | 9" x 9" Vinyl Floor Tile - Brown with White and Dark Brown | <1 m ² |  |  | Monitor Annually |
| Asbestos Non-Friable | 206 | 9" x 9" Vinyl Floor Tile - Blue with White and Dark Blue | <1 m ² |  |  | Monitor Annually |

Notes:

- 1) A copy of this report should be provided to all prospective contractors prior to tender or quotation, in accordance with Section 30 of the Occupational Health and Safety Act.
- 2) Recommended actions are the minimum required actions, as prescribed by the appropriate Acts, regulations, guidelines, standards, codes and general best practice measures. The Contractor may choose to alter the approach and combine or break out sections of work. This is acceptable provided that the appropriate Acts, regulations, guidelines, standards and codes are followed and afford protection for the health and safety of workers, occupants and the public that is at least equal to the protection that would be provided by complying with the minimum requirements.
- 3) All waste generated is subject to characterization and disposal in accordance with Ontario Regulation 347.

TABLE 2 - EXTERNAL ABATEMENT MANAGEMENT

| Elmira District Secondary School | | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|----------------------|----------------------|----------------------|---------------------|-----------------|
| Material | WRDSB Fixed Reference Number | Material Description | Approximate Quantity | Photograph - Context | Photograph - Detail | Required Action |
| None Identified During Inspection | | | | | | |
| <p>Notes:</p> <p>1) A copy of this report should be provided to all prospective contractors prior to tender or quotation, in accordance with Section 30 of the Occupational Health and Safety Act.</p> <p>2) Recommended actions are the minimum required actions, as prescribed by the appropriate Acts, regulations, guidelines, standards, codes and general best practice measures. The Contractor may choose to alter the approach and combine or break out sections of work. This is acceptable provided that the appropriate Acts, regulations, guidelines, standards and codes are followed and afford protection for the health and safety of workers, occupants and the public that is at least equal to the protection that would be provided by complying with the minimum requirements.</p> <p>3) All waste generated is subject to characterization and disposal in accordance with Ontario Regulation 347.</p> | | | | | | |

For Tender Purposes

TABLE 3: BULK ASBESTOS SAMPLING SUMMARY

| Sample # | Location | Material Description | Asbestos Content (%) | Fibre Type | Is Material ACM |
|-----------------------------------|----------|---------------------------------------------------------|-------------------------------|------------|-----------------|
| 2009 Asbestos Audit Update | | | | | |
| S01A | 3001 | 9" x 9" Floor Tile - Grey/Black and White Streaks | 5.6 | Chrysotile | Yes |
| S01B | 3001 | | NA | Chrysotile | Yes |
| S01C | 3001 | | NA (tile) | Chrysotile | Yes |
| S02A | 3015 | | 0.5 (mastic) | | Yes |
| S02B | 3015 | 12" x 12" Floor Tile - Brown Oatmeal | ND | - | No |
| S02C | 3015 | | ND | - | No |
| S03A | 3017 | | ND (tile) | - | No |
| S03B | 3017 | 12" x 12" Floor Tile - White with Blue Streaks | 1.3 (mastic) | Chrysotile | Yes |
| S03C | 3017 | | ND (tile) | - | No |
| S04A | 3018 | | NA (mastic) | Chrysotile | Yes |
| S04B | 3018 | | ND (tile) | - | No |
| S04C | 3018 | 9" x 9" Floor Tile - Red/Black and White Streaks | NA (mastic) | Chrysotile | Yes |
| S05A | 3018 | | 6.9 (tile) | Chrysotile | Yes |
| S05B | 3018 | | 10 (mastic) | Chrysotile | Yes |
| S05C | 3018 | | NA | - | Yes |
| S05A | 3018 | Wall Plaster (1964) | ND | - | No |
| S05B | 3019 | Wall Plaster (1953) | ND | - | No |
| S05C | 3007 | Wall Plaster (1938) | <0.25 | Chrysotile | No |
| S05D | 3009 | Wall Plaster (1959) | ND | - | No |
| S05E | 3025 | Wall Plaster (1959) | ND | - | No |
| S06A | 3020 | Drywall Joint Compound (1938) | ND | - | No |
| S06B | 3006 | Drywall Joint Compound (1938) | ND | - | No |
| S06C | 3009 | Drywall Joint Compound (1959) | ND | - | No |
| S06D | 3024 | Drywall Joint Compound (1959) | ND | - | No |
| S06E | 3025 | Drywall Joint Compound (1959) | ND | - | No |
| S07A | 3026 | 9" x 9" Floor Tile - Brown with Beige Streaks | 10 | Chrysotile | Yes |
| S07B | 26 | | NA | Chrysotile | Yes |
| S07C | 3026 | | NA | Chrysotile | Yes |
| S08A | 3008 | 9" x 9" Floor Tile - Green/Blue and Beige Streaks | 10 | Chrysotile | Yes |
| S08B | 3008 | | NA | Chrysotile | Yes |
| S08C | 3008 | | NA | Chrysotile | Yes |
| S09A | 3009 | | 10 | Chrysotile | Yes |
| S09B | 3009 | 9" x 9" Floor Tile - Olive with Beige Streaks | NA | Chrysotile | Yes |
| S09C | 3009 | | NA | Chrysotile | Yes |
| S10A | 3011 | | 10 | Chrysotile | Yes |
| S10B | 3011 | 9" x 9" Floor Tile - Tan/Brown and Beige Streaks | NA | Chrysotile | Yes |
| S10C | 3011 | | NA | Chrysotile | Yes |
| S11A | 3011 | | 10 | Chrysotile | Yes |
| S11B | 3011 | 9" x 9" Floor Tile - Green/Dark Green and Beige Streaks | NA (tile) | Chrysotile | Yes |
| S11C | 3011 | | ND (mastic) | - | No |
| S12A | 2051 | | NA | Chrysotile | Yes |
| S12B | 2051 | 9" x 9" Floor Tile - Grey/Black and Beige Streaks | 7.2 | Chrysotile | Yes |
| S12C | 2051 | | NA | Chrysotile | Yes |
| S13A | 2051 | | Drywall Joint Compound (1964) | ND | - |
| S13B | 2032 | Drywall Joint Compound (1959) | ND | - | No |
| S13C | 2032 | Drywall Joint Compound (1959) | ND | - | No |

Table 3 - Elmira District Secondary School Sample Summary Table

TABLE 3: BULK ASBESTOS SAMPLING SUMMARY

| Sample # | Location | Material Description | Asbestos Content (%) | Fibre Type | Is Material ACM |
|----------|----------|---------------------------------------------------------------|----------------------|------------|-----------------|
| S14A | 2052 | 9" x 9" Floor Tile - Light Brown/White and Dark Brown Streaks | 6.7 | Chrysotile | Yes |
| S14B | 2052 | | NA (tile) | Chrysotile | Yes |
| S14C | 2052 | | ND (mastic) | - | No |
| | | | NA (tile) | Chrysotile | Yes |
| S15A | 2050 | 12" x 12" Floor Tile - Oatmeal | ND (mastic) | - | No |
| S15B | 2050 | | ND | - | No |
| S15C | 2050 | | ND | - | No |
| | | | ND | - | No |
| S16A | 2049 | 9" x 9" Floor Tile - Green with Beige Streaks | 5.2 (tile) | Chrysotile | Yes |
| S16B | 2049 | | ND (mastic) | - | No |
| | | | NA (tile) | Chrysotile | Yes |
| S16C | 2049 | | NA (tile) | Chrysotile | Yes |
| S17A | 2046 | 9" x 9" Floor Tile - Red/Brown with Beige Streaks | 6.3 (tile) | Chrysotile | Yes |
| S17B | 2046 | | 10 (mastic) | Chrysotile | Yes |
| | | | NA | Chrysotile | Yes |
| S17C | 2046 | | NA | Chrysotile | Yes |
| S18A | 2046 | Wall Plaster (1964) | ND | - | No |
| S18B | 2045 | Wall Plaster (1964) | ND | - | No |
| S18C | 2009 | Wall Plaster (1938) | ND | - | No |
| S18D | 2033 | Wall Plaster (1938) | ND | - | No |
| S18E | 2032 | Wall Plaster (1959) | ND | - | No |
| S19A | 2039 | 9" x 9" Floor Tile - White with Brown Streaks | 1.2 (tile) | Chrysotile | Yes |
| S19B | 2039 | | ND (mastic) | - | No |
| | | | NA (tile) | Chrysotile | Yes |
| S19C | 2039 | | NA (tile) | Chrysotile | Yes |
| S20A | 2012 | 12" x 12" Floor Tile - White with Beige Streaks | ND | - | No |
| S20B | 2012 | | ND | - | No |
| S20C | 2012 | | ND | - | No |
| | | | ND | - | No |
| S21A | 2009 | 9" x 9" Floor Tile - Tan with Beige Streaks | 1.6 (tile) | Chrysotile | Yes |
| S21B | 2009 | | ND (mastic) | - | No |
| | | | NA (tile) | Chrysotile | Yes |
| S21C | 2009 | | ND (mastic) | - | No |
| S22A | 2008 | 9" x 9" Floor Tile - Burgundy and Black | 2.0 (tile) | Chrysotile | Yes |
| S22B | 2008 | | ND (mastic) | - | No |
| | | | NA (tile) | Chrysotile | Yes |
| S22C | 2008 | | ND (mastic) | - | No |
| S23A | 2008 | 9" x 9" Floor Tile - Burgundy and Yellow | 6.8 (tile) | Chrysotile | Yes |
| S23B | 2008 | | ND (mastic) | - | No |
| | | | NA (tile) | Chrysotile | Yes |
| S23C | 2008 | | ND (mastic) | - | No |
| S24A | 2032 | 9" x 9" Floor Tile - Yellow with Brown Streaks | 10 | Chrysotile | Yes |
| S24B | 2032 | | NA (tile) | Chrysotile | Yes |
| | | | ND (mastic) | - | No |
| S24C | 2032 | | NA (tile) | Chrysotile | Yes |
| S25A | 2030 | Texture Coat Ceiling | ND | - | No |
| S25B | 2030 | Texture Coat Ceiling | ND | - | No |
| S25C | 2030 | Texture Coat Ceiling | ND | - | No |
| S26A | 3005 | 1" x1" Ceiling Tile - Random Pinhole | ND | - | No |
| S26B | 3005 | 1" x1" Ceiling Tile - Random Pinhole | ND | - | No |
| S26C | 3005 | 1" x1" Ceiling Tile - Random Pinhole | ND | - | No |
| S27A | 1079 | 1" x1" Ceiling Tile - Random Pinhole | ND | - | No |
| S27B | 1079 | 1" x1" Ceiling Tile - Random Pinhole | ND | - | No |
| S27C | 1079 | 1" x1" Ceiling Tile - Random Pinhole | ND | - | No |
| S28A | 1084 | Wall Plaster (1962) | ND | - | No |
| S28B | 1083 | Wall Plaster (1962) | ND | - | No |
| S29A | 1082 | Texture Coat Ceiling | ND | Chrysotile | Yes |
| S29B | 1082 | Texture Coat Ceiling | 2.5 | Chrysotile | Yes |
| S29C | 1082 | Texture Coat Ceiling | NA | Chrysotile | Yes |
| S30A | 1077 | 12" x 12" Floor Tile - Yellow Oatmeal | ND | - | No |
| S30B | 1077 | 12" x 12" Floor Tile - Yellow Oatmeal | ND | - | No |
| S30C | 1077 | 12" x 12" Floor Tile - Yellow Oatmeal | ND | - | No |
| S31A | 1077 | Texture Coat Ceiling | ND | - | No |
| S31B | 1077 | Texture Coat Ceiling | ND | - | No |
| S31C | 1077 | Texture Coat Ceiling | ND | - | No |
| S32A | 1025 | Texture Coat Ceiling | 1.6 | Chrysotile | Yes |
| S32B | 1025 | Texture Coat Ceiling | NA | Chrysotile | Yes |
| S32C | 1025 | Texture Coat Ceiling | NA | Chrysotile | Yes |
| S33A | 1056 | 12" x 12" Floor Tile - Beige/Red and White Streak | 0.5 (tile) | Chrysotile | Yes |
| | 1056 | | ND (mastic) | - | No |
| | 1056 | | ND (caulk) | - | No |
| S33B | 1056 | | NA (tile) | Chrysotile | Yes |
| | 1056 | | ND (mastic) | - | No |
| S33C | 1056 | | NA (tile) | Chrysotile | Yes |
| | 1056 | | ND (mastic) | - | No |

Table 3 - Elmira District Secondary School Sample Summary Table

| TABLE 3: BULK ASBESTOS SAMPLING SUMMARY | | | | | |
|-------------------------------------------------------|----------|--------------------------------------------------------|----------------------|------------|-----------------|
| Sample # | Location | Material Description | Asbestos Content (%) | Fibre Type | Is Material ACM |
| S34A | 1038 | 12" x 12" Floor Tile - Olive with White Streaks | 1.2 (tile) | Chrysotile | Yes |
| | 1038 | | ND (mastic) | - | No |
| S34B | 1038 | | NA (tile) | Chrysotile | Yes |
| | | | ND (mastic) | - | No |
| S34C | 1038 | | NA (tile) | Chrysotile | Yes |
| | | | ND (mastic) | - | No |
| S35A | 1091 | Texture Coat Ceiling | ND | - | No |
| S35B | 1090 | Texture Coat Ceiling | ND | - | No |
| S35C | 1089 | Texture Coat Ceiling | ND | - | No |
| 2013 Asbestos Audit Update | | | | | |
| 34532-700-EDSS-S01A | 1000 | 9" x 9" Floor Tile - White with Green Fleck | 0.25 (tile) | Chrysotile | No |
| 34532-700-EDSS-S01B | | | ND (mastic) | - | No |
| 34532-700-EDSS-S01C | | | 0.25 (tile) | Chrysotile | No |
| 34532-700-EDSS-S02A | 1000 | 9" x 9" Floor Tile - Green with White Fleck | 1.2 (tile) | Chrysotile | Yes |
| 34532-700-EDSS-S02B | | | ND (mastic) | - | No |
| 34532-700-EDSS-S02C | | | NA (tile) | Chrysotile | Yes |
| 34532-700-EDSS-S03A | 1073 | 12" x 12" Floor Tile - Beige with White Fleck | ND (mastic) | - | No |
| 34532-700-EDSS-S03B | | | ND (tile) | - | No |
| 34532-700-EDSS-S03C | | | ND (mastic) | - | No |
| 34532-700-EDSS-S04A | 1072 | 12" x 12" Floor Tile - Beige with Black and White | 1.2 (tile) | Chrysotile | Yes |
| 34532-700-EDSS-S04B | | | ND (mastic) | - | No |
| 34532-700-EDSS-S04C | | | NA (tile) | Chrysotile | Yes |
| 34532-700-EDSS-S05A | 1074 | 9" x 9" Floor Tile - Beige with Blue Fleck | ND (mastic) | - | No |
| 34532-700-EDSS-S05B | | | 2.1 (tile) | Chrysotile | Yes |
| 34532-700-EDSS-S05C | | | 1.4 (mastic) | Chrysotile | Yes |
| 34532-700-EDSS-S06A | 1008 | 9" x 9" Floor Tile - Brown with Cream Fleck | NA (tile) | Chrysotile | Yes |
| 34532-700-EDSS-S06B | | | NA (mastic) | Chrysotile | Yes |
| 34532-700-EDSS-S06C | | | NA (tile) | Chrysotile | Yes |
| 34532-700-EDSS-S07A | 1006 | 9" x 9" Floor Tile - Beige with Brown Fleck | 1.3 (tile) | Chrysotile | Yes |
| 34532-700-EDSS-S07B | | | ND (mastic) | - | No |
| 34532-700-EDSS-S07C | | | NA (tile) | Chrysotile | Yes |
| 34532-700-EDSS-S08A | 1001 | 9" x 9" Floor Tile - Beige with Black and White Streak | 1.1 (tile) | Chrysotile | Yes |
| 34532-700-EDSS-S08B | | | ND (mastic) | - | No |
| 34532-700-EDSS-S08C | | | NA (tile) | Chrysotile | Yes |
| 34532-700-EDSS-S09A | 1025 | 12" x 12" Floor Tile - Beige with Brown Spots | ND (mastic) | - | No |
| 34532-700-EDSS-S09B | | | 1.3 | Chrysotile | Yes |
| 34532-700-EDSS-S09C | | | NA | Chrysotile | Yes |
| 34532-700-EDSS-S10A | 1071 | 12" x 12" Floor Tile - Beige with Black and White | 1.5 | Chrysotile | Yes |
| 34532-700-EDSS-S10B | | | NA | Chrysotile | Yes |
| 34532-700-EDSS-S10C | | | NA | Chrysotile | Yes |
| 34532-700-EDSS-S11A | 1075 | 9" x 9" Floor Tile - Blue with White and Green Streak | 2.2 | Chrysotile | Yes |
| 34532-700-EDSS-S11B | | | NA | Chrysotile | Yes |
| 34532-700-EDSS-S11C | | | NA | Chrysotile | Yes |
| 34532-700-EDSS-S12A | 1075 | 12" x 12" Floor Tile - Grey with White Fleck | 1.4 | Chrysotile | Yes |
| 34532-700-EDSS-S12B | | | NA | Chrysotile | Yes |
| 34532-700-EDSS-S12C | | | NA | Chrysotile | Yes |
| 34532-700-EDSS-S13A | 2032 | 9" x 9" Floor Tile - Beige with White and Brown Streak | 1.1 | Chrysotile | Yes |
| 34532-700-EDSS-S13B | | | NA | Chrysotile | Yes |
| 34532-700-EDSS-S13C | | | NA | Chrysotile | Yes |
| 2017 Asbestos Audit Update (February Sampling) | | | | | |
| S01C | 2006 | Drywall Joint Compound (1938) | ND | - | No |
| S02B | 2016 | Plaster (1953) | ND | - | No |
| S02C | | | ND | - | No |

Table 3 - Elmira District Secondary School Sample Summary Table

TABLE 3: BULK ASBESTOS SAMPLING SUMMARY

| Sample # | Location | Material Description | Asbestos Content (%) | Fibre Type | Is Material ACM |
|----------------------------------------------------|----------|-------------------------------------------------------|----------------------|------------|-----------------|
| S03A | 1043 | Drywall Joint Compound (1962) | ND | - | No |
| S03B | | | ND | - | No |
| S03C | | | ND | - | No |
| S04A | 1011 | Plaster (1966) | ND | - | No |
| S04B | | | ND | - | No |
| S04C | | | ND | - | No |
| S05A | 2050 | Plaster (1964) | ND | - | No |
| S05B | | | ND | - | No |
| S05C | | | ND | - | No |
| S06A | 1021 | 9"x9" Vinyl Floor Tile - Brown with Brown Fleck | 1.69 (tile) | Chrysotile | Yes |
| S06B | | | ND (mastic) | - | No |
| S06C | | | NA (tile) | Chrysotile | Yes |
| S07A | 1083 | 9"x9" Vinyl Floor Tile - Tan, Brown, and Brown | 5.25 | Chrysotile | Yes |
| S07B | | | NA | Chrysotile | Yes |
| S07C | | | NA | Chrysotile | Yes |
| S08A | 1084 | 9"x9" Vinyl Floor Tile - Brown, Black, Beige, Streaks | 7.2 (tile) | Chrysotile | Yes |
| S08B | | | NA (tile) | Chrysotile | Yes |
| S08C | | | ND (mastic) | - | No |
| S09A | Exterior | Hard Texture Coat | 0.5 | Chrysotile | Yes |
| S09B | | | NA | Chrysotile | Yes |
| S09C | | | NA | Chrysotile | Yes |
| 2017 Asbestos Audit Update (March Sampling) | | | | | |
| S01A | 1001 | 2'x2' Ceiling Tile - Long Fissure Random Pinhole | 5 | Amosite | Yes |
| S01B | | | NA | Amosite | Yes |
| S01C | | | NA | Amosite | Yes |
| S02A | 1002 | 2'x4' Ceiling Tile - Long Fissure Random Pinhole | 5 | Amosite | Yes |
| S02B | | | NA | Amosite | Yes |
| S02C | | | NA | Amosite | Yes |
| S03A | 1008 | 9"x9" Vinyl Floor Tile - Cream with Brown Fleck | 2.08 | Chrysotile | Yes |
| S03B | | | NA | Chrysotile | Yes |
| S03C | | | NA | Chrysotile | Yes |
| S04A | 1034 | 9"x9" Vinyl Floor Tile - Beige with Brown Streak | 0.72 | Chrysotile | Yes |
| S04B | | | NA | Chrysotile | Yes |
| S04C | | | NA | Chrysotile | Yes |
| S05A | 1038 | 12"x12" Vinyl Floor Tile - Olive with White Streak | ND | - | No |
| S05B | | | ND | - | No |
| S05C | | | ND | - | No |
| S06A | 1120 | Vinyl Sheet Flooring - Beige Square Pattern | ND | - | No |
| S06B | | | ND | - | No |
| S06C | | | ND | - | No |
| S07A | 1022 | 9"x9" Vinyl Floor Tile - White with Grey Fleck | ND | - | No |
| S07B | | | ND | - | No |
| S07C | | | ND | - | No |

Table 3 - Elmira District Secondary School Sample Summary Table

TABLE 3: BULK ASBESTOS SAMPLING SUMMARY

| Sample # | Location | Material Description | Asbestos Content (%) | Fibre Type | Is Material ACM |
|---------------------------------------------------------------------------------------------|------------------|--------------------------------------|----------------------|------------------|-----------------|
| S08A | 2000 | Tar Paper on Wall | ND | - | No |
| S08B | | | ND | - | No |
| S08C | | | ND | - | No |
| 2019 Additional Sampling | | | | | |
| S01A | Fan Room | Yellow Duct Expansion Joint | ND | - | No |
| S01B | Fan Room | Yellow Duct Expansion Joint | ND | - | No |
| S01C | Fan Room | Yellow Duct Expansion Joint | ND | - | No |
| 2020 Asbestos Audit Update | | | | | |
| S01A | Room 1075 (1959) | Exterior Window Sealant - Grey | 1 | Chrysotile | Yes |
| S01B | Room 1075 (1959) | Exterior Window Sealant - Grey | NA | Chrysotile | Yes |
| S01C | Room 1075 (1959) | Exterior Window Sealant - Grey | NA | Chrysotile | Yes |
| S02A | Exterior (1959) | Exterior Door Sealant - Grey | 1 | Chrysotile | Yes |
| S02B | Exterior (1959) | Exterior Door Sealant - Grey | NA | Chrysotile | Yes |
| S02C | Exterior (1959) | Exterior Door Sealant - Grey | NA | Chrysotile | Yes |
| S03A | Room 2032 (1959) | Interior Door Sealant - Brown | 1 | Chrysotile | Yes |
| S03B | Room 2032 (1959) | Interior Door Sealant - Brown | NA | Chrysotile | Yes |
| S03C | Room 2032 (1959) | Interior Door Sealant - Brown | NA | Chrysotile | Yes |
| S04A | Room 2048 (1964) | Exterior Window Sealant - Grey | ND | - | No |
| S04B | Room 2051 (1964) | Exterior Window Sealant - Grey | ND | - | No |
| S04C | Room 2051 (1964) | Exterior Window Sealant - Grey | ND | - | No |
| S05A | Room 2051 (1964) | Exterior Window Pane Sealant - White | 0.5 | Chrysotile | Yes |
| S05B | Room 2051 (1964) | Exterior Window Pane Sealant - White | NA | Chrysotile | Yes |
| S05C | Room 2051 (1964) | Exterior Window Pane Sealant - White | NA | Chrysotile | Yes |
| S06A | Room 2043 (1953) | Floor Tile Mastic - Black | 0.5 | Chrysotile | Yes |
| S06B | Room 2043 (1953) | Floor Tile Mastic - Black | NA | Chrysotile | Yes |
| S06C | Room 2043 (1953) | Floor Tile Mastic - Black | NA | Chrysotile | Yes |
| S07A | Room 2043 (1953) | Drywall Joint Compound - White | ND | - | No |
| S07B | Room 2043 (1953) | Drywall Joint Compound - White | ND | - | No |
| S07C | Room 2043 (1953) | Drywall Joint Compound - White | ND | - | No |
| S08A | Room 2047 (1964) | Drywall Joint Compound - White | ND | - | No |
| S08B | Room 2047 (1964) | Drywall Joint Compound - White | ND | - | No |
| S09A | Room 1080 (1962) | Exterior Door Sealant - White | 0.5 | Chrysotile | Yes |
| S09B | Room 1080 (1962) | Exterior Door Sealant - White | NA | Chrysotile | Yes |
| S09C | Room 1080 (1962) | Exterior Door Sealant - White | NA | Chrysotile | Yes |
| S10A | Room 1084 (1962) | Exterior Window Sealant - Grey | 1 | Chrysotile | Yes |
| S10B | Room 1084 (1962) | Exterior Window Sealant - Grey | NA | Chrysotile | Yes |
| S10C | Room 1084 (1962) | Exterior Window Sealant - Grey | NA | Chrysotile | Yes |
| S11A | Room 1084 (1962) | Plaster - White | ND | - | No |
| S12A | Room 1079 (1962) | Exterior Window Sealant - White | 1 | Chrysotile | Yes |
| S12B | Room 1079 (1962) | Exterior Window Sealant - White | NA | Chrysotile | Yes |
| S12C | Room 1079 (1962) | Exterior Window Sealant - White | NA | Chrysotile | Yes |
| S13A | Room 1043 (1966) | Exterior Window Sealant - Beige | 1 | Chrysotile | Yes |
| S13B | Room 1043 (1966) | Exterior Window Sealant - Beige | NA | Chrysotile | Yes |
| S13C | Room 1043 (1966) | Exterior Window Sealant - Beige | NA | Chrysotile | Yes |
| S14A | Room 1041 (1966) | Drywall Joint Compound - White | 1 | Chrysotile | Yes |
| S14B | Room 1041 (1966) | Drywall Joint Compound - White | NA | Chrysotile | Yes |
| S14C | Room 1041 (1966) | Drywall Joint Compound - White | NA | Chrysotile | Yes |
| S14D | Room 1041 (1966) | Drywall Joint Compound - White | NA | Chrysotile | Yes |
| S14E | Room 1041 (1966) | Drywall Joint Compound - White | NA | Chrysotile | Yes |
| S15A | Room 1041 (1966) | Interior Door Sealant - Grey | ND | - | No |
| S15B | Room 1041 (1966) | Interior Door Sealant - Grey | ND | - | No |
| S15C | Room 1041 (1966) | Interior Door Sealant - Grey | ND | - | No |
| 2021 Elmira District Secondary School Window, Roof, HVAC & Sanitary Upgrades DSA | | | | | |
| S01A | Rm 41 | 1x1 Ceiling tile | ND | ND | No |
| S01B | Rm 41 | 1x1 Ceiling tile | ND | ND | No |
| S01C | Rm 41 | 1x1 Ceiling tile | ND | ND | No |
| S01A | Rm 41 | 1x1 Ceiling tile with mastic | ND | ND | No |
| S01B | Rm 41 | 1x1 Ceiling tile with mastic | ND | ND | No |
| S01C | Rm 41 | 1x1 Ceiling tile with mastic | ND | ND | No |
| S02A | Rm 41 | Concrete block mortar | ND | ND | No |
| S02B | Rm 41 | Concrete block mortar | ND | ND | No |
| S02C | Rm 41 | Concrete block mortar | ND | ND | No |
| S03A | Fan Room | Insulation wrap | ND | ND | No |
| S03B | Fan Room | Insulation wrap | Trace Chrysotile | Trace Chrysotile | No |
| S03C | Fan Room | Insulation wrap | Trace Chrysotile | Trace Chrysotile | No |
| S04A | Fan Room | Concrete block mortar | ND | ND | No |
| S04B | Fan Room | Concrete block mortar | ND | ND | No |
| S04C | Fan Room | Concrete block mortar | ND | ND | No |
| S05A | Fan Room | Duct Insulation - mastic | ND | ND | No |
| S05B | Fan Room | Duct Insulation - mastic | ND | ND | No |
| S05C | Fan Room | Duct Insulation - mastic | ND | ND | No |
| S05A | Fan Room | Duct Insulation - tarpaper | ND | ND | No |
| S05B | Fan Room | Duct Insulation - tarpaper | ND | ND | No |
| S05C | Fan Room | Duct Insulation - tarpaper | ND | ND | No |
| S06A | Rm 25 | Window Sill Cement parging | ND | ND | No |
| S06B | Rm 25 | Window Sill Cement parging | ND | ND | No |
| S06C | Rm 25 | Window Sill Cement parging | ND | ND | No |
| S07A | Rm 25 | Plaster at columns | ND | ND | No |
| S07B | Rm 25 | Plaster at columns | ND | ND | No |
| S07C | Rm 25 | Plaster at columns | ND | ND | No |

Table 3 - Elmira District Secondary School Sample Summary Table

TABLE 3: BULK ASBESTOS SAMPLING SUMMARY

| Sample # | Location | Material Description | Asbestos Content (%) | Fibre Type | Is Material ACM |
|---------------------------------------------------------------------|-----------------------------------------------|--------------------------------------------------------|----------------------|------------------|-----------------|
| S07A | Rm 25 | Plaster at columns | ND | ND | No |
| S07B | Rm 25 | Plaster at columns | ND | ND | No |
| S07C | Rm 25 | Plaster at columns | ND | ND | No |
| S08A | 25A | Ceiling material | ND | ND | No |
| S08B | 25A | Ceiling material | ND | ND | No |
| S08C | 25A | Ceiling material | ND | ND | No |
| S09A | Boiler room | Gasket - cord | ND | ND | No |
| S09B | Boiler room | Gasket - cord | ND | ND | No |
| S09C | Boiler room | Gasket - cord | ND | ND | No |
| S09A | Boiler room | Gasket | ND | ND | No |
| S09B | Boiler room | Gasket | ND | ND | No |
| S09C | Boiler room | Gasket | ND | ND | No |
| S10A | Boiler room | Interior | ND | ND | No |
| S10B | Boiler room | Interior | ND | ND | No |
| S10C | Boiler room | Interior | ND | ND | No |
| S11A | Boiler room | Door insulation | ND | ND | No |
| S11B | Boiler room | Door insulation | ND | ND | No |
| S11C | Boiler room | Door insulation | ND | ND | No |
| S12A | Rm 121 | Grey window sealant | ND | ND | No |
| S12B | Rm 121 | Grey window sealant | ND | ND | No |
| S12C | Rm 121 | Grey window sealant | ND | ND | No |
| S13A | Rm 121 | Glass Block Mortar | ND | ND | No |
| S13B | Rm 121 | Glass Block Mortar | ND | ND | No |
| S13C | Rm 121 | Glass Block Mortar | ND | ND | No |
| S14A | 901 vestibule | Mortar on speed tiles | ND | ND | No |
| S14B | 901 vestibule | Mortar on speed tiles | ND | ND | No |
| S14C | 901 vestibule | Mortar on speed tiles | ND | ND | No |
| S15A | 903 vestibule | White Window Pane sealant | ND | ND | Yes |
| S15B | 903 vestibule | White Window Pane sealant | 1% Chrysotile | Chrysotile | Yes |
| S15C | 903 vestibule | White Window Pane sealant | NA | Chrysotile | Yes |
| S16A | 903 vestibule | Black sealant on door (window pane) | ND | ND | No |
| S16B | 903 vestibule | Black sealant on door (window pane) | ND | ND | No |
| S16C | 903 vestibule | Black sealant on door (window pane) | ND | ND | No |
| S17A | Rm 219 | Interior soft grey sealant - window | 1% Chrysotile | Chrysotile | Yes |
| S17B | Rm 219 | Interior soft grey sealant - window | NA | Chrysotile | Yes |
| S17C | Rm 219 | Interior soft grey sealant - window | NA | Chrysotile | Yes |
| S18A | Rm 219 | Exterior soft grey sealant - window | 1% Chrysotile | Chrysotile | Yes |
| S18B | Rm 219 | Exterior soft grey sealant - window | NA | Chrysotile | Yes |
| S18C | Rm 219 | Exterior soft grey sealant - window | NA | Chrysotile | Yes |
| S19A | Rm 219 | Hard window pane sealant | 0.5% Chrysotile | Chrysotile | Yes |
| S19B | Rm 219 | Hard window pane sealant | NA | Chrysotile | Yes |
| S19C | Rm 219 | Hard window pane sealant | NA | Chrysotile | Yes |
| S20A | roof-replacement -1 | Built Up Roofing with Cellulose | ND | ND | No |
| S20B | roof-replacement -1 | Built Up Roofing with Cellulose | ND | ND | No |
| S20C | roof-replacement -1 | Built Up Roofing with Cellulose | ND | ND | No |
| S20A | roof-replacement -1 | Tarlike with drywall backing | ND | ND | No |
| S20B | roof-replacement -1 | Tarlike with drywall backing | ND | ND | No |
| S20C | roof-replacement -1 | Tarlike with drywall backing | ND | ND | No |
| S20A | roof-replacement -1 | Lower Brown Membrane | ND | ND | No |
| S20B | roof-replacement -1 | Lower Brown Membrane | ND | ND | No |
| S20C | roof-replacement -1 | Lower Brown Membrane | Trace Chrysotile | Trace Chrysotile | No |
| S21A | Roof Replacement - Upper roof - small section | Built Up Roof | ND | ND | Yes |
| S21B | Roof Replacement - Upper roof - small section | Built Up Roof | 0.75% Chrysotile | Chrysotile | Yes |
| S21C | Roof Replacement - Upper roof - small section | Built Up Roof | NA | Chrysotile | Yes |
| S22A | Upper Roof replacement | chimney grey sealant | ND | ND | No |
| S22B | Upper Roof replacement | chimney grey sealant | ND | ND | No |
| S22C | Upper Roof replacement | chimney grey sealant | ND | ND | No |
| S23A | Upper Roof replacement | grey parapet/seam sealant | ND | ND | No |
| S23B | Upper Roof replacement | grey parapet/seam sealant | ND | ND | No |
| S23C | Upper Roof replacement | grey parapet/seam sealant | ND | ND | No |
| S23A | Upper Roof replacement | grey parapet/seam sealant | ND | ND | No |
| S23B | Upper Roof replacement | grey parapet/seam sealant | ND | ND | No |
| S23C | Upper Roof replacement | grey parapet/seam sealant | ND | ND | No |
| S24A | rm 37 | 2x4 ceiling tile | 10% Amosite | Amosite | Yes |
| S24B | rm 37 | 2x4 ceiling tile | NA | Amosite | Yes |
| S24C | rm 37 | 2x4 ceiling tile | NA | Amosite | Yes |
| S25A | rm 37 | 12x12 Vinyl Floor Tile beige with white fleck | ND | ND | No |
| S25B | rm 37 | 12x12 Vinyl Floor Tile beige with white fleck | ND | ND | No |
| S25C | rm 37 | 12x12 Vinyl Floor Tile beige with white fleck | ND | ND | No |
| S25A | rm 37 | 12x12 Vinyl Floor Tile beige with white fleck - mastic | ND | ND | No |
| S25B | rm 37 | 12x12 Vinyl Floor Tile beige with white fleck - mastic | ND | ND | No |
| S25C | rm 37 | 12x12 Vinyl Floor Tile beige with white fleck - mastic | ND | ND | No |
| 2022 Elmira District Secondary School Bulk Asbestos Sampling | | | | | |
| S01A - Concrete Block | 901 | Concrete Block | ND | ND | No |
| S01B - Concrete Block | 901 | Concrete Block | ND | ND | No |
| S01C - Concrete Block | 901 | Concrete Block | ND | ND | No |
| S03A - Stair Top Layer | 901 | Stair Top Layer | ND | ND | No |
| S03B - Stair Top Layer | 901 | Stair Top Layer | ND | ND | No |
| S03C - Stair Top Layer | 901 | Stair Top Layer | ND | ND | No |

Table 3 - Elmira District Secondary School Sample Summary Table

TABLE 3: BULK ASBESTOS SAMPLING SUMMARY

| Sample # | Location | Material Description | Asbestos Content (%) | Fibre Type | Is Material ACM |
|---------------------|----------|----------------------|----------------------|------------|-----------------|
| S04A - Stair Filler | 901 | Stair Filler | ND | ND | No |
| S04B - Stair Filler | 901 | Stair Filler | ND | ND | No |
| S04C - Stair Filler | 901 | Stair Filler | ND | ND | No |

NA: Not Analyzed due to stop positive method **ND:** No asbestos fibres detected above the laboratory minimum detection limit

A bulk material sample containing 0.5% or more asbestos therefore establishes that material as asbestos-containing. In accordance with Table 1 of O. Reg. 278/05, a minimum number of samples for the material to be classified as non asbestos. A homogeneous material is defined by O. Reg. 278/05 "as material that is uniform in colour and texture". Homogeneous samples are identified by an alphabetical suffix to sample names to represent multiple samples of a homogeneous material. When a homogeneous material is analysed it is determined to be asbestos-containing upon the first positive detection of asbestos equal to or greater than 0.5%. Subsequent samples of the same material are therefore not analysed. Some bulk samples are comprised of multiple layers and as such will require multiple analysis. In such cases each layer is isolated at the laboratory and analysed individually to determine asbestos content. As a result the laboratory may report additional samples beyond the submitted number of samples or include multiple analyses as subsets within a sample.

For Tender Purposes

Appendix 01 35 34B– Lead Report- Not Applicable

01 42 00 – References

1.0 GENERAL

1.1. SECTION INCLUDES

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

1.2. RELATED SECTIONS

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

1.3. REFERENCES

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

1.4. STANDARDS

- .1 The following associations and organizations are cited in specification sections. Acronym, name, address, and Internet URL addresses are as follows:
- .2 Canadian Organizations:
 - .1 Street, Suite 616, Ottawa, ON K1P 5G4; URL: <http://www.acec.ca>.
 - .2 **AWMAC** - Architectural Woodwork Manufacturers Association of Canada, 516-4 Street West, High River, AB T1V 1B6; URL: <http://www.awmac.com>.
 - .3 **Canada Green Building Council**, 330 - 55 rue Murray Street, Ottawa, ON. K1N5M3; Tel: 613-241-1184, Fax: 613-241-5750; URL: <http://www.cagbc.org>.
 - .4 **CCA** - Canadian Construction Association, 75 Albert St., Suite 400, Ottawa, ON K1P 5E7; URL: <http://www.cca-acc.com>.
 - .5 **CCDC** – Canadian Construction Documents Committee, Refer to ACEC, CCA, CSC or RAIC; URL: <http://www.CCDC.org>.
 - .6 **CGA** - Canadian Gas Association, 20 Eglinton Avenue West, Suite 1305, Toronto, ON M4R 1K8; URL: <http://www.cga.ca..>

-
- .7 **CGSB** - Canadian General Standards Board, Place du Portage, Phase III, 6B1, 11 Laurier Street, Hull, QC K1A 0S5; URL: <http://w3.pwgsc.gc.ca/cgsb>.
 - .8 **CISC** - Canadian Institute of Steel Construction, 201 Consumers Road, Suite 300, Willowdale, ON M2J 4G8; URL: <http://www.cisc-icca.ca>.
 - .9 **CLA** - Canadian Lumbermen's Association, 27 Goulburn Avenue, Ottawa, ON K1N 8C7; URL: <http://www.cla-ca.ca>.
 - .10 **CNLA** - Canadian Nursery Landscape Association, RR #4, Stn. Main, 7856 Fifth Street, Milton, ON L9T 2X8; URL: <http://www.canadanursery.com>.
 - .11 **CRCA** - Canadian Roofing Contractors Association, 155 Queen Street, Suite 1300, Ottawa, ON K1P 6L1; URL: <http://www.roofingcanada.com>.
 - .12 **CSA** - Canadian Standards Association International, 178 Rexdale Blvd., Toronto, ON M9W 1R3; URL: <http://www.csa-international.org>.
 - .13 **CSC** - Construction Specifications Canada, 120 Carlton Street, Suite 312, Toronto, ON M5A 4K2; URL: <http://www.csc-dcc.ca>.
 - .14 **CSDMA** - Canadian Steel Door Manufacturers Association, One Yonge Street, Suite 1801, Toronto, ON M5E 1W7; URL: <http://www.csdma.org>.
 - .15 **CSPI** - Corrugated Steel Pipe Institute, 652 Bishop Street N, Unit 2A, Cambridge, ON N3H 4V6; URL: <http://www.cspi.ca>.
 - .16 **CSSBI** - Canadian Sheet Steel Building Institute, 652 Bishop St. N., Unit 2A, Cambridge, ON N3H 4V6; URL: <http://www.cssbi.ca>.
 - .17 **CUFCA** - Canadian Urethane Foam Contractor's Association, Box 3214, Winnipeg, MB R3C 4E7; URL: <http://www.cufca.ca>.
 - .18 **CWC** - Canadian Wood Council, 1400 Blair Place, Suite 210, Ottawa, ON K1J 9B8; URL: <http://www.cwc.ca>.
 - .19 **EC** - Environment Canada, Conservation and Protection, Inquiry Centre, 351 St. Joseph Blvd, Hull, QC KIA 0H3; URL: <http://www.ec.gc.ca>.
 - .20 **EFC** - Electro Federation of Canada, 5800 Explorer Drive, Suite 200, Mississauga, ON L4W 5K9; URL: <http://www.electrofed.com>.
 - .21 **MPI** - The Master Painters Institute, 4090 Graveley Street, Burnaby, BC V5C 3T6; URL: <http://www.paintinfo.com>.
 - .22 **NABA** - National Air Barrier Association, PO Box 2747, Winnipeg, MB R3C 4E7; URL: <http://www.naba.ca>.
 - .23 **NLGA** - National Lumber Grades Authority, 406-First Capital Place, 960 Quayside Drive, New Westminster, BC V3M 6G2; URL: <http://www.nlga.org>.
 - .24 **NRC** - National Research Council, Building M-58, 1200 Montreal Road, Ottawa, ON K1A 0R6; URL: <http://www.nrc.gc.ca>.

-
- .25 **QPL** - Qualification Program List, c/o Canadian General Standards Board, Place du Portage, Phase III, 6B1, 11 Laurier Street, Hull, QC K1A 1G6; URL: <http://www.pwgsc.gc.ca/cgsb>.
 - .26 **RAIC** - Royal Architectural Institute of Canada, 55 Murray Street, Suite 330, Ottawa, ON K1N 5M3; URL: <http://www.raic.org>.
 - .27 **SCC** - Standards Council of Canada, 270 Albert Street, Suite 2000, Ottawa, ON K1P 6N7; URL: <http://www.scc.ca>.
 - .28 **TTMAC** - Terrazzo, Tile and Marble Association of Canada, 30 Capston Gate, Unit 5 Concord, ON L4K 3E8; URL: <http://www.ttmac.com>.
 - .29 **ULC** - Underwriters' Laboratories of Canada, 7 Crouse Road, Toronto, ON M1R 3A9; URL: <http://www.ulc.ca>.
 - .3 USA Organizations:
 - .1 **AA** - Aluminum Association, 900 19th Street N.W., Washington, DC 20006; URL: <http://www.aluminum.org>.
 - .2 **AASHTO** - American Association of State Highway and Transportation Officials, 444 N Capitol Street N.W., Suite 249, Washington, DC 20001; URL: <http://www.aashto.org>.
 - .3 **AHA** - American Hardboard Association, 1210W Northwest Hwy, Palatine, IL 60067; URL: <http://www.hardboard.org>.
 - .4 **AITC** - American Institute of Timber Construction, 7012 S. Revere Parkway, Suite 140, Englewood, CO 80112; URL: <http://www.aitc-glulam.org>.
 - .5 **AMCA** - Air Movement and Control Association Inc., 30 West University Drive, Arlington Heights, IL 60004-1893; URL: <http://www.amca.org>.
 - .6 **ANSI** - American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036; URL: <http://www.ansi.org>.
 - .7 **APA** - The Engineered Wood Association, P.O. Box 11700, Tacoma, WA 98411-0700; URL: <http://www.apawood.org>.
 - .8 **API** - American Petroleum Institute, 1220 L St. Northwest, Washington, DC 20005-4070; URL: <http://www.api.org>.
 - .9 **ARI** - Air Conditioning and Refrigeration Institute, 4100 N Fairfax Drive, Suite 200, Arlington, VA 22203; URL: <http://www.ari.org>.
 - .10 **ASHRAE** - American Society of Heating, Refrigeration and Air-Conditioning Engineers, 1791 Tullie Circle NE, Atlanta, GA 30329; URL: <http://www.ashrae.org>.
 - .11 **ASME** - American Society of Mechanical Engineers, ASME Headquarters, 3 Park Avenue, New York, NY 10016-5990; URL: <http://www.asme.org>.

- .12 **ASTM International**, 100 Barr Harbor Drive West, Conshohocken, PA 19428-2959; URL: <http://www.astm.org>.
- .13 **AWCI** - Association of the Wall and Ceiling Industries International, 803 West Broad Street, Suite 600 , Falls Church, 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, IL60062-
2096; URL: <http://www.ul.com>.

END OF SECTION

01 45 00 – Quality Control

1.0 GENERAL

1.1. RELATED SECTIONS

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

1.2. REFERENCES

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

1.3. INSPECTION BY AUTHORITY

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

1.4. REVIEW BY CONSULTANT

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

1.5. INDEPENDENT INSPECTION AGENCIES

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

1.6. ACCESS TO WORK

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

1.7. CONTRACTOR RESPONSIBILITIES

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

1.8. DUTIES & AUTHORITY OF TESTING AGENCY

- .1 Testing agency is expected to do the following:
 - .1 Act in a professional and unprejudiced basis and carry out inspection and testing functions to establish compliance with requirements of Contract Documents.

- .2 Check work as it progresses and prepare reports stating results of tests and conditions of work and state in each report whether specimens tested conform to requirements of Contract Documents, specifically noting deviations.
- .3 Distribute reports as follows
 - .1 Consultant
 - .2 Owner
 - .3 Contractor
- .2 Testing agency is not authorized to amend or release any requirements of Contract Documents, nor to approve or accept any portion of work.

1.9. REJECTED WORK

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

1.10. TESTING OF EXCAVATION & BACKFILL

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

1.11. CONCRETE STRENGTH TESTS

- .1 Review the proposed concrete mix design and check test if considered necessary.

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

1.12. INSPECTION OF STRUCTURAL STEEL

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

and cracks from the back of the joint. Any suspect welds shall be checked ultrasonically.

1.13. INSPECTION OF METAL DECK

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

1.14. INSPECTION AND TESTING OF PAVING

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

- .10 Be responsible for all approvals given to the Paving Contractor. At completion of the paving project, inform the Consultant all tests were performed according to the Specifications and the Contractor's performance has been approved.
- .11 The Consultant will not entertain any credits for work either not performed or incorrectly performed by the contractor. If thicknesses or consistencies of sub-base are not as specified, or if asphaltic material is not as specified, then the Contractor shall remove the same at their expense and provide proper specified materials.

1.15. BUILDING THERMOGRAPHIC SCAN

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

1.16. TESTS AND MIX DESIGNS

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

1.17. MOCK-UP

- .1 Prepare mock-up for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.

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

1.18. EQUIPMENT AND SYSTEMS

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

END OF SECTION

01 51 00 – Temporary Utilities

1.0 GENERAL

1.1. RELATED SECTIONS

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

1.2. INSTALLATION AND REMOVAL

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

1.3. DEWATERING

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

1.4. WATER SUPPLY

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

1.5. TEMPORARY HEATING AND VENTILATION

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

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

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

1.6. TEMPORARY POWER AND LIGHT

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

- .12 Provide and pay for temporary power for electric cranes and other equipment requiring temporary power in excess of above noted requirements.

1.7. TEMPORARY COMMUNICATION FACILITIES

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

END OF SECTION

01 53 00 – Temporary Construction Facilities

1.0 GENERAL

1.1. RELATED SECTIONS

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

1.2. INSTALLATION AND REMOVAL

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

1.3. PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

1.4. PROTECTION OF SURROUNDING WORK

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

1.5. ROOF AND STRUCTURE PROTECTION

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

1.6. WORK SITE ENCLOSURE & SAFETY BARRIERS

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

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

1.7. TREE PROTECTION

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

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

1.8. GUARD RAILS AND BARRIERS

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

1.9. WEATHER ENCLOSURES

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

1.10. DUST TIGHT BARRIERS

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

1.11. SCAFFOLDING

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

1.12. SHORING, BRACING, PILING

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

1.13. HOISTING

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

1.14. OVERHEAD LIFTING

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

1.15. ELEVATORS/LIFTS

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

1.16. USE OF THE WORK

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

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

1.17. CONSTRUCTION PARKING

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

1.18. ACCESS TO SITE

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

1.19. SECURITY

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

1.20. OFFICES

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

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

1.21. EQUIPMENT, TOOL AND MATERIALS STORAGE

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

1.22. SANITARY FACILITIES

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

END OF SECTION

01 54 00 – Materials and Equipment

1.0 GENERAL

1.1. RELATED SECTIONS

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

1.2. PRODUCT AND MATERIAL QUALITY

- .1 Products, materials, equipment and articles referred to as “Products”; throughout the specifications incorporated in the Work, shall be new, not damaged or defective, and of the best quality, compatible with specifications for the purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is a precaution against oversight or error. Remove and replace defective products at own expense, and be responsible for delays and expenses caused by rejections.
- .3 Should any dispute arise as to the quality or fitness of products, the decision rests strictly with the Board contact, based upon requirements of the Contract Documents.
- .4 Current Material Safety Data Sheets shall be on file with the successful Contractor and shall be provided to the Board contact upon request, within twenty-four (24) hours.
- .5 Material safety data sheets are not required for products currently WHMIS exempt.

1.3. EQUIPMENT/TOOL MATERIALS STORAGE, HANDLING, AND PROTECTION

- .1 Handle and store products in a manner to prevent damage, adulterations, deterioration, and soiling, and in accordance with manufacturer’s instructions.
- .2 Store packaged or bundled products in original and undamaged condition, with manufacturer’s seals and labels intact.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Provide and maintain tools, equipment and materials in a clean and orderly condition. Board tools, ladders, lifts, power cords, flashlights etc. are not to be used.
- .5 Materials are to be stored in a manner to cause the least interference with Work activities.

- .6 The Contractor shall determine with the Board contact, prior to ordering materials, those locations that are suitable for receiving and storage of materials and equipment.
- .7 All materials and equipment shall be kept in a secure area, at Contractor's expense, or removed from the job site when Work is not actually in progress.
- .8 Vehicles, trailers or other similar apparatus may not be stored or parked overnight at site without written authorization from Board contact. Written requests are to be forwarded directly to the Board contact.
- .9 Approval for parking does not imply any liability or responsibility for safe keeping by the Board.
- .10 The Contractor may use the existing electrical and water services, as required, for the Work, and the costs of these services shall be borne by the Board.

1.4. WORKMANSHIP

- .1 Workmanship shall be the best quality, executed by Workers experienced and skilled in the respective duties for which they are employed. Immediately notify the Consultant if required Work is such as to make it impractical to produce required results.
- .2 Do not employ any unfit persons or anyone unskilled in their required duties.
- .3 Decisions as to the quality or fitness of Workmanship in cases of dispute rest solely with the Board contact, whose decision is final.
- .4 All Contractor personnel are restricted to the job site and necessary access routes. No personnel shall visit other areas or buildings without specific authorization.
- .5 The Contractor shall make their own arrangements for emergency treatment of accidents.
- .6 Any accidents shall be reported immediately to the Board contact.
- .7 The Contractor agrees to hold the Board harmless of any and all liability of every nature and description, which may be suffered through bodily injuries, involving deaths of any persons, by reasons of negligence of the Contractor, his agents, employees, or his Subcontractors.
- .8 The Contractor shall supply constant on-site supervision in the form of a Project Superintendent. The Project Superintendent shall have within their authority to negotiate minor changes regarding scheduling, manpower and equipment.

1.5. MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in the specifications, install, apply or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

1.6. TOOLS OF THE TRADE

- .1 The Board will not pay the Awarded Bidder a fee for tools and equipment that are considered "tools of the trade" that are required to perform the work in this Tender or any change orders.

1.7. EXISTING EQUIPMENT

- .1 Contractor shall demolish and dispose of all existing equipment specified to be removed and or replaced including obsolete services not being reused. The Board shall have first rights of refusal on all demolished equipment and or parts and the Contractor shall provide a minimum of (5) working days notice prior to disposal of the equipment, parts, or equipment and set aside same in a suitable location to be recovered by Board technicians.

END OF SECTION

01 61 00 – Product Requirements

1.0 GENERAL

1.1. RELATED SECTIONS

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

1.2. TERMINOLOGY

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

1.3. PRODUCT QUALITY

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

1.4. AVAILABILITY

- .1 Immediately upon receipt of the Board's Purchase Order, review Product delivery requirements and anticipate foreseeable supply delays for any items.
- .2 Immediately upon receipt of the Board's Purchase Order the Contractor shall issue Purchase Orders and or Contracts to all Sub-trades. Provide proof to the Consultant and the Board within 3 days. The Subcontractors shall identify in writing any delivery issues within 14 days of receiving the Contractor's purchase order or contract. The Schedule noted in 01-31 00 1.7.1 shall incorporate all deliveries and installation.
- .3 If delays in supply of Products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .4 In the event of failure to notify Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant reserves the right to substitute more readily available Products of similar character, at no increase in Contract Price or Contract Time.

1.5. STORAGE AND PROTECTION

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

1.6. TRANSPORTATION AND HANDLING

- .1 Transport and handle Products in accordance with manufacturer's written instructions.
- .2 Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.
- .3 Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

- .4 Suitably pack, crate and protect products during transportation to site to preserve their quality and fitness for the purpose intended.
- .5 Store products in original, undamaged condition with manufacturer's labels and seals intact until they are being incorporated into completed work.
- .6 Protect materials from damage by extreme temperatures or exposure to the weather.

1.7. EXISTING UTILITIES

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

1.8. MANUFACTURER'S WRITTEN INSTRUCTIONS

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

1.9. QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Consultant if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Consultant and or Board reserves right to require dismissal from site any workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Consultant, whose decision is final.

- .4 Products, materials, systems and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the applicable manufacturer's printed directions.
- .5 Where specified requirements are in conflict with manufacturer's written directions, follow manufacturer's directions. Where specified requirements are more stringent than manufacturer's directions, comply with specified requirements.

1.10. COORDINATION

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

1.11. CONCEALMENT

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

1.12. REMEDIAL WORK

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

1.13. LOCATION OF FIXTURES

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

1.14. FASTENINGS - EQUIPMENT

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

1.15. PROTECTION OF WORK IN PROGRESS

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

END OF SECTION

01 70 00 – Examination and Preparation

1.0 GENERAL

1.1. RELATED SECTIONS

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

1.2. REFERENCES

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

1.3. SUBMITTALS

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

1.4. QUALIFICATIONS OF SURVEYOR

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

1.5. SURVEY REFERENCE POINTS

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

1.6. SURVEY REQUIREMENTS

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

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

1.7. SUBSURFACE CONDITIONS

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

1.8. EXAMINATION

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

1.9. PREPARATION

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

1.10. EXISTING SERVICES

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

1.11. LOCATION OF EQUIPMENT AND FIXTURES

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

1.12. SURVEY RECORD

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

END OF SECTION

SECTION 01 73 30 – EXECUTION AND CUTTING AND PATCHING

1.0 GENERAL

1.1. RELATED SECTIONS

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

1.2. SUBMITTALS

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

1.3. TOLERANCES

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

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

2.0 PRODUCTS

2.1. MATERIALS

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

3.0 EXECUTION

3.1. EXAMINATION

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

3.2. PREPARATION

- .1 Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of the Project from damage.
- .2 Provide protection from elements for areas which may be exposed by uncovering work.
- .3 Maintain excavations free of water.

3.3. CUTTING

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

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

3.4. PATCHING

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

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

END OF SECTION

01 74 00 – Cleaning and Waste Management

1.0 GENERAL

1.1. RELATED SECTIONS

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

2.0 PRODUCTS

2.1. CLEANING PRODUCTS

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

3.0 EXECUTION

3.1. CLEANING DURING CONSTRUCTION

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

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

3.2. WASTE MANAGEMENT

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

3.3. PREPARATION FOR FINAL CLEANING

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

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

3.4. FINAL CLEANING PRIOR TO ACCEPTANCE: INTERIOR

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

3.5. FINAL CLEANING PRIOR TO ACCEPTANCE: EXTERIOR

- .1 For areas affected by construction final exterior cleaning operations shall be performed by the General Contractor or competent Subcontractor. Contractor's "broom cleaning" only is not acceptable.
- .2 Final exterior cleaning shall include:
 - .1 broom clean and wash exterior walkways, steps, and surfaces; rake clean other surfaces of grounds,
 - .2 remove dirt and other disfiguration from exterior surfaces,
 - .3 sweep and wash clean paved areas,
 - .4 replace filters of mechanical equipment for all equipment that was in use during construction,
 - .5 clean all roofs, gutters, downspouts, areaways, drywells, and drainage systems,
 - .6 remove debris and surplus materials from crawl areas and other accessible concealed spaces.
 - .7 remove overspray

END OF SECTION

01 78 10 – Closeout Submittals and Requirements

1.0 GENERAL

1.1. RELATED SECTIONS

- .1 Section 01 78 10 – WRDSB Warranty Card, Appendix 00 41 13A

1.2. TAKE-OVER PROCEDURES

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

1.3. SUBSTANTIAL PERFORMANCE

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

1.4. COMMENCEMENT OF LIEN PERIODS

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

1.5. TOTAL PERFORMANCE

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

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

1.6. PAYMENT OF SUBSTANTIAL PERFORMANCE HOLDBACK

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

1.7. FINAL PAYMENT

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

1.8. CLOSEOUT SUBMITTALS

- .1 Prepare instructions and data using personnel experienced in maintenance and operation of described products and submit them to the Consultant for review.
- .2 Copy will be returned to the contractor with the Consultant's comments.

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

1.9. OPERATION AND MAINTENANCE MANUAL FORMAT

- .1 Provide two copies of operating and maintenance data, prepared on 215 X 280mm sheets in printed or typewritten form, contained in 3-ring binders with soft vinyl covers for materials and equipment which require special maintenance or operating procedures.
- .2 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder at the front of each volume.
- .3 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .4 Arrange content by the divisions of the specifications under Section numbers and sequence of Table of Contents.
- .5 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .6 Include the following in each manual:
 - .1 Complete list of subcontractors and suppliers, their addresses and telephone numbers. Provide 24 hour emergency telephone numbers for such subcontractors as Plumbing, Electrical, Sprinklers, Fire System, Heating, etc.
 - .2 Specified warranties for contractor, each subcontractor and supplier.
 - .3 WRDSB Project Asset and Warranty Card, Appendix 00 41 13A
 - .4 Copy of finish hardware list, complete with all amendments and revisions and lock manufacturer's descriptive and service literature.
 - .5 Schedule of paints and coatings. Include sufficient explanation to fully identify each surface with the applicable paint or coating used. Enclose a copy of the colour schedule.
 - .6 Maintenance instructions for finished surfaces.
 - .7 Brochures, cuts of equipment and fixtures.

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

1.10. RECORDING ACTUAL SITE CONDITIONS

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

- .6 Other Documents: Maintain warranties, test reports and samples required by individual specifications sections.

1.11. RECORD (AS-BUILT) DOCUMENTS AND SAMPLES

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

1.12. RECORD DRAWINGS

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

1.13. SPARE PARTS

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

1.14. REPLACEMENT (MAINTENANCE) MATERIALS

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

1.15. SPECIAL TOOLS

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

1.16. FINAL SITE SURVEY

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

1.17. WARRANTIES AND BONDS

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

END OF SECTION

01 78 40 – Maintenance Requirements

1.0 GENERAL

1.1. SECTION INCLUDES

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

1.2. RELATED SECTIONS

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

1.3. EQUIPMENT AND SYSTEMS

- .1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for 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 a list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports as specified in Section 01 45 00.
- .15 Additional requirements: As specified in individual specification sections.

2.0 PRODUCTS

2.1. MATERIALS AND FINISH

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

2.2. SPARE PARTS

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

2.3. MAINTENANCE MATERIALS

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

2.4. SPECIAL TOOLS

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

3.0 EXECUTION

3.1. DELIVERY TO SITE

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

3.2. STORAGE, HANDLING AND PROTECTION

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

END OF SECTION

01 79 00 – Demonstration and Training

1.0 GENERAL

1.1. SECTION INCLUDES

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

1.2. RELATED SECTIONS

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

1.3. DESCRIPTION

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

1.4. COMPONENT DEMONSTRATION

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

1.5. SUBMITTALS

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

1.6. CONDITIONS FOR DEMONSTRATIONS

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

2.0 PRODUCTS

2.1. NOT USED

- .1 Not used.

3.0 EXECUTION

3.1. PREPARATION

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

3.2. PREPARATION OF AGENDAS AND OUTLINES

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

3.3. SEMINAR ORGANIZATION

- .1 Coordinate content and presentations for seminars.

- .2 Coordinate individual presentations and ensure representatives scheduled to present at seminars are in attendance.
- .3 Arrange for presentation leaders familiar with the design, operation, maintenance and troubleshooting of the equipment and systems. Where a single person is not familiar with all aspects of the equipment or system, arrange for specialists familiar with each aspect.
- .4 Coordinate proposed dates for seminars with Owner and select mutually agreeable dates.

3.4. EXPLANATION OF DESIGN STRATEGY

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

3.5. DEMONSTRATION AND INSTRUCTIONS

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

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 01.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 INTENT

- .1 Provide articles, labour, materials, equipment and transportation to complete the work of this Section.

1.3 SECTION INCLUDES

- .1 Provide masonry units, and related products including but not limited to the following:
 - .1 Concrete masonry units.
 - .2 Mortar and mortar aggregate.
 - .3 Grout fill for interior door frames.
 - .4 Control joints and expansion joints in masonry walls.
 - .5 Concrete grout in the cells of reinforced block.
 - .6 Reinforcing in cells of concrete unit masonry for reinforced masonry construction.
 - .7 Masonry reinforcement, ties, anchors, connectors and accessories.
 - .8 Firestopping insulation as required of all masonry wall fire separations.
 - .9 Grout in all bearing plates in masonry walls.
 - .10 Infill all beam pockets in masonry walls.
 - .11 Steel Angle Lintels
- .2 The summarized breakdown of the above mentioned work does not set out all the work of this Section of the Contract but rather outlines the essentials. Provide any masonry work indicated on the drawings or hereinafter specified, all whether enumerated above or not.

1.4 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION

- .1 Build, bed and secure into the masonry work the following materials which are supplied by other trades.
 - .1 Masonry inserts, hangers, anchors, sleeves, bolts, etc.
 - .2 Steel lintels supplied by structural steel and/or miscellaneous metals contractor.

- .3 Louvres in masonry, supplied by general contractor or mechanical trade.
- .4 Conduit, boxes and devices supplied by general contractor, mechanical and electrical contractors.

1.5 RELATED SECTIONS

- .1 Section 07 84 00 – Firestopping.
- .2 Section 07 92 00 – Joint Sealants.
- .3 Section 08 11 00 – Metal Doors and Frames.
- .4 Section 09 90 00 – Painting and Coating: Backpainting of hollow metal door frames in masonry walls.

1.6 REFERENCES

- .1 ASTM A82-05: Standard Specification for Steel Wire, Plain, For Concrete Reinforcement.
- .2 ASTM A123/A123M-02: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .3 ASTM A153/A153M-05: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- .4 ASTM A167-99 (2004): Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .5 ASTM A580/A580M-06: Standard Specification for Stainless Steel Wire.
- .6 ASTM A641/A641M-03: Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- .7 ASTM A1011/A1011M-06b: Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- .8 ASTM C207-06: Standard Specification for Hydrated Lime for Masonry Purposes.
- .9 ASTM C331-05: Standard Specification for Lightweight Aggregates for Concrete Masonry Units.
- .10 CAN/CSA A82.1-M87 (R2003): Burned Clay Brick (Solid Masonry Units Made from Clay or Shale).
- .11 CSA A165 Series-04: CSA Standards on Concrete Masonry Units.
- .12 CSA A179-04: Mortar and Grout for Unit Masonry.
- .13 CSA A370-04: Connectors for Masonry.
- .14 CSA A371-04: Masonry Construction for Buildings.
- .15 CAN/CSA-A3001-03: Cementitious Materials for Use in Concrete.
- .16 CAN/CSA-A3002-03: Masonry and Mortar Cement.
- .17 CAN/CSA-G30.18-M92 (R2002): Billet-Steel Bars for Concrete Reinforcement.

- .18 CSA S304.1-04: Design of Masonry Structures.
- .19 CAN/CGSB-1.40-M89: Primer, Structural Steel, Oil Alkyd Type.
- .20 CISC CPMA 2-75: Quick Drying Primer for Use on Structural Steel.

1.7 SUBMITTALS

- .1 Submit a list of products to be used in the work of this section, including insulation manufacturer, mortar supplier, concrete unit masonry supplier, and air barrier products for review by the Consultant
- .2 Prior to commencing the work submit manufacturers' complete set of standard details for the air/vapour barrier membrane system showing a continuous plane of air tightness throughout the building envelope.

1.8 SAMPLES

- .1 Submit samples as specified in Section 01 33 00.
- .2 Samples: duplicate full-size samples of each type of specified masonry unit; showing size, colour, design and pattern of faces.

1.9 QUALITY ASSURANCE

- .1 Submit documentation verifying that the air barrier applicator is a recommended installer by the air barrier manufacturer.

1.10 ENVIRONMENTAL REQUIREMENTS

- .1 Thaw and dry ice and snow which have formed on the bedding surface by the application of heat.
- .2 Remove masonry that has, in the opinion of the Consultant, been frozen or damaged due to weather conditions, before that section of wall is continued.
- .3 Do not lay masonry units that are wet or covered with ice.
- .4 Heating Requirements
 - .1 Provide heat enclosures and heat as required, in accordance with CSA A371.
 - .2 Observe the following heating requirements:
 - (1) Air Temperature 4°C – 0°C (40°F – 32°F): Mortar aggregate or mixing water shall be heated to produce mortar temperatures between 5°C (40°F) and 45°C (110°F).
 - (2) Air Temperature 0°C - -4°C (32°F – 25°F): Mortar aggregate and mixing water shall be heated to produce mortar temperatures between 5°C (40°F) and 45°C (110°F). Mortar temperatures shall be maintained above freezing on the boards.
 - (3) Air Temperature -4°C - -7°C (25°F – 20°F): Mortar aggregate and mixing water shall be heated to produce mortar temperatures between 5°C (40°F) and 45°C (110°F). Mortar temperatures shall be maintained above freezing on the boards. Salamanders or other sources of heat shall be used on both sides of walls under construction. Wind breaks shall be employed when wind is excess of 25 km/hour (15 m.p.h.)

- (4) Air Temperature -7°C and below (20°F and below): Mortar aggregate and mixing water shall be heated to produce mortar temperatures between 5°C (40°F) and 45°C (110°F). Enclosure and auxiliary heat shall be provided to maintain air temperatures above 0°C (32°F). Temperature of units when laid shall not be less than -7°C (20°F).

.5 Protection Requirements for Completed Masonry

.1 The following protection requirements apply to complete masonry and masonry not being worked:

- (1) Air Temperature $4^{\circ}\text{C} - 0^{\circ}\text{C}$ ($40^{\circ}\text{F} - 32^{\circ}\text{F}$): Masonry shall be protected from rain or snow for 24 hours by covering with a weather resistive membrane.
- (2) Air Temperature $0^{\circ}\text{C} - -4^{\circ}\text{C}$ ($32^{\circ}\text{F} - 25^{\circ}\text{F}$): Masonry shall be completely covered with weather resistive membrane for 24 hours.
- (3) Air Temperature $-4^{\circ}\text{C} - -7^{\circ}\text{C}$ ($25^{\circ}\text{F} - 20^{\circ}\text{F}$): Masonry shall be completely covered with insulating blanket or equally protected for 24 hours.
- (4) Air Temperature -7°C and below (20°F and below): Masonry temperature shall be maintained above 0°C (32°F) for 24 hours by enclosure and supplementary heat, by electric heating blankets, infra-red heat lamps or other approved method.

.6 Construct and maintain temporary protection as required to permit continuous progress of the Work. Areas so protected shall be of sufficient size to permit progress of all work necessary to maintain an orderly and efficient sequence of construction operations.

.7 Provide temporary lighting at levels adequate to permit work to be performed in accordance with the Contract Documents.

.8 Give adequate notification to the Consultant and Subcontractors prior to the erection and removal of temporary protective enclosures.

1.11 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 61 00.
- .2 Deliver Products in dry condition, and keep dry until use.
- .3 Deliver cement, lime and other packaged materials in original unbroken and undamaged packages with the marker's name and brand distinctly marked therein, and upon delivery store in a shed until used on the work.
- .4 Deliver masonry units palletized and protected with Shrink-Film.
- .5 Store or pile mortar aggregate on plywood, asphalt or concrete area, and protect from dirt and rubbish.
- .6 Store masonry units off the ground with care to avoid damage. Damaged units will not be acceptable for face work.
- .7 Do not double stack cubes masonry units.

2 PRODUCTS

2.1 MORTAR MATERIALS

- .1 Portland Cement: to CAN/CSA-A3001, Type GU, Grey colour.
- .2 Masonry Cement: to CAN/CSA-A3002, Type N.

- .3 Hydrated Lime: to ASTM C207, Type N – Normal.
- .4 Sand: to CSA A179, standard masonry type; free from loam, clay, vegetable or organic matter, acid, alkali, salt or other soluble or deleterious matter.
- .5 Water: clean, potable.

2.2 MASONRY UNITS

- .1 Concrete Masonry Units – Lightweight (LCMU): to CSA A165.1, using L₂20S slag aggregate to ASTM C331; 190 x 390 mm size, bed depth as indicated on Drawings; solid factory-finished ends with bull nosed corners for use at exposed wall corners, special shapes as required; types as follows:
 - .1 Hollow: Type H/15/C/M
 - .2 Solid (100 percent): SF/15/C/M
 - .3 Solid (75 percent): SS/15/C/M

2.3 JOINT REINFORCEMENT

- .1 Single Wythe Joint Reinforcement: Ladder type, 3.7 mm side rods with 3.7 mm cross ties; to ASTM A82; hot dipped galvanized; e.g. Blok-Lok BL-10, unless noted on Drawings.
- .2 Bed Joint Reinforcement: single 3.7 mm OD wire rod to ASTM A82; hot dipped galvanized.
- .3 Reinforcing Steel: to CSA G30.18, as specified in Section 03 20 00; sizes as indicated on Drawings.
- .4 Strap Anchors: 6.35 mm thick steel plate, hot dipped galvanized; U-shaped and Z-shaped to suit application; e.g., BLT11Z by Blok-Lok.

2.4 ACCESSORIES

- .1 Firestop Insulation: as specified in Section 07 84 00. Mineral wool insulation in thickness to achieve ratings shown on Drawings; by Roxul, Fibrex, Johns Manville or Thermafiber.
- .2 Shop Paint: for steel angle lintels, CPMA 2-75.
- .3 Sealants: as specified in Section 07 92 00.
- .4 Hollow Metal Coating: as specified in Section 09 90 00.

2.5 MORTAR TYPES

- .1 Mortar Types: to CSA A179 as follows:
 - .1 Non-loadbearing Interior Partitions: Type N (compressive strength 750 psi).
 - .2 Loadbearing Walls, Inner-wythe of Exterior Walls, Piers, and Foundation Walls: Type S (compressive strength 1800 psi).
- .2 Mortar Colour
 - .1 Colour of mortar as directed by the Consultant. Mortar pigments shall be Hacros Pigments Canada or Bayferrox Pigments by Bayer Loading shall be as directed by the Consultant (6% maximum).

- .2 Use natural mortar (without colour additives) in all areas to be painted or covered.

2.6 CONCRETE GROUT

- .1 Proportion normal density concrete to meet the following criteria for concrete grout in reinforced masonry units.

| | | |
|----|-------------------------------------|---------------|
| .1 | Portland Cement | Type GU |
| .2 | Supplementary Cementing Materials | Permitted |
| .3 | Minimum 28 Day Compressive Strength | 15 MPa |
| .4 | Minimum Cementitious Content | As required |
| .5 | Normal Size of Course Aggregate | 10 mm |
| .6 | Slump Range at Point of Discharge | 180 to 220 mm |
| .7 | Air Content | Less than 3% |
| .8 | Water/Cementing Materials Ratio | 0.55 |

2.7 MORTAR MIXING AND RE-TEMPERING

- .1 Add mortar colour, when specified, in rates determined by manufacturer. Provide 4' x 3' sample panel in an enclosed area for inspection after 24 hours drying, to determine if colour is correct. Wait for Consultant's approval before proceeding with the work.
- .2 Do not use anti-freeze compounds to lower the freezing point of mortar.
- .3 Machine mix masonry cement mortar in a drum type mixer for not less than 3 minutes and not more than 5 minutes with only enough water to produce a workable consistency.
- .4 Stiffened mortar due to the evaporation of water may be re-tempered within 2 hours of original mixing provided the temperature is not over 25°C (77°F) If the temperature is over 25°C (77°F), it may only be re-tempered within one hour of the original mixing.

2.8 SHOP FINISHES

- .1 Hot Dip Galvanizing:
- .1 Horizontal Joint Reinforcement Wire and V-Ties: to ASTM A153/A153M, Class B2, minimum 458 g/m² (1.50 oz/ft²) zinc coating.

3 EXECUTION

3.1 EXAMINATION

- .1 Prior to the commencement of work, examine all areas that are to receive the work of this Section.
- .2 Report misalignments that may affect the Work to the Consultant for correction.
- .3 Commencement of the work or any parts thereof shall mean acceptance of the prepared substrate.

3.2 RELATIONSHIP TO OTHERS

- .1 Co-operate with other Sections, leaving chases, slots and reglets.
- .2 Build-in frames, sleeves, anchors, bolts, etc. as supplied by others. Ensure items are set square and true.
- .3 Set metal, wood, and wood buck frames for louvres, pressed metal screens and doors, etc. All pressed metal and wood frames for doors and screens in masonry and concrete shall be set and braced by others. Be responsible for and ensure that all frames are set plumb, true and accurately remain in position. Solidly build-in all frames and anchor with the backs of all jambs solidly packed with mortar unless otherwise noted on Drawings.
- .4 Provide openings and lintels in masonry walls where required by other Sections or where indicated; including those required by the Mechanical and Electrical Subcontractors. Locations of such openings must be coordinated by the Subcontractor involved. Cutting and patching for openings that have been missed or incorrectly located shall be provided at no cost to the Owner.
- .5 Accurately locate and neatly finish chases and openings to the required sizes.
- .6 Do not cover pipe, conduit chases or enclosures until advised that the work has been inspected and tested.

3.3 QUALITY OF WORK

- .1 Perform work by skilled workers under the continuous supervision and direction of skilled and experience foremen in each branch of the work. At least one thoroughly experienced and competent man is to be in charge of all mortar mixing.
- .2 Build work plumb, true, level and square, accurately to the dimensions shown and with all angles and reveals at right angles to faces unless distinctly shown otherwise.
- .3 Set out and build masonry work to the respective dimensions called for on drawings. Build and lay work true in line, plumb, square and level; align vertical joints. Keep angles, reveals etc., strictly true and square and plumb.
- .4 All masonry courses to be of uniform height, and both vertical and horizontal joints to be of equal and uniform thickness.
- .5 Do not use chipped, cracked or otherwise damaged units in exposed and load-bearing masonry walls.

3.4 NON-LOADBEARING PARTITIONS

- .1 Extend non-loadbearing partitions in all cases from the top of the structural floor to the bottom surface of the floor or roof construction above unless noted otherwise on Drawings.
- .2 Anchor wall to the underside of the floor structure according to Standard Details.
- .3 In walls exposed to view, support tops of walls with concealed angle clips fastened to deck above wall.

3.5 PROVISION FOR MOVEMENT

- .1 Leave 25 mm space between top of non load-bearing walls and partitions and structural elements.
- .2 Do not use wedges.

- .3 Fill space with mineral wool.

3.6 TEMPORARY WALL BRACING

- .1 Provide temporary engineered wall bracing design.
- .2 Brace masonry walls to resist wind pressure and other temporary lateral loads during the construction period.

3.7 CONCRETE UNIT MASONRY

- .1 Lay units in face shell mortar bedding, plumb, level and true in line, in running bond and properly jointed with other connecting work. Units with open cells exposed in walls will not be permitted.
- .2 Use lightweight concrete unit masonry for exposed interior walls and partitions. Normal weight concrete blocks may be used for all concealed surfaces unless otherwise noted.
- .3 Remove excess mortar and objects. Exercise special care to prevent breaking block corners and the tooled joints shall be made uniform on exposed work.
- .4 Use special concrete unit masonry as indicated on the drawings.
- .5 Use bull-nosed concrete unit masonry for all interior external corners unless noted otherwise on the drawings.
- .6 While laying units, avoid over-plumbing and pounding of the corners and jambs to fit stretcher units after they are set in position. Where an adjustment must be made after the mortar has started to harden, remove mortar and replace with fresh mortar.
- .7 Exercise special care in laying up concrete unit masonry in locations where plastic wall coating finish or painting is indicated. Plumb and tool all joints of concrete unit masonry walls in these locations.
- .8 Tie tee-shaped intersecting walls together with truss-type joint reinforcement. Do not use masonry header bond. Rake and tool joints as indicated on Drawings.
- .9 Sealants to be completed by Section 07 92 00.

3.8 MORTAR JOINTS

- .1 Mortar Joint Thickness: to CSA A371.
- .2 Mortar joints shall be straight, clean and uniform in thickness.
- .3 Tool joints to a dense, slightly concave curved surface well bonded to the unit at the edges.

3.9 Pointing

- .1 Point and fill holes and cracks in exposed mortar joints.
- .2 Cut out defective joints, refill solidly with mortar and tool to form a neat joint to match existing.

3.10 CONCRETE UNIT MASONRY REINFORCING

- .1 Continuously reinforce and tie together with reinforcing in every second block bed joint concrete unit masonry. Refer to Standard Details.

- .2 Provide horizontal reinforcing in first and second bed joints above and below openings. The first bed joint immediately above and below openings shall have continuous reinforcing. In second bed joint, the reinforcing shall extend 600 mm (24") beyond each side of the opening. Refer to Standard Details.
- .3 Place continuous reinforcing in the second bed joint below the top of the wall. Refer to Standard Details.
- .4 Lap reinforcement a minimum of 150 mm (6") at splices, and cut and bend at corners. Overall width of reinforcement shall be according to the manufacturer's recommendations for the various wall thicknesses.
- .5 Do not use crimped metal wall ties.
- .6 Where vertical bars are called for, fill cores of block full with concrete grout.

3.11 CONTROL JOINTS

- .1 Provide control joints at locations in accordance with Portland Cement Association Concrete Masonry Handbook and determined by the Consultant unless indicated on the drawings to maintain construction integrity.
- .2 Break vertical mortar bond with extruded neoprene gasket
- .3 Prime control joint surfaces to prevent drying out of sealant.
- .4 Provide 2:1 width-to-depth joint for sealant Section 07 92 00.
- .5 To form control joints in interior block walls, fill completely with mortar the core of a full height vertical joint after inserting a strip of building paper to keep the mortar from bonding to one side. Refer to Standard Details.

3.12 BEARING

- .1 Fill concrete masonry units acting as bearing structural members solid with 15 MPa (2175 psi) concrete for a width and depth equal to 3 times the length of bearing.
- .2 Use solid concrete masonry units where indicated on Drawings.

3.13 BEAMS AND LINTELS

- .1 Provide steel angle lintels in accordance with the Drawings unless indicated otherwise.
- .2 Clean steel lintels by scraping, wire brushing or other effective means to remove loose scale, rust, grease, oil or other foreign matter.
- .3 Apply one coat of paint prior to installation, unless lintels are galvanized.
- .4 Angle lintels shall have a bearing of not less than 150 mm (6") at each end.

3.14 SHEET METAL WORK

- .1 Cut and form reglets in masonry walls as required for the securing of flashings.

3.15 ANCHORAGE TO CONCRETE

- .1 Provide continuous dovetail anchor slots to be supplied and set by the Concrete Contractor in the concrete for the anchorage of all masonry facing, furring, abutting walls and partitions to the concrete walls, concrete spandrels, concrete columns, etc. Slot shall be for full height as required equal to D & R galvanized steel dovetail type with fibreglass filler and provided complete with adjustable galvanized steel anchors to be placed at 400 mm (16") vertically. Slots are to be at 400 mm (16").

3.16 FIELD QUALITY CONTROL

- .1 Drying Out
 - .1 When masonry work is completed, provide ventilation and heat as required to reduce moisture level in masonry to maximum 15%, sustained for a 48 hour period. Timing for achieving this to be determined by Contractor, but no later than start of finishing work.
 - .2 Testing may be performed as specified in Section 01 45 00. In the absence of such testing, random sampling with moisture meter will be conducted by the Consultant.

3.17 PROTECTION

- .1 Cover walls exposed to the elements with waterproof membranes at the end of each Working Day and keep covered until work is re-commenced.
- .2 Protect visually-exposed Products from marks and damage.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 1.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 SECTION INCLUDES

- .1 Section includes: Provide cold-formed metal framing, including but not limited to the following:
 - .1 Wind bearing studs including:
 - (1) Wall studs subjected to lateral loads (no axial load other than self-weight and the weight of applied finish.)
 - (2) Top and bottom track.
 - (3) Head and sill members and jamb studs for wall openings.
 - (4) Stud, bridging and track connections.
 - (5) Top and bottom track connections to main structure including detailing to accommodate floor and roof deflections.

1.3 RELATED SECTIONS

- .1 Section 06 10 00 - Rough Carpentry: Wood support systems.
- .2 Section 07 51 00 – Built-up Bituminous Roofing:
- .3 Section 09 21 16 – Gypsum Board Assemblies: non-loadbearing metal support systems, and gypsum sheathing boards.
- .4 Section 09 51 00 – Acoustical Ceilings: Acoustic ceilings and related suspension systems.

1.4 REFERENCES

- .1 ANSI/AWS D1.3 Structural Welding Code — Sheet Steel.
- .2 ASTM A307-00: Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
- .3 ASTM A325M-05: Standard Specification for Structural Bolts, Steel, Heat Treated, 830 MPa Minimum Tensile Strength (Metric).
- .4 ASTM A653/A653M-04a: Standard Specification for Sheet Steel Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .5 ASTM A792/A792M-99: Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .6 ASTM A879/A879M-04: Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface.

- .7 CAN/CSA-S16-01: Limit States Design of Steel Structures.
- .8 CAN/CSA-S136-01: North American Specification for the Design of Cold-Formed Steel Structural Members.
- .9 CSA W47.1-03: Certification of Companies for Fusion Welding of Steel Structures.
- .10 CSA W59-03: Welded Steel Construction (Metal Arc Welding).
- .11 CAN/CGSB-1.181-99: Ready-Mixed Organic Zinc-Rich Coating.
- .12 CAN/CGSB-7.1-M86: Cold-Formed Steel Framing Components.
- .13 CAN/ULC-S101-04: Standard Methods of Fire Endurance Tests of Building Construction and Materials.

1.5 SUBMITTALS

- .1 Submittals under this Section shall be in accordance with Section 01 33 00.
- .2 Shop Drawings:
 - .1 Submit engineered shop drawings. Field review requirements to be supplemented to include the following:
 - (1) Checking that mill test reports are properly correlated to materials.
 - (2) Sampling fabrication and erection procedures for general conformity to requirements of the Contract Documents.
 - (3) Checking fabricated members against specified member shapes.
 - (4) Sample checking of screwed and bolted joints.
 - (5) Sample checking that tolerances are not exceeded during fit-up or erection.
 - (6) General review of field cutting and alterations required by other sections.
 - .2 Include necessary shop details and erection diagrams. Indicate member sizes, locations thicknesses exclusive of coating, coatings and materials. Include connection details for attaching framing to itself and for attachment to the structure. Show splice details where permitted. Indicate dimensions, openings, requirements of related work and critical installation procedures. Show temporary bracing required for erection purposes.
- .3 Submit two (2) copies of engineering calculations or data verifying the capacity of the members and the ability of the assemblies to meet the design requirements.
 - .1 Indicate design loads and design calculations.
- .4 Submit three (3) copies of field review reports.

1.6 QUALITY ASSURANCE

- .1 Retain a Professional Engineer registered in the Place of the Work to design the Lightweight Steel Framing System; to prepare, seal and sign all shop drawings; and to perform field review. Shop drawings shall show both design and installation requirements.
- .2 Installers: company specializing in installing lightweight steel framing systems, with minimum of ten years experience and a member in good standing of the Canadian Sheet Steel Building Institute (CSSBI)

- .3 Welders: Companies certified by the Canadian Welding Bureau to CSA W47.1, and having welders qualified for the base material types and thicknesses that are to be welded.

1.7 PROJECT CONDITIONS

- .1 Co-operate in co-ordinating work of other Sections with work of this Section, in order that the work may proceed in an orderly and effective manner.

2 PRODUCTS

2.1 MANUFACTURERS

- .1 Manufacturers of cold-formed metal framing and accessories having Products considered acceptable for use:
 - .1 Bailey Metal Products
 - .2 MiTek Canada Inc.
- .2 Substitutions: refer to Section 01 33 00.

2.2 DESIGN REQUIREMENTS

- .1 Design shall be based on Limit States Design principles using factored loads and resistances.
- .2 Loads and load factors shall be in accordance with applicable codes.
- .3 Resistances and resistance factors shall be determined in accordance with applicable codes and CAN/CSA-S136.
- .4 Conform to the requirements of specified fire rated assemblies.
- .5 Design bridging to prevent member rotation and member translation perpendicular to the minor axis. Provide for secondary stress effects due to torsion between lines of bridging. Collateral sheathing may be used to help restrain member rotation and translation perpendicular to the minor axis for wind-bearing studs. Provide bridging at 1500 mm (5 ft.) OC maximum for wind bearing studs, 1200 mm (4 ft.) OC maximum for axial load bearing studs and 2100 mm (7 feet) OC maximum for joists and rafters. Closer spacing may be required to satisfy structural requirements.
- .6 Sheathing materials that may lose their structural integrity when subject to a moist environment or when subjected to a sufficient number of load cycles will not be considered to provide structural bracing.
- .7 Maximum deflections under specified loads shall conform to the following:
 - .1 Wall studs supporting masonry veneer, L/720.
 - .2 Wall studs supporting other finishes L/360.
 - .3 Floor joists, L/360.
 - .4 Roof joists and rafters supporting materials susceptible to cracking, L/360. Roof joists and rafters supporting materials not susceptible to cracking, L/240.
 - .5 Building sway due to all effects 1/400 of building height or 1/500 of storey height.

- .8 Design components or assemblies to accommodate specified erection tolerances of the structure.
- .9 The spacing of members shall not exceed the following:
 - .1 Wall studs 410 mm (16") OC.
- .10 Allow for movement of the structure. Design wind bearing stud end connections to accommodate floor/roof deflections such that the studs are not loaded axially.
- .11 Connections between lightweight steel framing members shall be by bolts, welding or sheet metal screws.
- .12 Allow for appropriate end eccentricities in the design of axial load bearing members.
- .13 Resistances for sheet metal screws shall be based on the manufacturer's lowest bound test values multiplied by the appropriate resistance factor, given in CAN/CSA-S136.

2.3 MATERIALS

- .1 Steel: to CAN/CSA-S136, identified as to specification, type, grade and mechanical properties; finished to ASTM A653/A653M, Z275 or ASTM A792/A792M, AZM150.
 - .1 Roof and wall members forming part of the exterior building envelope shall have a minimum coating of Z180 galvanizing in accordance with ASTM A653/A653M. Other coatings (e.g., aluminum-zinc alloy) providing equal or better corrosion protection may be used.
 - .2 Interior members not forming part of the exterior building envelope shall have a coating of Class C electrogalvanizing to ASTM A879. Other coatings, providing equal or better corrosion protection may be used.
- .2 Bolts and Nuts: to ASTM A307 or ASTM A325M; hot-dipped galvanized, c/w washers.
- .3 Screws: Sheet metal type, minimum zinc coating of .008 mm. Other coatings providing equal or better corrosion protection may be used.
- .4 Welding electrodes shall be of the 480 MPa minimum tensile strength series (e.g., E480XXX, E480S-X).
- .5 Touch-up Paint: Zinc rich paint for touching up welds and damaged metallic coatings, to CAN/CGSB-1.181.

2.4 FABRICATION

- .1 Except as noted herein, fabricate components to CAN/CGSB-7.1 and in accordance with approved Shop Drawings.
- .2 Where specified, provide cut-outs centred in the webs of members to accommodate services. Unreinforced cut-outs shall be limited to the dimensions as specified by the manufacturer. The effect of cut-outs on the strength and stiffness of the member shall be considered.
- .3 The distance from the centreline of the last unreinforced cut-out to the end of the member shall be not less than 300 mm (12").

- .4 The minimum steel thickness exclusive of coating shall be as follows:
 - .1 Wall studs 18Ga.
 - .2 Thicker material may be required to satisfy structural requirements.
- .5 Mark the steel thickness, exclusive of coating, on each member by embossing, stamping with indelible ink or by colour coding.

3 EXECUTION

3.1 EXAMINATION

- .1 Thoroughly examine all surfaces scheduled to receive work of this Section to see that they are secure, rigid, true and not liable to impair performance or appearance of this Trade's work.
- .2 Commencement of work implies total acceptance of surface and site conditions.

3.2 WELDING

- .1 Welding: to CSA W59 and/or ANSI/AWS D1.3, whichever is applicable.
- .2 For material less than 3 mm thick, shop drawings may show nominal weld leg sizes. For such material, the effective throats of welds shall not be less than the thickness of the thinnest connected part.
- .3 Touch-up welds with zinc rich paint.

3.3 SCREWS

- .1 Steel screws shall equal or exceed the minimum diameter indicated on the Drawings.
- .2 Penetration beyond joined materials shall be not less than 3 exposed threads.
- .3 Thread types and drilling capability shall conform to the manufacturer's recommendations.
- .4 Screws covered by sheathing materials shall have low profile heads.

3.4 ERECTION

- .1 Methods of construction may be either piece by piece (stick-built) or by fabrication into panels (panelized) either on or off site.
- .2 Lightweight steel framing shall be erected true and plumb within the specified tolerances. Temporary bracing shall be employed wherever necessary to withstand all loads to which the structure may be subject during erection and subsequent construction. Temporary bracing shall be left in place as long as required for the safety and integrity of the structure. The Erector shall ensure that during erection a margin of safety consistent with the requirements of the applicable code and CAN/CSA-S136 exists in the uncompleted structure.
- .3 Make all field measurements necessary to insure the proper fit of all members.
- .4 Cutting of members may be by saw or shear. Torch cutting is not permitted.
- .5 All axially loaded members shall be aligned vertically to allow for full transfer of the loads down to the foundation. Vertical alignment shall be maintained at floor/wall intersections.

- .6 Complete bearing shall be maintained under tracks to provide for load transfer in axially loaded assemblies. Any discrepancy shall be brought to the attention of the Consultant.
- .7 Field cut holes into lightweight steel framing members as described above.
- .8 Splicing of axial load bearing members is not permitted.
- .9 Insulation equal to that specified shall be placed in all jamb and header assemblies that will be inaccessible after their installation into the wall. Ensure that insulation is kept dry and not compressed.
- .10 Handling and lifting of prefabricated panels shall not cause permanent distortion to any member or collateral material.

3.5 ERECTION TOLERANCES:

- .1 For the purposes of this section, camber is defined as the deviation from straightness of a member or any portion of a member with respect to its major axis, and sweep is defined as the deviation from straightness of a member or any portion of a member with respect to its minor axis.
- .2 For axial load bearing studs, out of plumbness and out of straightness (camber and sweep) shall not exceed 1/1000th of the member length.
- .3 For wind bearing studs, out of plumbness shall not exceed 1/500th of the member length. Out of straightness (camber and sweep) shall not exceed 1/1000th of the member length.
- .4 For track, camber shall not exceed 1/1000th of the member length.
- .5 Studs shall seat into top and bottom tracks. The gap between the end of the stud and the web of the track shall not exceed 1.5 mm for axial load bearing studs or 4 mm for wind bearing studs.
- .6 Align adjacent prefabricated panels to provide surface continuity at the interface.
- .7 Spacing of studs shall not be more than ± 3 mm from the design spacing. The cumulative error in spacing shall not exceed the requirements of the finishing materials.

3.6 FIELD QUALITY CONTROL

- .1 The lightweight steel framing Design Engineer, responsible for the production of the shop drawings, shall provide periodic field review during construction and shall submit reports.
 - .1 The cost of this field review shall be paid for by the Contractor.
- .2 Additional field inspection and testing will be conducted by a qualified Independent Inspection Agency, as specified in Section 01 45 00.
 - .1 Any testing or inspection required by the Consultant because of an error by the Contractor or due to departure from the contract documents by the Contractor, shall be paid for by the Contractor.
 - .2 Inspection shall include:
 - (1) Checking that mill test reports are properly correlated to materials.
 - (2) Sampling fabrication and erection procedures for general conformity to the requirements of the specification.
 - (3) Checking that the welding conforms to the requirements of the Contract Documents.
 - (4) Checking fabricated members against specified member shapes.

- (5) Visual inspection of all welded connections including sample checking of joint preparation and fit-up.
 - (6) Sample checking of screwed and bolted joints.
 - (7) Sample checking that tolerances are not exceeded during fit-up or erection.
 - (8) Additional inspection and testing of welded connections as required by CSA W59.
 - (9) General inspection of field cutting, and alterations required by other Sections.
 - (10) Submission of reports to the Consultant the Contractor and the authorities having jurisdiction covering the work inspected with details of deficiencies discovered.
- .3 The Contractor shall provide the necessary co-operation to ensure that the inspection can proceed.
 - .4 The inspection provided in this section does not relieve the Contractor of his responsibility for the performance of the contract. The Contractor is solely responsible for quality control, and he shall implement his own supervisory and quality control procedures.
 - .5 Materials or workmanship not conforming to the requirements of the contract documents may be rejected at any time during the progress or work.
- .3 Defective materials or quality of work whenever found at any time prior to acceptance of the work shall be rejected regardless of previous inspection. Inspection will not relieve responsibility, but is a precaution against oversight and error.
 - .4 Remove and replace defective materials and work of other Sections affected by this replacement, at no additional cost to the Owner.

3.7 ADJUSTING

- .1 Touch-up welds and coatings damaged by welding with zinc rich paint.
- .2 Prior to touch-ups, prepare surface in accordance with paint manufacturer's recommendations.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 01.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 INTENT

- .1 Provide all articles, labour, materials, equipment, transportation, hoisting and incidentals noted, specified or required to complete the work of this Section.

1.3 SECTION INCLUDES

- .1 Provide all miscellaneous metal items as detailed on the Architectural drawings, specified herein or required for the proper execution of the project including those listed below. Provide each item complete with all the required anchorage and such accessories as are necessary for the proper installation and for correlation with the adjoining work. Shop drawings for steel guards and handrails to be submitted with Engineer's seal for review and execution.
- .2 Itemized List
 - .1 Steel guards – stainless steel
 - .2 Steel elements not shown on structural drawings but required by architectural details.

1.4 RELATED SECTIONS

- .1 Section 03 01 00 –Concrete Forming and Accessories: placement of metal fabrications in concrete.
- .2 Section 03 30 00 – Cast-In-Place Concrete: placement of metal fabrications in concrete.

1.5 REFERENCES

- .1 ASTM A167-99 (2004): Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .2 ASTM A269-04: Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- .3 ASTM A325M-05: Standard Specification for Structural Bolts, Steel, Heat Treated, 830 MPa Minimum Tensile Strength (Metric).
- .4 ASTM B36/B36M-06: Standard Specification for Brass Plate, Sheet, Strip, and Rolled Bar.
- .5 ASTM B101-02: Standard Specification for Lead-Coated Copper Sheet and Strip for Building Construction.
- .6 ASTM B209M-06: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
- .7 ASTM A101-066: Standard Specification for Steel, Sheet, and Strap.
- .8 ASTM B221M-06: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods,

Wire, Profiles, and Tubes (Metric).

- .9 ASTM B370-03: Standard Specification for Copper Sheet and Strip for Building Construction.
- .10 CSA G40.21-04: General Requirements for Rolled or Welded Structural Quality Steel.
- .11 CAN/CSA-G164-M92 (R2003): Hot Dip Galvanizing of Irregularly Shaped Articles.
- .12 CAN/CSA-S136-01: North American Specification for the Design of Cold-Formed Steel Structural Members.
- .13 CSA W47.1-03: Certification of Companies for Fusion Welding of Steel Structures.
- .14 CSA W59-03: Welded Steel Construction (Metal Arc Welding).

1.6 SUBMITTALS

- .1 Submit Shop Drawings and erection drawings as specified in Section 01 33 00.
- .2 Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
- .3 Shop drawings must be stamped, signed and dated by the fabricator's design engineer.

1.7 QUALITY ASSURANCE

- .1 Fabricator's Design Engineer: a professional Structural Engineer experienced in design of steel stairs, guards and railings, and licensed in the Place of the Work.
- .2 Fabricator: company specializing in fabricating metal fabrications with institutional experience.
- .3 Welders: individual or organization certified by the Canadian Welding Bureau to CSA W47.1.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 61 00.
- .2 Handle and store Products in a manner to prevent damage to other materials, to any existing building or property, and to the Work.
- .3 Store Products to avoid disruption in the progress of the Work.

2 PRODUCTS

2.1 MATERIALS

- .1 Sheet Steel: to CSA G40.20, Grade 300W.
- .2 Steel Sections and Plates: to CSA G40.21, Grade 300W.
- .3 High Strength Bolts: to ASTM A325M, including suitable nuts and plain hardened washers; hot dipped galvanized for exterior members.
- .4 Welding Materials: to CSA W59.
- .5 Shop Primer: to CPMA 2-75.

2.2 FABRICATION

- .1 Fabricate components to CAN/CSA-S136 and in accordance with the approved Shop Drawings.
- .2 Fit and shop assemble components for delivery in largest practical sections.
- .3 Continuously seal joined pieces by continuous welds. Conform to CSA W59.
- .4 Grind exposed joints flush and smooth with adjacent finish surface.
- .5 Make exposed joints butt tight, flush and hairline.
- .6 Exposed Mechanical Fastenings: Flush countersunk screws or bolts; except where specifically noted otherwise.
- .7 Supply components required for anchorage of fabrications.
- .8 Quality of work shall be the best grade of modern shop and field practice known to recognized fabricators specializing in this work. Accurately fit joints and intersecting members and make in true planes with adequate fastening. All work shall be plumb, true, square, straight, level, accurate to sizes detailed and free from distortion or defects detrimental to appearance and/or performance.
- .9 After fabrication, clean and scrape all surfaces to remove rust, mill scale, oil and grease of extraneous material.

2.3 SHOP FINISHES

- .1 Stainless Steel: No. 4 - Brushed.

3 EXECUTION

3.1 EXAMINATION

- .1 Prior to fabrication, verify all existing conditions which may affect the work of this Section and take any field measurements necessary to ensure a perfect fit of all miscellaneous metal items.
- .2 Report deficiencies and misalignments to the Consultant for correction.

3.2 PREPARATION

- .1 Supply items to be built into the work for the anchorage of miscellaneous metal work including templates or information required for sleeves or openings to the Trade involved at the proper time.

3.3 ERECTION

- .1 Install miscellaneous metal items as required by welding, bolting or lagging to the building structure.
- .2 Erect all items square, plumb, straight and true, accurately fitted with tight joints and intersections.
- .3 Field weld components to CSA W59.
- .4 Field bolt and weld to match shop bolting and welding.
- .5 Supply necessary anchor bolts, washers, nuts, lag screws, expansion shields, toggles, straps, sleeves, brackets etc. required to complete the installation to the satisfaction of the Consultant. Secure items to be screwed with sufficient self-tapping "shake-proof" screws with flat countersunk heads.
- .6 Mechanically fasten joints butted tight, flush, and hairline.

- .7 Grind welds smooth and flush.
- .8 Carry out all cutting and drilling of concrete and masonry required for the installation of miscellaneous metal items. All making good after shall be carried out by the Trade whose work was affected at the expense of this Contractor.

3.4 FIELD QUALITY CONTROL

- .1 Defective materials or quality of work whenever found at any time prior to final acceptance of the work shall be rejected regardless of previous inspection. Inspection will not relieve responsibility but is a precaution against oversight and error.
- .2 Remove and replace defective materials and work of other trades affected by this replacement, at no additional cost to the Owner.

3.5 ADJUSTING

- .1 Upon completion of erection, all areas from which shop paint has been scraped or chipped, bolts, nuts, welds, etc. shall receive one coat of primer as previously specified.
- .2 Touch-up galvanized materials with zinc-rich paint.
- .3 Grind smooth and prime paint field welded connections.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 1.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 INTENT

- .1 Provide all articles, labour, materials, equipment, transportation, hoisting, and incidentals noted, specified or required to complete the work of this Section.

1.3 SECTION INCLUDES

- .1 Rough Carpentry, including:
 - .1 Wood nailers and blocking.
 - .2 Nylon/acrylic blocking
 - .3 Exterior Plywood sheathing, curbs, cants, etc.
 - .4 Hardware for anchoring rough carpentry to masonry, concrete, steel, etc.

1.4 RELATED SECTIONS

- .1 Section 06 20 00 – Finish Carpentry.
- .2 Section 06 40 00 – Architectural Woodwork.

1.5 REFERENCES

- .1 CSA B111-1974 (R2003): Wire Nails, Spikes and Staples.
- .2 CSA O80 Series-97 (R2002): Wood Preservation.
- .3 CAN/CSA-O86-01: Engineering Design in Wood.
- .4 CSA O121-M1978 (R2003): Douglas Fir Plywood
- .5 CSA O141-05: Softwood Lumber.
- .6 CSA O151-04: Canadian Softwood Plywood.
- .7 CSA O437 Series-93 (R2001): Waferboard and Strandboard.
- .8 National Lumber Grades Authority: Standard Grading Rules for Canadian Lumber.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 61 00.

- .2 Store Products under waterproof cover both in transit and at the Place of the Work in such a manner as to prevent damage to other materials, to any existing building or property or to the Work.
- .3 Co-ordinate delivery schedule of Products with Suppliers.

2 PRODUCTS

2.1 MATERIALS

- .1 Lumber: well seasoned stock, free from shakes, splits, dry rot, mildew or other defects which would impair strength and durability; SPF species, NLGA No. 2 and Better Grade Mix; S-Dry; sizes as indicated on Drawings.

Blocking: shall be non-wood material, structural sound and suitable to installation of new windows. Mold and moisture resistant, waterproof material such as acrylic or nylon Plywood Sheathing: DFP to CSA 0121, Grade "C" veneer; laminated using waterproof glue; thicknesses as indicated on Drawings; exterior grade for exterior applications.

- .2 Nails: to CSA B111, Type 304 or 316 stainless steel, common wire type for general use and spiral type for structural connections.
- .3 Anchors: toggle bolt type for anchorage to hollow masonry, expansion shield and lag bolt type for anchorage to solid masonry or concrete, or bolts or ballistic fasteners for anchorages to steel.
- .4 Mineral Fibre Wool Insulation: by Roxul or Fibrex.

2.2 SHOP-TREATMENT OF WOOD

- .1 Wood Preservative - Pressure Treatment: to CSA O80; using alkaline copper quaternary (ACQ) preservative.
- .2 Wood Preservative - Surface Application: to CSA O80, brush-applied.

3 EXECUTION

3.1 CO-OPERATION WITH OTHER TRADES

- .1 Give sufficient notice to Section 09 90 00 so that untreated or unprimed carpentry items or material can be primed immediately upon delivery to the Place of the Work.
- .2 Supply fastenings with installation locations and necessary templates to other trades to which wood is to be secured.

3.2 SITE-APPLIED WOOD PRESERVATIVE

- .1 Treat wood nailers, blocking, wood sills, etc. in contact with concrete or masonry with green Pentox to ensure full protection against rot and decay.
- .2 Apply two coats of preservative to new surfaces when treated lumber is cut or sawn for fabrication or drilled and countersunk for bolts etc.
- .3 Treat all wood curbs and blocking for roof ventilators, Electrical and Mechanical equipment on the roof.

3.3 INSTALLATION

- .1 Provide blocking where indicated on Drawings and as required for attachment of windows, fitments and equipment by other Sections.
- .2 Provide wood copings, nailing strips, etc. as specified in Section 07 51 00. Construct curb and cant members of single pieces per location. Curb roof openings except where prefabricated curbs are provided.
- .3 Form corners by lapping side members alternately.
- .4 Provide mineral fibre wool insulation where required at curbs, parapets then in locations as shown on the architectural drawings and details.
- .5 Fastenings to solid masonry or concrete surfaces shall be with expansion shields and lag screws, unless otherwise specified, and to steel with bolts and nuts. Wood or inorganic fibre plugs shall not be permitted. Powder activated fasteners and staples shall not be used unless permitted by the Consultant.
- .6 Accurately fit all work to sit level and true and securely fastened.

3.4 FIELD QUALITY CONTROL

- .1 Defective materials or quality of work whenever found, at any time prior to final acceptance of the work, shall be rejected.
- .2 Inspection will not relieve this Contractor of responsibility but is a precaution against oversight or errors.
- .3 Defective materials shall be removed and replaced by this Contractor at his own expense, and he shall be responsible for the cost of the work of other trades affected by this replacement.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 1.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 INTENT

- .1 Provide all articles, labour, materials, equipment, transportation, hoisting and incidentals noted, specified or required to complete the work of this Section.

1.3 SECTION INCLUDES

- .1 Finish Carpentry, including:
 - .1 Plastic laminate windowsills
 - .2 Accept delivery, store, and install the following:
 - (1) Hollow Metal Doors and Frames
 - (2) Wood Doors
 - (3) Finishing Hardware
 - (4) Interior Door Signs
 - (5) Washroom Accessories

1.4 RELATED SECTIONS

- .1 Section 06 10 00 – Rough Carpentry.
- .2 Section 06 40 00 – Architectural Woodwork.
- .3 Section 08 11 00 - Metal Doors and Frames.
- .4 Section 08 14 00 - Wood Doors.
- .5 Section 08 70 00 – Hardware.
- .6 Section 09 90 00 – Painting and Coating.

1.5 REFERENCES

- .1 ANSI A208.1-99: Particleboard.
- .2 ANSI A208.2-2002: Medium Density Fiberboard.
- .3 ANSI / NEMA LD 3-2000: High Pressure Decorative Laminate.
- .4 Architectural Woodwork Manufacturers Association of Canada (AWMAC): Architectural Woodwork Quality Standards Illustrated.

- .5 CSA B111-1974 (R2003): Wire Nails, Spikes and Staples.
- .6 CSA O80 Series-97 (R2002): Wood Preservation.
- .7 CSA O115-M1982: Hardwood and Decorative Plywood.
- .8 CSA O121-M1978: Douglas Fir Plywood
- .9 CSA O141-05: Softwood Lumber.
- .10 CSA O151-04: Canadian Softwood Plywood.
- .11 CAN/CGSB-11.3-M87: Hardboard.
- .12 National Lumber Grades Authority: Standard Grading Rules for Canadian Lumber.

1.6 SAMPLES

- .1 Submit samples as specified in Section 01 33 00.
- .2 Samples: as follows:
 - .1 Duplicate 300 x 300 mm (12" x 12") size, illustrating full panel sheet, edge trim, joint trim, and applied finish.
 - .2 Duplicate 300 x 300 mm (12" x 12") size, illustrating wood grain and specified finish.
 - .3 Duplicate 300 mm (12") long, illustrating wood trim.

1.7 QUALITY ASSURANCE

- .1 Installer: company specializing in custom carpentry work with three years documented experience.
- .2 Perform finish carpentry to AWMAC Quality Standards, Custom grade.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 61 00.
- .2 Store Products under waterproof cover both in transit and at the Place of the Work in such a manner as to prevent damage to other materials, to any existing building or property or to the Work.
- .3 Co-ordinate delivery schedule of Products with Suppliers.

2 PRODUCTS

2.1 MATERIALS

- .1 Hardwood Lumber: AWMAC CustomGrade; maximum moisture content of 7 percent, WhiteBirch species, with verticalgrain, of quality capable of opaque finish.
- .2 Plastic Laminate: to ANSI/NEMA LD 3, velour or satin finish, solid colour; as follows:
 - .1 General Purpose Type: Grade HGS; 1.2 mm thick.

- .2 Vertical Surface Type: Grade VGS; 0.7 mm thick.
- .3 Postforming Type: Grade HGP; 1.0 mm thick.
- .4 Vertical Postforming Type: Grade VGP; 0.7 mm thick.
- .5 Backing Type: Grade BKL; 0.51.2 mm thick. Manufactured by same manufacturer as facing sheet.
- .6 Scratch-resistant Type: FIN-SA (41) by Formica, or 90 finish by Wilsonart;
- .7 Acceptable Manufacturers: Formica, Wilsonart, Arborite, Nevamar or Laminart.

2.2 ACCESSORIES

- .1 Contact Adhesives: water base solvent release type.
- .2 Wall Adhesive: solvent release, cartridge type, compatible with wall substrate, capable of achieving durable bond.
- .3 Nails: to CSA B111, size and type to suit application, plain finish.
- .4 Lumber for Shimming, Blocking, and Strapping: softwood lumber, as specified in Section 06 10 00.
- .5 Wood Filler: Solvent base, tinted to match surface finish colour.

2.3 SHOP-TREATMENT OF WOOD

- .1 Wood Preservative - Pressure Treatment: to CSA O80; using alkaline copper quaternary (ACQ) preservative.
- .2 Wood Preservative - Surface Application: to CSA O80, brush-applied.

3 EXECUTION

3.1 CO-OPERATION WITH OTHER TRADES

- .1 Give sufficient notice to Section 09 90 00 so that untreated or unprimed carpentry items or material can be primed immediately upon delivery to the Place of the Work.
- .2 Supply fastenings with installation locations and necessary templates to other trades to which wood is to be secured.

3.2 SITE-APPLIED WOOD PRESERVATIVE

- .1 Treat all wood nailers, blocking, wood sills, etc. in contact with concrete or masonry with surface applied wood preservative to ensure full protection against rot and decay.
- .2 Apply two coats of preservative to new surfaces when treated lumber is cut or sawn for fabrication or drilled and countersunk for bolts etc.

3.3 INSTALLATION

- .1 Install Products to AWMAC Custom Grade.

- .2 Set and secure materials and components in place, plumb and level.
- .3 Install components and trim with nails, screws, or bolts with blind fasteners at 400 mm OC; or wall adhesive by gun application as required by specific installation requirements.
- .4 Machine sand all exposed surfaces of finished woodwork to an even smooth surface ready for finishing; fit all joints and mitres accurately with nail heads set and ready for finishing.
- .5 Back out flat members of trim to prevent warping.
- .6 Hand sand all finished materials, after erection to remove roughness, machine marks or other blemishes.
- .7 Set exposed fasteners.
- .8 Apply wood filler in exposed fastener indentations.
- .9 Site Finishing: refer to Section 09 90 00.

3.4 PLASTIC LAMINATE INSTALLATION

- .1 Comply with ANSI/NEMA LD 3, Annex A and AWMAC Quality Standards.
- .2 Use lengths adequate for longest dimension of surface to be covered. Splices within lengths of 2400 mm (8'-0") will be rejected.
- .3 Install work plumb, true and square, neatly scribed and fitted to adjoining surfaces. Gaps at corners or between trim and back-up materials will be rejected by Consultant.
- .4 Use draw bolts and splines to form tight, flush hairline joints in core materials.
- .5 Ensure cutouts are prepared for faucets and sinks. Round internal corners, chamfer edges and seal exposed core edges.
- .6 Ensure adjacent laminate sheets match in colour and pattern.
- .7 Apply plastic facing sheets to base material as recommended by laminate and adhesive manufacturers.
- .8 Ensure laminate and core profiles coincide to provide full continuous support and bond over entire surface.
- .9 Use continuous lengths to minimize joints; maintain joints a minimum of 600 mm (24") from sink cutouts. Offset joints in plastic facing from core joints.
- .10 Provide postformed counter tops with 180 degrees front roll or D-Wrap and 65 mm rolled backsplash.
- .11 Apply laminate to exposed edges of core material for straight self-edging strips or flat work. Chamfer exposed edges uniformly at 20 degrees; do not mitre laminate edges.
- .12 Apply backing sheets in accordance with manufacturer's directions, where required to conceal core material.
- .13 Apply cabinet liner sheets to interior of cabinets where indicated on the drawings, in accordance with manufacturer's directions.

3.5 MISCELLANEOUS INSTALLATIONS

- .1 Install finishing hardware, interior door signage and washroom accessories as specified in Section 08 70 00.
- .2 Install wood doors as specified in Section 08 14 00.
- .3 Install metal doors and frames as specified in Section 08 11 00.

3.6 FINISHING HARDWARE

- .1 Finishing hardware shall be supplied by the Hardware Supplier under the work of Section 08 70 00 and installed by this Contractor.
- .2 Mortise and neatly fit finishing hardware. Cut mortises straight and sharp without ragged edges and size accurately to accommodate the hardware. Where mortising and application have not been done in a first class workmanlike manner such work shall be replaced.
- .3 Install hardware in accordance with the manufacturer's recommendations.
- .4 Examine and adjust as required all doors and other moveable parts prior to completion of the building.
- .5 Hang doors 1½ pairs of butts, unless otherwise shown in the hardware list to be provided under Section 08 70 00. Neatly and accurately fit all finishing hardware.

3.7 HOLLOW METAL DOORS

- .1 Installation of hollow metal doors supplied under Section 08 11 00 shall be carried out by workmen skilled in this trade and done in strict accordance with the manufacturer's direction to produce a first class installation.
- .2 Hang doors so that they will operate freely, without tension or free swing.

3.8 HOLLOW METAL DOOR FRAMES

- .1 Set hollow metal frames, supplied under Section 08 11 00, plumb, square, level and at correct elevation. Brace solidly in position while being installed.
- .2 Provide a temporary horizontal wood spreader at the mid height of the door opening to ensure the frame remains plumb and true until surrounding partitions are complete.

3.9 FIELD QUALITY CONTROL

- .1 Defective materials or quality of work whenever found, at any time prior to final acceptance of the work, shall be rejected. Inspection will not relieve this Contractor of responsibility but is a precaution against oversight or errors. Defective materials shall be removed and replaced by this Contractor at his own expense, and he shall be responsible for the cost of the work of other trades affected by this replacement.

3.10 CLEANING

- .1 Remove Kraft paper protective coating.
- .2 Visually inspect each installed item, wash, and polish thoroughly all surfaces and remove debris from work site and dispose.

3.11 PROTECTION

- .1 Protect exposed and finished woodwork after installation until Substantial Performance of the Work.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with Instructions to Bidders, the General Conditions of the Contract as amended by the Supplementary Conditions including all Sections outlined in Division 00 – Procurement and Contracting Requirements and Division 01 - General Requirements.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 SECTION INCLUDES

- .1 Provide millwork and casework as shown on the Drawings, including but not limited to the following:
 - .1 Provide prefinished millwork where shown on Drawings as specified herein and as needed for a complete and proper installation.
 - .2 Provision of rough hardware, including fastening devices required to secure in place items of carpentry and millwork.
 - .3 Installation of finishing hardware for millwork by this Millwork Contractor Section 06 40 00.
 - .4 Supply and installation of miscellaneous trims, scribes, filler panels, plastic laminate windowsills.
 - .5 Supply and installation of grilles, etc. on millwork items. Coordinate with Mechanical Contractor for perimeter radiant heating grilles set in countertops.
 - .6 Provide cut-outs in the millwork for the sinks, gas outlets, electrical outlets and all other necessary cut-outs regarding the millwork.

1.3 INTENT

- .1 The intent of this Section is that casework shall be manufactured and finished at the plant, delivered to the site and immediately installed by this Section, including provision of necessary strapping, backings, bearers, rough hardware and finish hardware and miscellaneous support metals and stainless steel metal components. Touch-up finish immediately prior to completion of the work and leave in perfect condition.

1.4 RELATED SECTIONS

- .1 Section 06 10 00 – Rough Carpentry.
- .2 Section 06 20 00- Finish Carpentry
- .3 Section 07 92 00 – Joint Sealants.
- .4 Section 09 21 16 – Gypsum Board Assemblies.
- .5 Section 09 30 00 – Tiling
- .6 Section 09 65 00- Resilient Flooring
- .7 Section 09 65 66 – Resilient Athletic Flooring

- .8 Section 09 90 00 – Painting and Coating.
- .9 Divisions 20, 22 and 23 – Mechanical.
- .10 Division 26 – Electrical.

1.5 REFERENCES

- .1 Architectural Woodwork Manufacturers Association of Canada (AWMAC): Architectural Woodwork Quality Standards Illustrated.

1.6 SUBMITTALS

- .1 Submit shop drawings as specified in Section 01 33 00.
- .2 Shop Drawings:
 - .1 Shop drawings only required where not detailed by “AW” Drawing. Copies of “AW” are to be marked up to indicate changes. “AW” Drawings refer to WRDSB Millwork Standards Drawings contained in the Specifications or Drawing sets.
 - .2 Before shop drawings and fabrication is started, take critical measurements at the site to facilitate installation, fitting of work and access required to move millwork into final location. Take such measurements prior to fabrication of the work of this Section and in ample time to avoid delays in the work.
 - .3 Draw shop drawings in related and/or dimensional positions with sections. Scale minimum 1:10.
 - .4 Shop drawings shall show fabrication details, materials, jointing, description of anchorage and hardware.
 - .5 Submit four (4) sets for approval.
 - .6 Do not commence work until reviewed shop drawings have been returned as approved by Consultant and WRDSB.
 - .7 The drawings are to be photocopied, confirmed to fit openings and sizes, marked up in red and returned for approval.

1.7 SHOP FINISH

- .1 All cabinet work, including wood for change room bench seating and all other cabinet trims, to be shop finished by this Section and per Section 09 90 00.

1.8 SAMPLES

- .1 Submit samples as specified in Section 01 33 00.
- .2 Samples:
 - .1 Samples melamine 12 in. x 12 in. mm, plastic laminate, edging, hinges, pulls, bumpers, drawer slides and shelf clip.
 - .2 Submit duplicate 12 in. long samples of each type of molding.
 - .3 Submit samples of construction methods and of all hardware.

1.9 QUALITY ASSURANCE

- .1 Perform work to latest edition of Architectural Woodwork Manufacturers' Association of Canada (AWMAC), Custom Grade.
- .2 Fabricate millwork by a manufacturer that is a recognized millwork supplier, well experienced in the manufacturing techniques of a millwork shop.
- .3 Employ fully trained mechanics who are regularly employed in this field.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 61 00.
- .2 Give Painter sufficient notice so that untreated or unprimed carpentry items or materials can be primed immediately upon delivery to site.
- .3 No equipment shall be delivered to the site until portion of the building in which it is to be installed is completely ready for equipment as approved by Consultant.
- .4 Store finished work properly and keep under cover both in transit and at site. Finish woodwork shall not be delivered to site until concrete and masonry work has dried out.
- .5 Cover all plastic laminate and prefinished top surfaces at shop with heavy Kraft paper.
- .6 Carefully protect form damage of any kind.

1.11 COOPERATION

- .1 Water, drainage, gas and air piping, faucets, hose cocks, retort rod and bases, traps, ventilation ducts, sinks, electric receptacles and wiring are supplied and installed by the Mechanical and Electrical Sections at all rooms. Coordinate the work with these trades and make provision in the construction of the fitments to accommodate this work. Methods of construction shall be such as to permit mechanical and electrical work being concealed in the fitments, cut and frame accordingly, provide removal access panels in the units or provide proper access for installation and repairs.
- .2 Cabinet hardware, pilaster strips, locks, finishing hardware will be supplied by this section. Miscellaneous metals used in this section will be supplied and installed by miscellaneous metals contractor unless otherwise noted.
- .3 Woodwork, not shop primed, will be primed and back painted as per painting section immediately upon delivery to the site. Care shall be taken that all surfaces cut after priming are brush coated with an approved primer before installation.

1.12 MAINTENANCE

- .1 Provide Owner with printed instructions for "Care and Maintenance of Plastic Laminate" and millwork finishes.

1.13 WARRANTY

- .1 Warranty all workmanship against manufacturing defects, including warpage or delamination, for a period of five (5) years from date of Substantial Completion. Make good or replace work showing defects in this period, as requested, at no expense to the Owner.

2 PRODUCTS

2.1 MATERIALS

- .1 Finishing Work: Materials used for finish work shall be sound, free from defects that would mar finished appearance, well-seasoned and air dried and of good quality for intended purposes. Wood laminates pressure bonded.
- .2 Plywoods:
 - .1 Select Plain Sliced Maple architectural Grade 'A' No. 1 Face grade; as in compliance with C.S.A. 0115-M1982 with a minimum 5 ply plywood veneer waterproof core, laminated with waterproof adhesive. Plywood shall be good both sides except where concealed by construction. Exposed faces to be natural grade per AWMAC. Interior of doors to be classified as exposed. Provide marine grade plywood with all plastic laminate child care sink cabinets.
 - .2 Melamine Faced Particleboard: to CAN3-0.188.1-M78, grade "H" particleboard sanded faces, ½ in., 5/8 in., ¾ in., 1-1/8 in. and 1¼ in. thickness, faced with laminated plastic. Melamine resin impregnated cover sheet with coloured and/or patterned paper inner layer. Melamine shall be thermally fused to rigid particle board substrate. Melamine faces shall be 120 Gram Weight Paper. Colour to be Hardrock Maple or as noted on the Drawings. Maximum of six colours/patterns to be chosen by Consultant from manufacturer's full range. Alternate colours will be chosen in feature areas of the school, such as the office and the library.
 - (1) Acceptable Material: Flakeboard, Uniboard or approved equal. Final colour by Architect at Shop Drawing submission.
 - .3 Particleboard: CSA-0118-1975 Type 11, Grade R, minimum 690 K8/m³, 4.5 to 8% moisture content.
- .3 Hardwood: shall be selected Soft Maple, Hard, all shall be Architectural Grade (knots will not be accepted). It shall be selected for colours and graining when used for stain work. Sizes and thicknesses as shown on drawings.
- .4 Wood Edging: 1/4" hardwood to match plywood unless indicated otherwise (if maple, use hard maple).
- .5 Melamine Faced Particle Board Edge Banding: solid polyvinylchloride (PVC), 3 mm thickness x full width of board, wood core, wood grain type to match melamine face by Canada Wood tape or approved colour equal. Edging rigid PVC with a measured degree of hardness of "95 shore D" and thickness of "1/8 in. (+0.15 mm, -0.2 mm)" with the primer side having a concave measuring 0.10 to 0.25 mm.
 - .1 Edging adhesive: Ethylene vinylacetate thermalset adhesive with a temperature resistance of not less than 100 degrees C; A Processing range of 190 degrees - 200 degrees C and natural in colour.
 - .2 Edging is to be applied using only equipment designed for the application of thick PVC in strict accordance with the specifications of both the thick PVC and hot-melt adhesive manufacturers. All edges and all corners of this 1/8 in. PVC edge banding are to be machined to a 1/8 in. radius for all cabinet parts.
 - .3 Care should be taken during application to achieve the thinnest glue line consistent with a good bond without causing skips or un-spread areas. Final colour by Architect.

- .6 Plywood Concealed by Construction: Douglas Fir plywood shall be veneer core, waterproof, bonded, sanded, complying with CSA 0121-M1978. Solid grade where concealed by construction.
- .7 Concealed Framing Lumber: N.L.G.A.C. select eastern white pine, kiln dried to a 5% moisture content.
- .8 Unexposed Plywood for Framing: Waterproof fir plywood minimum 1/2" thickness unless indicated otherwise.
- .9 Adhesive:
 - .1 Waterproof synthetic resinous glue of approved general type conforming to CSA 0112.
 - .2 For plastic laminate - as recommended by plastic laminate manufacturer and to conform to CSA 0120-M1978.
 - .3 Approved waterproof type.
- .10 Plastic Laminate:
 - .1 Laminated Plastic for Flatwork: .050" thick decorative, melamine surfaced, high pressure laminated plastic sheeting in suede finish to conform to CAN3-A172-M1979 Grade G.P., Type 1. Manufacturer shall thoroughly sand back of sheet to form a homogeneous bonding surface. Plastic laminates shall be as manufactured by Arborite, Formica, Wilsonart or Nevamar. Backing sheet .020" thick, sanded one side. Products may be selected based upon manufacturer's full standard range of colours and patterns.
 - .2 Laminated plastic for post-forming work and preforming work: to CAN3-A172-M79 Grade P.F., Type 3, .050" thick, based on standard colours with suede finishes as selected by Architect. The colour will be non-stock.
 - .3 Plastic Laminate casework to be HardRock Maple, by Formica, or equal unless otherwise indicated.
- .11 Nails and Staples: to CSA Bill-1974. Use spiral threaded nails and barbed staples.
- .12 Shelves: adjustable shelves longer than 38 in. and fixed shelves without centre supports longer than 38 in. to be 28.6 mm thick wood veneer plywood or melamine faced particleboard as detailed. Shelves shorter than lengths specified above are to be 3/4 in. thick wood veneer plywood core and melamine faced particleboard for alternate price items. Front edges of adjustable shelves to be edge-banded. Front edges of fixed shelves to edge banded, rear edge to be secured to cabinet back panel.
- .13 Glazing: Doors 6 mm tempered clear glazing.
- .14 Aluminum Angles: 2 in. x 2 in. x 1/8 in. aluminum angles for vertical corners at mobile storage units.
- .15 Exposed Fasteners: All millwork units secured to walls shall be secured with Tapcon screws and cup washers. All specialty fasteners such as acorn head bolts shall be supplied and installed by this section. Submit samples for Architect's approval. 'D' profile.
- .16 Countertops: to be plastic laminate postformed on particleboard or marine grade plywood with hardwood edge at counters with sinks or as noted on the drawings.
 - .1 Adhesives: to CSA 0112.5M, waterproof type.

- .2 Countertops are to have no open seams. Joints, where unavoidable in bench tops to be over a gable. Shop drawings shall identify location of all proposed seams. Consultant may modify location to suit design or function.
- .3 Coordinate with Mechanical subtrade for installation of sinks and gas outlets in new countertops.
- .4 Countertops to be quartz/engineered stone where shown on drawings. Countertops to have straight edge profile.
- .17 Stainless Steel: 16 gauge type 304 stainless steel where shown on drawings. Countertops to have finished edge. Provide sound deadening coating to underside of counters.
- .18 Windowsills: To be plastic laminate on veneer cove waterproof plywood or as noted on drawings.
- .19 Pencil grilles (linear bar grilles):
 - .1 Heavy duty, aluminum, linear bar grille
 - .2 3-½" inches wide, x 75 percent of length of countertops where millwork conceals perimeter radiant piping. (refer to Mechanical and Architectural drawings)
 - .3 Distributed by Price Industries
 - .4 Or approved equal
- .20 Backer standard: to be .028 thick. Panels shown to have backer panel shall be balanced with 0.5 mm (0.030) backing sheet manufactured by the same manufacture as the facing sheet. Core CSA 0115-M1982 (G/SO) or CSA0121-M1978 Grade "B" or CAN3-0188.1-M78, Grade R.

2.2 HARDWARE

- .1 The cabinet work manufacturer shall furnish and install cabinet hardware. Finish of hardware shall be used US32D or US28 depending on base material. Hardware shall be manufactured as follows or approved equal:
 - .1 Pulls - door and drawer, Canadian Building Hardware CBH 255 x C26D.
 - .2 Hinges - Blum Model 170BL91-653 with Blum mounting plate BL175.810 or approved equal or specified other on Drawings or Hafela Aximat hinges self-closing 270 degree if noted on Drawings.
 - .3 Cabinet locks door and drawer - National #C8053-5, Schlage CL 1000, or approved equal. Locks to be capped in stainless steel. All cupboard doors in a room to be keyed the same. Each room to be keyed different. Provide six (6) master keys for cupboard locks. Teacher's cabinets (cylinder lock to be supplied by Hardware Section – 08 70 00 and installed by this Section. All other hardware associated with Teacher closets locks are supplied and installed by this Section.
 - .4 Shelf support - Richelieu - # 5834-180 for 1¼ in. spaced holes in all gables or recessed pilaster strips see Drawings complete with neoprene sleeves typical all shelf supports.
 - .5 Door Bumper - Richelieu # AMP5312-11.
 - .6 Elbow Catch - Richelieu # BP3675-2G.
 - .7 Toe Kick Vent - Richelieu # 010533-30.

- .8 Drawer slides - Blum Metabox 320M integrated runner system using epoxy steel carcasses, adjustable front fixing brackets and ½ in. melamine with 1/8 in. PVC on all exposed edges for bottoms and back panels. Install screws to all pre-drilled holes. Use deepest Metabox possible for space available or approved equal.
 - (1) See Drawings for other slides called for specific locations.
- .9 Rough Hardware - Nails, screws, bolts, lag screws, anchors, special fastening devices and supports required for erection of carpentry components. Use galvanized components if exposed to exterior atmosphere. Galvanize in accordance with the requirements of CSAG164-M1981.
 - (1) Install all hardware to manufacturer specifications.
- .10 Glass Sliding Doors: Glass sliding doors to be 6mm tempered complete with track from Richelieu, lock in track and ground in finger pulls 12mm x 64mm. Glass shelves to be 6mm tempered.
- .11 Finishes
 - (1) Melamine Composite Panels simulated Hardrock Maple or as noted on the Drawings.
 - (2) Edge Banding: simulated Hardrock Maple grain or as noted on the Drawings.
- .12 Display Case Shelf Brackets and Standards:
 - (1) Brackets: Knape & Vogt 187 Series length as shown on Drawings to suit glass shelf width.
 - (2) Standards: Knape & Vogt Sereis 87.
- .13 Computer Grommets: Standard recessed 3" diameter. Colour as selected by Architect.
- .14 Slide Bolts: Gallery 73 - 3" or approved equal.
- .15 Casters from Colson in Cambridge - lockable model 22.04156.445, non-lockable model 2.04056.445.
- .16 Closet rod: Metal rod chrome 1 in. diameter #122.108.140 and matching flanges #8332-140 by Richelieu
- .17 Coat Hooks: Henkel Hook from Henkel Diversified Inc. (519-641-5872). Supply and install Henkel Hook for all Teachers closets (AW 329 – AW 331). To be made of high strength polycarbonate. Release weight to be 26 lb. Colour to be Honey Beige.

2.3 FABRICATION

- .1 Fitments shall be machined, assembled in mill where possible and delivered to job in units. Construct in accordance with details using first class cabinet construction with joints dowelled, glued and properly fastened. Machine all surfaces of finished woodwork to an even smooth surface; fit all joints and miters accurately. Frame materials with tight joints held in place,
 - .1 Conceal joints and connections where possible. Joints made on site shall be equal in quality of work to joints made in the shop.
 - .2 Check job dimensions and conditions and notify the Consultant in writing of unacceptable conditions. Design construction methods for expansion. Do not proceed until remedial instructions are received.

- .3 Deliver work to the job ready for installation. Leave ample allowance for fitting and scribing on the job. Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings, Design units to fit together if site assembly is required.
- .4 Fabricate work square and to the required lines. Recess and conceal fasteners and anchor heads. Fill with matching wood plugs.
- .5 Comply with glue manufacturer's recommendations for lumber moisture content, glue life, pot life, working life, mixing spreading, assembly time, time under pressure and ambient temperature.
- .6 The interior of counters, cupboards, shelving units, desks, shall be considered "exposed". Finish all exposed edges with 1/8 in. thick PVC edge banding material, applied by an Edge-Bander using Hot Melt adhesive. Colour to match the melamine. Radius all exposed edges and corners (PVC edging or Wood edging). Counter tops which are to receive plastic laminate coverings may be 3/4" (19 mm) thick sanded veneer core plywood where specified. Particle core shall be used for shelving and gables, countertops specifically called for as solid material or as otherwise specified. Include all filler strips and to match the face colour.
- .7 Refer to Drawings and Architectural Detail sheets for location, details, number of units required and location of fittings.
- .8 Interior fitments shall be complete in every respect with special fittings required and hardware.
- .9 Provide exposed end grain of solid members and edges of exposed plywood with matching solid hardwood edging at least 1/4" thick and thicker where specified. At melamine faced particle board provide 1/8 in. PVC edging complete with 1/8 in. radius on all exposed edges and corners as per millwork sections. Edging to melamine faced particle board shall be applied with an Edge-Bander using hot melt adhesive.
- .10 Make all necessary cut-outs in the furniture for sinks, gas cocks, appliances, and electrical switch and outlet boxes and pre-drill all mounting holes for faucets, fittings, and outlet boxes. Refer to electrical and mechanical drawings and specifications.
- .11 Provide and install pipe covers, scribing pieces, top, bottom and/or closures and filler panels where necessary, including wherever units require furring out or blocking to existing conduits, pipes, etc.
- .12 Service cover panels to be provided at all kneehole drawer units, kneehole front rails and knee drawer table assemblies. End closing panels to be provided at all exposed ends of service strips and island/peninsula assemblies. Front filler panels to be provided where called for on Drawings and as required by field conditions.
- .13 Telephone and electrical receptacles and wiring are specified under Electrical Division. Coordinate work of this trade, make provision to accommodate this work and cut tops for and provide wood bearers for support.
- .14 Cooperate with others engaged in work on the building to the end that proper unity of action will assure the orderly progress of the work. Do necessary boxing and protecting of sills, jambs, and the like. Construct scaffold, ramps, and other temporary staging necessary.
- .15 Provide 3/4" plywood adjustable or fixed shelving where detailed. Maximum unsupported span for shelving shall be 3'-0". Fixed shelves shall be dowelled into gables and divisions. Where shelves are set on clips only, gables shall be drilled 1¼ in. OC for total height of gables.

- .16 The plywood used in interior fitments throughout regardless of whether for paint or stain finish, shall have exposed edges edged with solid strips 1/4" wide, unless noted otherwise by full thickness of plywood. No exposed edges of plywood will be permitted. Strips shall be glued and accurately fixed to edges. Adjustable shelves shall have strips applied to front edge.
 - .17 Exposed framing members and trim shall be solid hard maple or birch.
 - .18 Plastic laminate coverings to fitments, cupboards and counters shall be in colours selected by Architect and applied in accordance with manufacturer's directions. Where plastic laminate occurs, exposed edges and edges around cut-outs such as sinks shall be edged in the same material. Seal remaining exposed edges of surfaces with heavy Kraft paper prior to shipment. Paper shall not be removed until final cleaning. When cutting holes in plastic laminate work, corners shall be rounded and filed smooth.
 - .19 When cutting holes in plastic laminate work, corners shall be rounded and filed smooth.
 - .20 Protection erected by this trade shall be removed, damage to this work and adjoining work due to the lack or failure of such protection, made good and debris, surplus materials, plant, and equipment removed and premises and the whole left clean and tidy to Architect's satisfaction.
 - .21 Melamine on all surfaces unless noted otherwise.
 - .22 Fabricate all plywood and melamine faced particle board backs, gables, and bottoms of millwork units together by means of 3/8 in. x 1 in. hardwood dowels or with hardwood biscuits. All backs to be 1/2" stock. Dowel all panel cabinet components using 1/4 in. x 1 in. hardwood dowels or biscuits at maximum 4" OC. All drawer bottoms and backs are 1/2" stock or greater. All exposed edges on all melamine faced particle board units to be edged with solid 1/8 in. PVC c/w 1/8 in. radius edges and corners including drawer parts and with 1/4" matching hardwood edge banding at Maple and Birch units. Kick material for normal application shall be 3/4" waterproof spruce/fir plywood to be used. Resilient base by Section 09 65 00 and quarry tile base by Section 09 30 00.
- .2 Cupboard Doors
- .1 Doors shall be 3/4" thick particle core veneer plywood. Doors shall be flush, slab type, accurately fitted, free of warp and twist. Care must be taken in sawing and assembling so that there is no splintering of finish face. Splintered doors that mar the appearance will be rejected by the Architect.
 - (1) Where melamine is specified; construct doors of 3/4" particle core with melamine good - two sides.
 - .2 Provide two door silencers/bumpers per panel mechanically fastened to the cabinet frames.
- .3 Drawers
- .1 Fabricate Blum Metabox drawer bottom and backs with 5/8 in. melamine composite panel.
 - .2 Where melamine is specified: drawer fronts to be 3/4" particle core with melamine, good two (2) sides.
 - .3 Extend all backs in file drawers for use with hanging file hardware. Metabox units used should also allow for legal width hanging folders to run front to back and letter width side to side where space permits.

- .4 Fronts to match cupboard doors finish.
- .5 Provide two drawer silencers/bumpers per drawer panel mechanically fastened to the cabinet frame.
- .4 Counters, Cupboards, Shelving, Circulation Desk etc.
 - .1 Adjustable shelves c/w clips and drilled holes at 1¼ in. centers. Base cabinet's c/w one (1) shelf, wall cabinet's c/w two (2) shelves, and tall cabinet's c/w five (5) shelves, the center shelf is fixed unless drawings show otherwise.
 - .2 Factory installs all hardware firmly into position for long life under hard use. Install two (2) hinges on doors up to 3 feet in height, three (3) hinges to 1½ feet in height and four (4) hinges for doors greater than 1½ feet in height or shown otherwise.
 - (1) Frame as detailed with ¾" thick, or as noted otherwise, plywood gables, tops and bottoms. House intermediate dividers and plywood backs, into gables and top and bottom shelves, for all fitments. Plywood shall be birch or oak as called for in this Section unless otherwise indicated. Cabinet backs to be ½" plywood.
 - (2) Where melamine specified: horizontal and vertical gables; and shelving to be ¾" particle core with melamine, good two sides. Cabinet backs to be ½" particle core with melamine, good one side.
 - (3) Fabricate cabinet carcass: The 1¼ in. system from ¾ in. thick melamine composite panel using flush frameless construction and exposed edges, to AWMAC Standard "Custom grade" c/w ⅛ in. thick PVC edge banding on exposed edges. All exposed edge banding c/w ⅛ in. radiused edges and corners.
 - (4) Do not exceed 32 in. maximum width of cabinet without a divider or specified otherwise.
 - (5) Carcass construction: Backs ⅝ in., bottoms, rails, doors, drawer fronts ¾ in. of melamine composite panels, assembled with glued hardwood dowels ⅜ in. x 1¼ in. or wafers.
 - .3 Cut countertops for sinks and provide bearers. Provide splash-back at back of sink for entire length of the unit and at return ends where walls or other vertical surface occur within 24 in. of sink or other wet location.
 - .4 Countertop and splash-back will be plastic laminate unless noted otherwise. Stainless steel to be provided at Child Care kitchen. Engineered stone (quartz) where noted on drawings.
 - .5 Provide removable plywood access panels, screwed in place, where necessary for access to concealed wiring.
 - .6 Fit trim and scribe molds to fitments as shown and as required to hide voids at walls, partitions and ceilings.
 - .7 Provide cut-outs for inserts, outlets, grilles, appliances, etc. occurring in fitments.
 - .8 Bottom of units blocked up to form a 4" high x 3" deep toe space and fabricated from 19mm waterproof veneer core plywood of fir or spruce.
 - .9 Fit fillers between fitments, of same material as fitments, where necessary to fill voids between fitments and walls.
 - .10 Lighting fixtures and outlets to be supplied and installed under Division 26.
 - .11 Provide cut-outs and access panels where required for Mechanical Divisions and covers over ductwork (stove exhaust fans) or piping that run exposed above counters and upper shelves.

- .12 Provide extended top, bottom, and exposed gables where furring out of upper cupboards is required due to pipes, conduits, and the like behind to provide a flush face at walls.
- .13 Plastic Laminate Work:
 - (1) Comply with CAN3-A172-M79, Appendix "A".
 - (2) Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Provide cores of not less than 3/4" nominal thickness solid face Douglas Fir.
 - (3) Form shaped profiles and bends as indicated, using post-forming grade laminate to laminate manufacturer's instructions.
 - (4) Use straight self-edging laminate strip .062" thick for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges. Curved self-edging shall be post-formed material or bending grade.
 - (5) Apply laminate backing sheet to reverse side of core of plastic laminate work where specified. Provide backing sheet of sufficient thickness to compensate for stresses caused by the facing sheet.
 - (6) Locate joints where indicated, where not indicated at approximately 8'-0" or 12'-0" centres also include joints at corners, and changes in superficial area.
 - (7) Accurately fit decorative laminate together to provide tight, flush, butt joints. Joints in cored panels shall be made with 1/4" blind splines and draw bolts, one draw bolt for widths up to 6", two or more draw bolts at maximum 18" OC for widths exceeding 6".
 - (8) Keep joints min. 2'-0" from sink cut-outs.
 - (9) Seal the core at joints and exposed edges with sealer.
 - (10) Countertops apply Tremco Tremsil 200 silicone sealant at junction of plastic laminate or phenolic tops when tops are joined. All joints to be over a gable or supported otherwise.
 - (11) Use draw bolts in counter top joints.
 - (12) Apply a small bead of mildew-resistant paintable silicone sealant at junction of plastic laminate counter back and adjacent wall finish.

3 EXECUTION

3.1 EXAMINATION

- .1 Preparation and Protection.
 - .1 Protect work of other trades from damage.
 - .2 Make Good any resulting damage, to the satisfaction of the Consultant, at no additional cost to the owner.

3.2 WORKMANSHIP

- .1 Fabricate and install work in accordance with the best practice. Finished work shall be free from drag, feathers, slivers or roughness of any kind. Remove machine marks by sanding. Give finished work smooth surfaces, ready for painting or varnish application.
- .2 Mortise and tenon joints shall be glued and pinned. All panels shall be secured together with specified glued and dowelled method. Glue blind screw all fabricated component work unless otherwise specified. Set surface nails and plug countersunk screws with matching wood plugs. Use screws with cap washers where units with doors are secured to walls behind.

- .3 Finished woodwork shall be free from bruises, blemishes, mineral marks, knots, shakes and other defects.
- .4 All metal items such as grilles, tracks, supports, legs, brackets, etc. supplied by other trades shall be built into fitments, panelling, wood doors, etc., in strict accordance with directions of trades supplying such.
- .5 Furnish rough hardware, nails, expansion shields, screws, brackets and incidentals required to assemble and install the fitments in their proper locations.
- .6 Fit small scribe moulds or fillers of same materials as fitment to hide or fill voids at walls, partitions ceilings, furrings, exposed tops of millwork units, at base locations where rubber base occurs.
- .7 Plywood Edging: all exposed 3/4" plywood edges shall be covered with glued on 1/4" thick hardwood strips.

3.3 MILLWORK WORKMANSHIP

- .1 Fitments shall have joints dowelled and all joints shall be glued and nailed or screwed. All cabinet bases shall be of 3/4" plywood, blocked 3'-0" OC maximum and at corners.
- .2 Countertops shall have splash backs where sinks occur.
- .3 Shelving shall be 3/4" plywood, adjustable or fixed as detailed. Maximum unsupported span for shelving shall be 3'-0". Adjustable shelves shall be set on angle clips or metal pilaster strips. Loose shelves shall have PVC edges on front edge.
- .4 Laminates shall be pressure bonded to back-up board. Countertops shall be self-edged and have plastic laminate covered back splash. Back-up material for counter tops shall be particle core unless otherwise noted.
- .5 Plastic laminate surface shall be level, without bubbles and core ghosting. Core edges in counter cut-outs shall be sealed with asphalt compound. All exposed plastic edges shall be matched and sanded.

3.4 INSTALLATION

- .1 Welded bench brackets to be supplied and installed by others. Installation of wood work to the bench brackets to be completed by this Section.
- .2 Commencement of work implies total acceptance of surface and site conditions.
- .3 Set and secure all materials and components in place, rigid plumb and square.
- .4 Provide all furring strips and strapping required fixing millwork and casework to walls, etc. Provide all filler strips to seal any openings or joints at adjacent surfaces.
- .5 After installation, fit and adjust operating hardware to align all doors and drawers.
- .6 Clean up as the work proceeds and upon completion remove all rubbish and surplus materials resulting from the foregoing work.

- .7 Plumbing.
 - .1 Sink installation.
 - (1) Cut hole, clean the counter top with alcohol.
 - (2) Use Tremco, Tremsil #200 a silicone sealant that gives protection against fungi and bacteria.
 - (3) Install Tremsil around the cuts, and then place a bead of Tremsil on the top before installing the sink.
 - (4) Millwork Contractor to make sure the Plumber installs as specified.
 - .2 Installation and assembly work on the job shall be executed by skilled forces under supervision of a competent joinery foreman.
 - .3 Furnish rough hardware, nails, expansion shields, screws, brackets and incidentals required to assemble and install fitments in proper locations. Units shall be adequately fastened and secured in place with concealed fixings wherever possible. Include grounds and furring where required.
 - .4 Fitments shall be installed level, plumb and true and complete in all respects.
 - .5 Provide smooth surfaces with fastenings sunk and filled over to receive stain and sealer.
 - .6 Use draw bolts in countertop joints.
 - .7 At junction of plastic laminate counter, back splash and adjacent wall finish, apply small bead of silicone sealant as per Section 07 92 00 in colour as selected by Architect.
 - .8 Apply water resistant building paper over wood framing members in contact with masonry or cementitious construction.

3.5 HARDWARE INSTALLATION

- .1 Locate concealed European style hinges in accordance with manufacturer of hinge and with best standard practice. Set knobs, locks, and cylinders square with doors and escutcheons plumb. Apply accurately and neatly, to operate quietly and smoothly. Knobs shall turn easily, bolts slide freely and smoothly.
- .2 All cupboard doors and drawer locks except as noted below shall be keyed alike in each room unless otherwise stated. All such keys shall be labelled as to their lock location and shall be turned over to the Owner. All locks, slide bolts, etc. shall be supplied with the appropriate strikes and screws. Provide slide bolts at all locked pair of doors on interior side of door leaf without lock.

NOTE: No locks on doors below sink units.
- .3 All pilaster strips, where specified, shall be recess mounted and installed with the numbers on the pilaster at equal heights.
- .4 At completion of the work, moving parts shall be gone over, made to work easily, smoothly and efficiently. Work carefully cleaned down and left in complete and finished condition satisfactory to Architect.

3.6 RESILIENT BASE

- .1 Supply and installation of resilient base or quarry tile base at millwork to match adjacent flooring installation by Section 09 65 00.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with Instructions to Bidders, the General Conditions of the Contract as amended by the Supplementary Conditions including all Sections outlined in Division 00 – Procurement and Contracting Requirements and Division 01 - General Requirements.
- .2 Report in writing to the Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 SUMMARY

- .1 Section Includes: Provide all labour, materials, equipment and services necessary for the complete and proper installation of the insulation Work throughout project except where specified by other including but not limited to:
 - .1 Rigid Insulation
 - .2 Semi-rigid Insulation
 - .3 Batt Insulation
 - .4 Loose Insulation
 - .5 Spray Foam Insulation
 - .6 Related accessories for installation
- .2 Related Sections The following description of work is included for reference only and shall not be presumed complete:
 - .1 Section 04 20 00 – Unit Masonry
 - .2 Section 07 27 00 – Air Barrier Membrane
 - .3 Section 07 84 00 – Firestopping
 - .4 Section 07 92 00 – Joint Sealants
 - .5 Section 09 21 16 – Gypsum Board Assemblies
 - .6 Mechanical and Electrical Divisions

1.3 REFERENCES

- .1 Abbreviations and Acronyms:
 - .1 LTTR: Long Term Thermal Resistance.
 - .2 NRCC: National Research Council of Canada; www.nrc-cnrc.gc.ca

- .3 OBC: Ontario Building Code.
- .4 ULC: Underwriters Laboratories of Canada; www.ulc.ca
- .2 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section.
 - .1 American (ASTM):
 - (1) ASTM C165 – Standard Test Method for Measuring Compressive Properties of Thermal Insulations
 - (2) ASTM C1303/C1303M – Standard Test Method for Predicting Long-Term Thermal Resistance of Closed Cell Foam Insulation
 - (3) ASTM C1338 – Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings
 - (4) ASTM D1621 – Standard Test Method for Compressive Properties of Rigid Cellular Plastics
 - (5) ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
 - (6) ASTM E96/E96M – Standard Test Methods for Water Vapor Transmission of Materials
 - (7) ASTM E283 – Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
 - .2 Canadian General Standards Board (CGSB):
 - (1) CAN/CGSB-51.34 – Vapour Barrier, Polyethylene Sheet for Use in Building Construction
 - (2) CGSB 71-GP-24M - Adhesive, Flexible, for Bonding Cellular Polystyrene Insulation
 - .3 Underwriters Laboratory of Canada (ULC):
 - (1) CAN/ULC-S102 – Test Method of Surface Burning Characteristics of Building Materials and Assemblies
 - (2) CAN/ULC-S114 – Standard Method of Test for Determination of Non-Combustibility in Building Materials
 - (3) CAN/ULC-S701 – Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering
 - (4) CAN/ULC-S702 – Standard for Mineral Fibre Thermal Insulation for Buildings
 - (5) CAN/ULC-S704 – Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced
 - (6) CAN/ULC-S710.1 – Standard for Thermal Insulation - Bead Applied One-Component Polyurethane Air Sealant Foam, Part 1: Material Specification
 - (7) CAN/ULC-S710.2 – Standard for Thermal Insulation - Bead Applied One-Component Polyurethane Air Sealant Foam, Part 2: Application
 - (8) CAN/ULC-S711.1 – Standard for Thermal Insulation - Bead Applied Two-Component Polyurethane Air Sealant Foam, Part 1: Material Specification
 - (9) CAN/ULC-S711.2 – Standard for Thermal Insulation - Bead Applied Two-Component Polyurethane Air Sealant Foam, Part 2: Application
 - (10) CAN/ULC-S770 – Standard Test Method for Determination of Long-Term Thermal Resistance of Closed Cell Thermal Insulating Foams
 - .4 Provincial and Federal Building Codes as applicable.

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

- .1 Coordination under this Section shall be in accordance with General Conditions and Division 01.
- .2 Coordinate with other work having a direct bearing on the Work of this Section.
- .3 Coordinate installation of insulation with completion of other work requiring interface with insulation.

1.5 SUBMITTALS

.1 Submittals under this Section shall be in accordance with General Conditions and Section 01 33 00.

.2 Product Data:

- .1 Include product characteristics and limitations. Identify dissolving solvents, fuels and potential destructive compounds. Include WHMIS safety data sheets for reference on Site.

1.6 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturer's:

- (1) Manufacturer shall have a minimum of 15 years' experience having successfully manufactured and supplied products required for the Work of this Section for other projects of similar size and complexity.

.2 Installer's:

- (1) A manufacturer-approved firm with minimum 5 years' experience in installation of specified products in successful use on similar projects, employing workers trained by manufacturer, including a full-time on-site supervisor with a minimum of three years' experience installing similar work.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Delivery and acceptance requirements:

- .1 Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

.2 Storage and handling procedures:

- .1 Handle and store materials in a clean, dry area in accordance with manufacturer's written instructions in a weather protected environment, clear of ground and moisture, within temperature ranges recommended by materials manufacturer.
- .2 Store materials in manner to prevent damage to other materials, to any existing building or property, and to the Work.
- .3 Store Products to avoid disruption in the progress of the Work.

- .4 Store materials in original, undamaged containers or wrappings with manufacturer's seals and labels intact.

1.8 PROJECT CONDITIONS

- .1 Ambient Conditions:
 - .1 Maintain ambient and substrate temperatures during application and curing of adhesive at temperature limits established by the manufacturer of adhesive.
- .2 Existing Conditions:
 - .1 Ensure substrate is ready to receive insulation system. Proceed with installation only when the substrate construction and preparation work is complete.

2 PRODUCTS

2.1 MANUFACTURERS

- .1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:
 - .1 CertainTeed Corporation; www.certainteed.com
 - .2 Dow Chemical Canada Inc.; www.dow.com
 - .3 Johns Manville.; www.jm.com
 - .4 Owens Corning; www.owenscorning.ca
 - .5 Rockwool International.; www.rockwool.com
 - .6 Thermafiber Inc.; www.thermafiber.ca
 - .7 Substitution Limitations: Comparable Products from manufacturers not listed herein may be acceptable provided they meet requirements of this Specification.
- .2 Single source responsibility: Obtain each type of insulation from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work. Products installed as part of the Work of this Section shall be from the same production run including all extra stock materials.

2.2 MATERIALS

- .1 Rigid and Semi-Rigid Stone Wool Board Insulation:
 - .1 Stone wool rigid or semi-rigid board insulation a minimum nominal density of 64 kg/m³ (4 pcf). Ensure deformation of rigid board does not exceed 10% when tested at 1.2 kPa (25 psf) in accordance with CAN/ULC-S702, Type 1 and ASTM C165.
 - .2 Thickness as indicated on Drawings.
 - .3 LTR shall be minimum RSI (R) value or 0.704 (4.0) per 25mm (1”).

.4 Products:

- (1) "CavityRock" by Rockwool International A/S.
- (2) "FireSpan 40" by Thermafiber.
- (3) "JM CladStone" by Johns Manville

.2 Foam in Place Polyurethane Foam Insulation:

- .1 One-component foam, slow rise, Compressive Strength: 34 kPa (5 psi), Shear Strength: 83 kPa (12 psi); Closed Cell ULC classified sealant for insulating, sealing, bonding, filling, preventing air infiltration. Ensure 1 component foams meet CAN/ULC-S102 and ASTM E84 flame spread requirements for caulks and sealants, flame Spread 25, cure in place within 24 hours to densities between 16.02 to 32.04 kg/m³ (1.0 to 2.0 lb/cu ft) and carry R-value of 0.03 w/m•k (4 to 5 per inch). Cured foam can be trimmed, sanded and/or painted.

.3 Roof Insulation:

- .1 Refer to roofing sections in Division 07.

2.3 ACCESSORIES

.1 Insulation Adhesives:

- .1 As recommended by insulation manufacturer.

- .2 For polystyrene rigid insulation: Polymer modified liquid applied membrane, compatible with insulation, type manufactured for the attachment of insulation. Acceptable product: 230-21 by Henry Company Canada.

.3 Mechanical Fasteners:

- .1 Insulation Clips: Impale type, perforated 50 mm x 50 mm (2" x 2") cold rolled steel adhesive back, spindle of length to suit insulation plus 25 mm (1") with speed washers. Acceptable Product: "Self-Stick Insul-Anchors" by Continental Studwelding Ltd.; www.constud.ca.
- .4 Strip Impalement Clips: 25 mm (1") wide strip of "Insul Hold Clips" by Insul Hold Canada Ltd., fabricated from galvanized sheet in rolls with punch out insulation securement arrows.
- .5 Nails: Galvanized steel, length 25 mm (1") longer than insulation thickness.
- .6 Staples: Galvanized wire, 13 mm (1/2") minimum.

3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions:

- .1 Examine all work of other Sections upon which the Work of this Section depends.
- .2 Report in writing to the Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work of this Section.
- .3 Do not proceed with Work of this Section until all unsatisfactory conditions have been rectified and site conditions are ready to receive work.

- .4 Commencement of work implies acceptance of existing conditions and work by others.

3.2 INSTALLATION

- .1 Install materials in accordance with manufacturer's written instructions.
- .2 Install insulation to maintain continuity of thermal protection to building elements and spaces as indicated on Drawings.
- .3 Fit insulation tight to electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other projections or openings.
- .4 Install attachment at rate as required to prevent displacement of insulation during and after construction operations.
- .5 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation panels free from ripped backs or chipped or broken edges. Ensure integrity and continuity of insulation at juncture with different types of materials and seal in acceptable manner. Stagger joints in row.
- .6 Ensure continuity of insulation at juncture with different materials and seal with compatible materials acceptable to the manufacturer.
- .7 Do not cover insulation and air/vapour barrier installed under this Section or other Sections until it has been reviewed by Project Manager.
- .8 Foam in Place Polyurethane Foam Insulation:
 - .1 Install foam in place insulation materials to OBC requirements in accordance with manufacturer's instructions and acceptable to authorities having jurisdiction to provide required air seal.
 - .2 Apply sealants within recommended application temperature ranges. Consult manufacturer when sealants cannot be applied within specified ranges.
 - .3 Apply foam in place insulation materials to fill gaps where indicated.

3.3 FIELD QUALITY CONTROL

- .1 Non-Conforming Work:
 - .1 Defective materials or quality of work whenever found at any time prior to final acceptance of the work shall be rejected regardless of previous inspection. Inspection will not relieve responsibility but is a precaution against oversight and error.
 - .2 Remove and replace defective materials and work of other trades affected by this replacement, at no additional cost to the Owner.

3.4 CLEANING

- .1 Clean work area daily in accordance with Section 01 74 00.
- .2 Remove all excess materials from site as Work proceeds and at completion.
- .3 On completion of the Work remove all tools, containers, surplus materials, equipment, waste, etc., and leave Site neat, clean and tidy satisfactory to the Owner.

- .4 Clean and make good surfaces soiled or otherwise damaged as a result of Work of this Section at no additional cost to the Owner.
- .5 Leave surfaces clean and ready for subsequent Work.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 01.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 SECTION INCLUDES

- .1 Cold Applied Built-up bituminous roofing system.

1.3 RELATED SECTIONS

- .1 Section 04 20 00 – Unit Masonry: Connection of wall vapour barrier system to roofing system.
- .2 Section 05 31 23 – Steel Roof Decking.
- .3 Section 06 10 00 - Rough Carpentry: cants, blocking and curbs.
- .4 Section 07 62 00 - Sheet Metal Flashing and Trim.
- .5 Section 07 72 00 - Roof Accessories: Manufactured hatches
- .6 Division 22 – Plumbing

1.4 REFERENCES

- .1 ASTM C931/931M-01: Standard Specification for Exterior Gypsum Soffit Board.
- .2 ASTM D4601-98: Standard Specification for Asphalt-Coated Glass Fibre Base Sheet Used In Roofing.
- .3 CSA A123.4 M1979: Bitumen for Use in Construction of Built Up Roof Coverings and Dampproofing and Waterproofing Systems.
- .4 CGSB 37 GP 9Ma: Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
- .5 CGSB 37-GP-52M: Roofing and Waterproofing Membrane, Sheet Applied, Elastomeric.
- .6 CAN/CGSB 51.33 M89: Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
- .7 CAN/ULC-S704-2001: Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
- .8 CAN/ULC-S706-02: Standard for Wood Fibre Thermal Insulation for Buildings.

1.5 PERFORMANCE REQUIREMENTS

- .1 Install at specified Roof Area; - Cold Process Built Up Roof System Gravelled
 - .1 Prime any new metal or wood components using Tremprime WB that are to receive asphaltic materials.
 - .2 Install self-adhering AVC membrane and associated primer over existing deck.

- .3 Install 1 layer of Polyisocyanurate into Low Rise Foam Insulation Adhesive. Contractor is to verify existing insulation thickness and are to match.
 - .4 Install Cover Board 0.5" Asphalt Coated Fiberboard into Low Rise Foam Insulation Adhesive.
 - .5 A built up roof membrane – 3 Ply Cold Process
 - .6 Install Roofing Membrane as follows:
 - (1) Plies: Three
 - (2) Ply Type: Composite Felt, Three plies.
 - (3) Interply Adhesive: Burmastic Cold Process Adhesive
 - .7 Surfacing: 3/8" Clean round pea gravel, free of all fines, splinters etc. into Cold Process Flood Coat.
- .2 Specified Flashings and accessories: Install flashings at all roof perimeters, projections, and drains incorporating:
- .1 Reinforced EPDM/SBR Rubber sheet adhered with Elastomeric Bedding Adhesive as per detail drawings.
 - .2 Provide Products that are compatible with one another under field conditions, as demonstrated by roofing manufacturer.
 - .3 Provide watertight roofing system capable of resisting specified uplift pressures, thermally induced movement and exposure to weather without failing during the specified warranty period.

1.6 CERTIFICATES

- .1 Manufacturer Certificates: Signed by roofing manufacturer verifying that installer is approved, authorized or licensed by manufacturer to install specified Products.
- .2 Vendor Approved Contractors are as follows:
 - Atlas Apex Roofing (Kitchener) Inc – (519)894-4422
 - D. Thackeray Roofing Company Ltd – (519)745-7386
 - Flynn Canada Ltd (Cambridge) – (519)624-8797
 - Lafleche Roofing Services (800)387-1549
 - Nedlaw Roofing Ltd – (519)648-2218
 - Schreiber Brothers Ltd – (905)561-7780
 - Semple Gooder Roofing Ltd – (519)623-3300
 - Spinton Roofing Ltd – (905)575-3686
 - Triumph Roofing & Sheet Metal Inc – (416)534-8877
 - Wm. Green Roofing Ltd – (519)822-6414
- .3 Installer Certificates: Signed by installer verifying that they have the specified qualifications described below.

1.7 TEST REPORTS

- .1 Manufacturer Field Inspection Reports: manufacturer's written acceptance of roofing installation based on daily inspections.

1.8 QUALITY ASSURANCE

- .1 Manufacturer: qualified manufacturer having roofing systems listed by UL and approved for use by Factory Mutual.
- .2 Installer: a company and persons specializing in the application of protected elastomeric roofing, with documented experience and approved to apply roofing system by manufacturer.
- .3 Conform to CRCA Roofing Specifications and roofing membrane manufacturer's instructions.

1.9 PRE-INSTALLATION MEETINGS

- .1 Conduct pre-installation meeting.
- .2 Meeting: prior to commencement of deck installation, review and document methods and procedures related to roof deck and roofing system construction, including the following:
 - .1 Participants: authorized representatives of the General Contractor, Consultant, Owner, Roofing Subcontractor, Roofing Manufacturer, and installers of roof accessories and roof-mounted equipment.
 - .2 Review methods and procedures related to roofing installation, including manufacturer's written installation instructions.
 - .3 Review construction schedule and confirm availability of Products, Subcontractor personnel, equipment and facilities.
 - .4 Review deck installation criteria and finishes for conformance with roofing system criteria, including issues of flatness and fastening.
 - .5 Review structural loading conditions and limitations of roof deck both during and after roofing application.
 - .6 Review flashing details, special roofing details, roof drainage, roof penetrations, equipment curbs, and other conditions affecting roofing installation.
 - .7 Review governing regulatory requirements, and requirements for insurance and certificates as applicable.
 - .8 Review safety requirements, including temporary fall-arrest measures.
 - .9 Review field quality control procedures.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Deliver and store Products undamaged in original containers with manufacturer's labels and seals intact.
- .2 Store Products in designated areas elevated off the ground and protected from ultra-violet radiation, inclement weather and construction activities.
- .3 Store solvent-based liquids away from excessive heat and open flame.

- .4 Store adhesives and sealants at temperature above -5 degrees Celsius.
- .5 Store membrane rolls on end, dry, and protected from moisture and damage. Cover rolls, insulation and other moisture-sensitive Products with tarpaulins.
- .6 Store Products on roof deck in a manner to prevent overloading the structure and properly secured to prevent movement due to wind or other forces

1.11 SITE CONDITIONS

- .1 Protect adjacent properties from damage as a result of contract operations.
- .2 Protect the Work and the Owner's property from damage as a result of contract operations.
- .3 Confine equipment, material storage, and operations of workers to limits indicated by laws, ordinances, permits, and prior arrangements with the Owner.
- .4 Do not interrupt or hamper occupant operations without prior written approval.
- .5 Remove progressively all debris created by the execution of the Work and dispose of same at appropriate disposal sites.
- .6 Alert the General Contractor to the expected presence of odours, fumes, or dust and co-ordinate the shielding of ventilation equipment or scheduling of process to achieve acceptable abatement.
- .7 Upon completion of the work, leave premises in original order and condition.

1.12 ENVIRONMENTAL REQUIREMENTS

- .1 Do not install roofing during weather that might adversely affect the performance of the system.
- .2 Do not install roofing over surfaces that are wet, icy, dirty or otherwise unacceptable to the system being installed.
- .3 Secure the Work in a safe and watertight fashion before the onset of inclement weather and at the end of each day's work.

1.13 WARRANTY

- .1 Submit warranties in accordance with the General Conditions of the Contract.
- .2 Installer's Warranty: standard 2 year warranty, commencing from the date of Substantial Performance of the Work.

2 PRODUCTS

2.1 PRODUCTS

- .1 All primers, adhesives, sealants (including hardener), joint filler, grout, epoxy, sealers, and finishes applied on site and within weather barrier shall meet environmental requirements for low emitting materials.

2.2 MANUFACTURERS

- .1 Manufacturers of cold-applied built-up asphalt roofing systems having Products considered acceptable for use as per Tender 6862-KP-18:
 - .1 Tremco Canada.

2.3 MATERIALS

- .1 Primer:
 - .1 Tremprime WB by Tremco.
 - .2 Insulation: To match existing and confirmed by contractor.
 - (1) Insulation 1 layer of Polyisocyanurate Insulation
 - (2) Overlay Insulation – 0.5” Asphalt Coated Fiberboard
- .2 Insulation Adhesive:
 - .1 Low Rise Foam Insulation Adhesive by Tremco.
- .3 Vapour Retarder
 - .1 AVC Membrane and Primer.
- .4 Flashing Membrane
 - .1 TRA membrane
- .5 Cold Applied BUR. Burmastic by Tremco
 - .1 Three Ply Composite Ply HT Felt
- .6 Reinforcing Membrane:
 - .1 Burmesh by Tremco.
- .7 Ballast:
 - .1 3/8” Pea Gravel free of fines and long splinters.

2.4 ACCESSORIES

- .1 Stack Flashings: Prefabricated aluminum sleeves as manufactured by Thaler Metal Industries or equivalent.
- .2 Drains: Prefabricated drains as manufactured by Altra Metal Specialties – Mode ABD-CR-X-SS: Aluminum Body Roof Drain complete with clamping ring.
- .3 Metal Flashings and Coping
 - .1 Metal counter flashings and caps shall be 26 gauge, G90 galvanized Grade A steel conforming to ASTM A525. Finish to be Stelco 8000 series and colour to be as selected by the Board. Obtain written confirmation of colour prior to ordering.
 - .2 Two-piece gooseneck flashings are to be installed around all electrical projections.
- .4 Sealant
 - .1 One-part polyurethane – approved product and manufacturer – Dymonic by Tremco.

2.5 SHOP FINISHING

- .1 Galvanizing: to ASTM A653/A653M, zinc coating, hot dip process, minimum G90 coating.

- .2 Shop Painted Finish: baked ceramic pigmentation coating, applied to a minimum 1 mil dry film thickness and having a specular gloss of 30 (plus or minus 5) gloss units when measured with a Gardner 60 degree gloss meter; eg. Colorite HMP by Valspar, colour as selected by Consultant from standard range of colours.

3 EXECUTION

3.1 PREPARATION – ROOF AREAS AS PER DRAWINGS

- .1 Examine all drains and report any plugged drains to the Inspector. Any drains not reported and found plugged at the end of the contract will be deemed the responsibility of the contractor. Use temporary plugs during roof removal operations and remove before the end of each working day or when rain is imminent.
- .2 Remove existing roofing, insulation and vapour retarder to allow for installation of new roof curbs.
- .3 Verify acceptability of deck, projections, curbs, parapets, walls and other constructions as these pertain to the roofing work and its expected performance.
- .4 Correct any deficiencies in these constructions or advise General Contractor of conditions believed to be beyond the Scope of Work.
- .5 Fill and pack all joints, cracks, seams, and openings in the deck and its appurtenances to prevent air leakage from the building interior.

3.2 ROOF DECK

- .1 Deck reattachment:
 - .1 Mechanically reattach loose sections of deck to steel or wood support members according to existing fastening pattern.
- .2 Deck replacement:
 - .1 Remove defective decking. Examine supports. If unsound, contact General Contractor immediately for future action.
 - .2 Install new decking in accordance with appropriate building regulations and CSSBI, (Canadian Sheet Steel Building Institute).
- .3 Deck protection (Metal):
 - .1 Remove loose flaking rust, down to clean, dust free, sound metal surface.
 - .2 Apply one coat of rust inhibitive paint over prepared surface at the rate of 6 m²/litre (250 ft²/gal).

3.3 AIR BARRIER

- .1 Apply primer and install on to substrate, overlapping side and end laps in conformance with manufacturer's written recommendations. Begin work at bottom of slopes, unroll and align on substrate. Ensure all edges are supported.
- .2 Remove release sheet and adhere membrane, working in sections to avoid wrinkles in membrane.
- .3 Seal membrane at insulation perimeters and around penetrations to ensure sealed connections with base sheet at upstands.
- .4 Sprayed in Place Foam:

- .1 Fill all cavities and joints with foam according to manufacturer's directions.

3.4 VAPOUR RETARDER

.1 Self-Adhering Membrane

- .1 Apply primer and install on to substrate, overlapping side and end laps in conformance with manufacturer's written recommendations. Begin work at bottom of slopes, unroll and align on substrate. Ensure all edges are supported.
- .2 Remove release sheet and adhere membrane, working in sections to avoid wrinkles in membrane.
- .3 Seal membrane at insulation perimeters and around penetrations to ensure sealed connections with base sheet at upstands.

3.5 INSULATION

.1 NB: Adhered with Low Rise Foam Insulation Adhesive

- .1 Firmly butt each insulation board to surrounding boards. Do not jam or deform owners.
- .2 Minimize elevation variation between boards at joints to provide level surface to accommodate subsequent roofing.
- .3 Stagger joints at least 150mm (6 inches).
- .4 Leave no voids at blocking, penetrations, walls, or parapets.
- .5 At all drains and scuppers slope insulation for a radius of 1200 mm (48 inches) to ensure positive drainage.
- .6 Adhere insulation into ribbons of low rise foam insulation adhesive in ½" to ¾" beads approximately 12" o.c.
- .7 Immediately after placement, walk insulation boards into adhesive to achieve solid contact.

3.6 COLD APPLIED BUR

.1 Three Ply – Cold

- .1 Starting at the low point of the Roof, install three (3) plies of ply sheet, shingle fashion. Overlap starter strips 660 mm (26 inches) with first ply, then overlap each succeeding ply 625 mm (24 2/3 inches). Place ply sheets to ensure water will flow over or parallel to; but never against exposed edges.
- .2 Embed into Cold Process Adhesive, 300, 600 and 900 mm (12, 24 and 36 inch) wide plies to start and finish roof membrane along roof edges and terminations.
- .3 Solidly coat each ply of felt for the full width with Cold Process Adhesive. Immediately after installation, broom and/or roll ply sheet. Ensure complete and continuous seal and contact between adhesive and felts, including ends, edges and laps without wrinkles, fish mouths, or blisters.
- .4 Extend all plies to the top edge of all cant strips and cut off evenly.
- .5 Apply uniform and continuous pressure to exposed edge and end laps to ensure complete adhesion.

- .6 Avoid walking on plies until adhesive has set.
- .7 Overlap previous days' work 600 mm (24 inches) as required.
- .8 Cut out fishmouths/side laps which are not completely sealed and patch. Replace all sheets which are not fully and continuously bonded.
- .9 Lap ply membrane ends 150 (6 inches). Stagger end laps 1 metre (3 feet) minimum.
- .10 Adhesive application rate: Minimum 1.0 Litres/Sq. Metre (2.5 Gals per 100 Sq. ft).

3.7 TEMPORARY WATERSTOP/TIE-INS

- .1 Remove embedded gravel, dirt and debris from top ply of felt along termination for a distance of 450 mm (18 inches).
- .2 Extend roofing system at least 300 mm (12 inches) onto prepared area installing insulation fillers as required.
- .3 Seal edge with 150 mm (6 inch) wide reinforcing membrane embedded between alternate courses of temporary waterstop adhesive.
- .4 At beginning of next day's work, remove temporary connection by cutting felts evenly along edge of existing roof system and remove insulation fillers.
- .5 Temporary waterstop adhesive application rate:
 - .1 Cold 3.3 l/m² (12 ft²/gallon)

3.8 PERMANENT WATERSTOP/TIE-INS

- .1 Remove embedded gravel, dirt and debris from top ply of felt along termination for a distance of 450 mm (18 inches).
- .2 Install 450 mm (18 inch) wide ply sheet(s) from exposed deck to the existing roofing with a continuous application of permanent waterstop adhesive.
- .3 Extend roofing system beyond permanent waterstop ply sheet and at least 300 mm (12 inches) onto prepared area of adjacent roofing.
- .4 Seal leading edge of new membrane with 300 mm (12 inch) wide reinforcing membrane embedded between alternate courses of flashing adhesive.
- .5 Permanent waterstop adhesive application rate:
 - .1 Cold Adhesive 3.3 l/m² (12 ft²/gallon)

3.9 FLASHINGS

- .1 Curb Details - Elastomeric Sheeting:
 - .1 Adhere sheeting completely to horizontal and vertical blocking surfaces with flashing adhesive. Press sheeting into adhesive. Ensure complete bond and continuity without wrinkles or voids.
 - .2 Sheeting width: Sufficient to extend from 50 mm (2 inches) down inside face of curb down onto adjacent roofing 150 mm (6 inches), minimum. Mechanically fasten sheeting on inside face of curb.

- .3 Lap sheeting ends 100 mm (4 inches); and adhere with flashing adhesive.
- .4 Overcoat lap edges with end lap stripping adhesive and membrane.
- .5 Tie in leading edge of sheeting with stripping ply membrane embedded between alternate continuous courses of stripping ply adhesive.
- .2 Pitch pans:
 - .1 Apply 1.5 mm (1/16 inch) uniform layer of flashing adhesive to surface receiving metal flange.
 - .2 Install pre-manufactured pitch pan into adhesive. Prime flange prior to installation.
 - .3 Pitch pans shall be a 24-gauge galvanised steel, a minimum 100 mm (4 inches) high. There shall be at least 50 mm (2 inches) clearance between the projection and side wall.
 - .4 Adhere elastomeric sheeting completely to flashing surface with flashing adhesive. Cover flange completely. Extend flashing at least 100mm (4 inches) onto adjacent roofing. Ensure complete bond and continuity without wrinkles and voids. Lap sheeting ends 100mm (inches).
 - .5 Overcoat lap edges with end lap stripping adhesive and membrane.
 - .6 Tie in leading edge of sheeting with stripping ply membrane embedded between alternate courses of stripping ply adhesive.
 - .7 Fill pitch pan 25 mm (1 inch) from top with pitch pan base filler.
 - .8 Fill remainder with pitch pan topping mastic. The mastic shall be crowned in order to ensure water run-off.
 - .9 Install metal cap and caulk opening.
- .3 At piping through roof boxes
 - .1 Install wood blocking.
 - .2 Fabricate and install two-piece pipe box. The bottom portion shall be fabricated with 100 mm (4 inch) flange. The top section shall be notched to fit over piping. Openings shall be a minimum 200 mm (8 inches) above the roof surface.
 - .3 Set flange in mastic, nail flange to wood blocking 75 mm (3 inches) o.c. Prime flange.
 - .4 Fill box interior with batt insulation.
 - .5 Fasten top and closure detail to bottom.
 - .6 Wipe clean metal surfaces of box and piping with metal cleaner. Prime metal with metal primer. Caulk joint between box and piping. Tool neatly.
 - .7 Install elastomeric sheeting with flashing adhesive and membrane.
 - .8 Flashing detail shall conform to drawing entitled, Piping Through Roof Deck.
 - .9 Overcoat lap edges with end lap stripping adhesive and membrane.
 - .10 Tie in leading edge of sheeting with stripping ply membrane embedded between alternate courses of stripping ply adhesive.

3.10 METAL FLASHINGS

- .1 Installation of metal flashing shall be in accordance with the metal flashing section of the Canadian Roofing Contractors' Association (CRCA) manual.

3.11 SURFACING APPLICATION

- .1 Gravel Finish
 - .1 Prior to application of surface treatment system, contractor shall inspect roof with manufacturer's representative.
 - .2 Ensure surface is clean and dry. Flood coat the entire roof with specified flood coat bitumen at the rate of 6 gallons per square (cold adhesive) or 60 lbs. per square
 - .3 Immediately broadcast minimum 25 kg per sq. metre (500 lbs. per 100 sq. ft.) of new, clean, dry roofing gravel. Cover flood coat material completely.
 - .4 Rake out gravel to provide a neat even surface.

3.12 CLEANING

- .1 Refer to Section 01 74 00.
- .2 Clean drains of debris, ensuring free drainage.
- .3 Clean adjacent roof surfaces, levels and ground level areas of debris and excess Products.

3.13 PROTECTION

- .1 Adequately protect Products and work from damage by weather, traffic and other causes.
- .2 At the end of each Working Day, seal exposed edges of roofing membrane to be watertight.
- .3 Protect adjacent Work from damage. Repair damage.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with Instructions to Bidders, the General Conditions of the Contract as amended by the Supplementary Conditions including all Sections outlined in Division 00 – Procurement and Contracting Requirements and Division 01 - General Requirements.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 SUMMARY

- .1 Section includes: Provide all articles, labour, materials, equipment, transportation, hoisting and incidentals noted, specified or required to complete the work of this Section, including but not limited to the following:
 - .1 Prefinished metal (steel) flashings and trims
 - .2 Non-shrink grout
- .2 Related sections: The following is included for reference only and shall not be presumed complete:
 - .1 Section 06 10 00 – Rough Carpentry
 - .2 Section 07 92 00 – Joint Sealants
 - .3 Division 23 – Heating, Ventilation and Air Conditioning

1.3 REFERENCES

- .1 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction.
 - .1 The Aluminum Association Inc. (AAI)
 - (1) AA Aluminum Design Manual - Part VIII Guidelines for Aluminum Sheet Metal Work in Building Construction.
 - (2) AAI DAF45 - Designation System for Aluminum Finishes.
 - .2 American Architectural Manufacturers Association (AAMA)
 - (1) AAMA 611 - Voluntary Specifications for Anodized Architectural Aluminum.
 - (2) AAMA 621 - Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Substrates.
 - (3) AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
 - (4) AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
 - (5) AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

- .3 American National Standards Institute (ANSI)
 - (1) ANSI/SPRI/FM 4435/ES-1, Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems, latest edition.
- .4 ASTM International
 - (1) ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - (2) ASTM A606/A606M - Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
 - (3) ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - (4) ASTM A755/A755M - Standard Specification for Steel Sheet, Metallic coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
 - (5) ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - (6) ASTM B32 - Standard Specification for Solder Metal.
 - (7) ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - (8) ASTM B 370 - Standard Specification for Copper Sheet and Strip for Building Construction.
 - (9) ASTM D 523 - Standard Test Method for Specular Gloss.
 - (10) ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
 - (11) ASTM D4587 - Standard Practice for Fluorescent UV-Condensation Exposures of Paint and Related Coatings.
 - (12) ASTM F1667 – Standard Specification for Driven Fasteners: Nails, Spikes and Staples.
- .5 Canadian General Standards Board (CGSB)
 - (1) CAN/CGSB-51.32 – Sheathing, Membrane, Breather Type.
- .6 Canadian Roofing Contractors Association (CRCA)
 - (1) Roofing Specifications Manual, latest edition.
- .7 Canadian Sheet Steel Building Institute (CSSBI)
 - (1) CSSBI S8 – Quality and Performance Specification for Prefinished Sheet Steel Used for Building Products.
 - (2) CSSBI B17 – Barrier Series Prefinished Steel Sheet: Product Performance & Applications.
 - (3) CSSBI Sheet Steel Facts #12 – Fastener Guide for Sheet Steel Building Products.
- .8 Canadian Standards Association (CSA):
 - (1) CSA A123.3 – Asphalt Saturated Organic Roofing Felt.
 - (2) CSA A123.22 – Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- .9 Sheet Metal and Air Conditioning Contractors Association of North America (SMACNA)
 - (1) Architectural Sheet Metal Manual, latest edition.

1.4 SUBMITTALS

- .1 Submittals under this Section shall be in accordance with Section 01 33 00.

.2 Shop Drawings:

.1 Submit shop drawings including the following:

- (1) Plans, elevations, sections, and attachment details.
- (2) Detail fabrication and installation layouts, expansion-joint locations, and key details. Distinguish between shop and field assembled work.
- (3) Include identification of material, thickness, weight, and finish for each item and location in the work.
- (4) Include details for forming, including profiles, shapes, seams, and dimensions.
- (5) Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
- (6) Include details of termination points and assemblies.
- (7) Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contracting from fixed points.
- (8) Include details of roof penetrations flashing.
- (9) Include details of edge conditions, including crickets, and counter flashings as applicable.
- (10) Include details of special conditions.
- (11) Include details of connections to adjoining work.

.3 Samples:

- .1 Submit full-size samples of each specified flashing material formed to detailed profile including corner, curb, cap, and parapet flashing, and coping including lock- joints and hold-down clips.
- .2 Submit 2 - 50 mm x 50 mm (2" x 2") samples of each type of sheet metal material, colour and finish.

1.5 QUALITY ASSURANCE

.1 Qualifications:

- .1 Installers: Provide work of this section, executed by competent installers with experience in application of Products, systems and assemblies specified and with approval of Product manufacturers.

(1) Sealant shall be applied by a Subcontractor of recognized standing, having experience in this type of work, and who has the necessary equipment and skilled mechanics to carry out the work of this section satisfactorily and can substantiate this to satisfaction of Consultant.

.2 Quality standards:

- .1 Quality of fabrication and installation of sheet metal work shall comply with recommendations published by National Roofing Contractors Association.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials of this Section in accordance with Section 01 61 00.
- .2 Keep materials and equipment free from debris, ice, snow and contaminants. Allow air to circulate around metal components, sheets and break shapes.
- .3 Protect holes, and reglets from water and ice during freezing weather.

2 PRODUCTS

2.1 PERFORMANCE/DESIGN CRITERIA

- .1 Design members to withstand wind loads as calculated in accordance with the building code to maximum allowable deflection without permanent deformation.

2.2 MATERIALS

- .1 Sheet steel: Commercial quality to ASTM A653/A653M-11 with Z275 designation zinc coating.
 - .1 Minimum thickness: 0.61 mm (0.0239") (24 gauge).
- .2 Flexible flashing membrane; high temperature grade for use at locations where membrane is not protected by insulation:
 - .1 Description:
 - (1) Thickness: 0.76 mm (30 mils) minimum.
 - (2) Self-adhesive grade rubberized membrane backed by high density polyethylene.
 - (3) Primer for substrate.
 - (4) High temperature grade to resist softening at 105°C minimum.
 - .2 Acceptable Products:
 - (1) Bakor 'Blueskin PE 200 HT'.
 - (2) Firestone 'Clad-Gard SA'.
 - (3) Grace 'Ultra'.
 - (4) Soprema 'LASTOBOND SHIELD HT'.
- .3 Non-shrink grout:
 - .1 Cementitious Grout: CSA-A23.1/A23.2.
 - (1) Portland Cement: CSA-A3001, Type [GU].
 - (2) Grout Aggregate: CSA-A3001, standard type.
 - (3) Non-Shrink Admixture: as per manufacturer.
 - (4) Substrate Bonding Agent: Latex type.
 - (5) Water: Clean and potable.
 - .2 Grout Mixing and Testing:
 - (1) Thoroughly mix grout ingredients in quantities needed for immediate use.
 - (2) Add admixtures to manufacturer's written instructions; mix uniformly.
 - (3) Do not use anti-freeze compounds to lower the freezing point of grout.
 - (4) Testing of Grout Mix: ASTM C942 for compressive strength and ASTM C882 for bond strength.
 - .3 Acceptable Products:
 - (1) Mapei 'Planigrout 712'.
 - (2) Equivalent by approved manufacturer.

2.3 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable NRCA Roofing Manual: Membrane Roof Systems 2011, details and as indicated.
- .2 Form pieces in 3048 mm (10 ft) maximum lengths. Make allowance for expansion at joints.
- .3 Sealed joints: Form non-expansion but movable joints in metal to accommodate sealant.
- .4 Expansion provisions: Form expansion joints of intermeshing hooked flanges, not less than 25.4 mm (1") deep, filled with silicone sealant concealed within joints.
 - .1 Joints that provide expansion and contraction capabilities should be located near the corners within approximately 610 mm (24") from each direction of the corner measured from the interior side.
- .5 Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" and by FMG Loss Prevention Data Sheet 1-49 for application, and of greater thickness of metal being secured.
- .6 Hem exposed edges on underside 12.7 mm (1/2"). Mitre and seal corners with sealant.
- .7 At parapets, provide 25.4 mm (1") minimum overlap between bottom of wood blocking or flashing anchorage support and edge of drip or termination of flashing.
- .8 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .9 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.
- .10 Provide 25.4 mm (1") gap between drip edges and wall finish material to redirect water runoff away from walls.
- .11 Provide 25.4 mm (1") minimum overlap between bottom of wood blocking or flashing anchorage support and edge of drip or termination of flashing.
- .12 Shop fabricate inside and outside corners.

2.4 PREFINISHED METAL FINISHES

- .1 Provide the following finish to exposed prefinished metal (steel/aluminum as applicable):
 - .1 Finish: Silicone polyester, with ceramic pigments and other select inorganic pigments, 2-coat system.
 - (1) Coating shall not crack, chip, or peel (lose adhesion) for twenty-five (25) years from date of application. This does not include minute fracturing that may occur during the normal fabrication process. Coating shall not chalk in excess of a number eight (No. 8) rating, in accordance with ASTM D4214-98 method D659 at any time for twenty (20) years from date of application; will not change colour more than five (5) Hunter ΔE units as determined by ASTM method D2244-02.
 - (2) Colour to later selection by Consultant from manufacturer's full range.
 - (3) Acceptable Products:
 - .1 ArcelorMittal Dofasco 'Perspectra Series'.
 - .2 Firestone Metal Products (SMP or Kynar).
 - .3 Valspar 'WeatherX'.

2.5 ACCESSORIES

- .1 Isolation coating: to CAN/CGSB-1.108, bituminous type.
- .2 Sealants: in accordance with Section 07 92 00, colour as selected by Consultant from manufacturer's full range.
- .3 Cleats: of matching metal to flashing material, continuous, and of greater thickness than flashing material. Joints in cleats shall not coincide with joints in perimeter edge metal. Allow a 12.7 mm (1/2") gap between pieces.
- .4 Fasteners:
 - .1 Screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
 - .2 General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head:
 - (1) Exposed screws: 38 mm (1-1/2") long minimum at 450 mm (18") on centre maximum. Heads matching colour of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM washer under heads of exposed fasteners.
 - (2) Blind fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - (3) Cleat fasteners: Corrosion-resistant barbed angular ring or screw shank nail; length to achieve approximately 32 mm (1-1/4") penetration into nailer; fasten at 150 mm (6") on centre.
 - .3 Fasteners for prefinished aluminum sheet: Aluminum or Series 300 stainless steel.
 - .4 Fasteners for prefinished galvanized steel sheet: Series 300 stainless steel or hot dip galvanized steel to ASTM A153/A153M-09 and ASTM A653/A653M-11 Class G185.
 - .5 Fasteners and plates to meet the requirements of FM 4470-12 for wind uplift and corrosion resistance.

3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions:
 - .1 Examine all work of other Sections upon which the Work of this Section depends.
 - .2 Report in writing to the Consultant any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work of this Section.
 - .3 Do not proceed with Work of this Section until all unsatisfactory conditions have been rectified and site conditions are ready to receive work.
 - .4 Commencement of work implies acceptance of existing conditions and work by others.

3.2 INSTALLATION

- .1 Install Work of this Section in compliance with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

- .2 Use concealed fasteners except where approved before installation.
- .3 Flexible Flashing Underlayment Installation:
 - .1 Apply primer to concrete masonry and precast concrete substrates.
 - .2 Install in a consecutive weatherboard method starting at bottom or base of wall and working up.
 - .3 Provide minimum of 100 mm (4") side laps and 75 mm (3") end laps.
 - .4 Cut to manageable lengths, position membrane for alignment, remove protective poly-film and firmly apply pressure to assure adhesion.
 - .5 Eliminate wrinkles or gaps, roll entire membrane surface (including seams) with a counter top or "J-roller" to ensure full contact and adhesion.
 - .6 Seal membrane terminations, heads of mechanical fasteners, masonry tie fasteners, around penetrations, duct work, electrical and other apparatus extending through the air barrier membrane and around the perimeter edge of membrane terminations.
 - .7 Flashing membrane shall be applied in weatherboard fashion starting at bottom of base of wall and working up, in and around the full perimeter of openings, to provide water tight protection and according to the following procedures:
 - (1) Apply the first strip horizontally immediately below the sill, cut it sufficiently long to extend past each side of the window, so that it projects even with the vertical jamb flashing to be applied later. Turn sill flashing up 50 mm (2") at ends of sill.
 - (2) Sill flashing shall overlap wall membrane. Overlap jamb at head flashing membrane in the same manner.
- .4 Roof Flashing Installation
 - .1 Install sheet metal work in accordance with applicable NRCA Roofing Manual: Membrane Roof Systems 2011, details and as indicated.
 - .2 Provide watertight flashing installing capable of resisting specified uplift pressures in accordance with roofing specifications, thermally induced movement and exposure to weather.
 - .3 Provide minimum 10% slope for drainage towards roof at parapet locations, with minimum 2% sloped to drain at remaining flashing locations.
 - .4 Provide continuous cleats for attachment of flashings at exterior face of wall and cleats for interior face of wall.
 - .5 Provide radius (3-piece) copings for curved wall condition unless otherwise indicated.
 - .6 Prefabricate corner copings in 610 mm (24") x 610 mm (24") sections.
 - .7 Concealed fastenings and cleats, from view except where exposed flashings are accepted by Consultant prior to installation.
 - .8 Install surface mounted flared joint true and level, and caulk top of reglet with sealant at reglets.
 - .9 Insert metal flashings to other materials and flashings to form weather-tight junction.
 - .10 Provide prefinished metal flashing over equipment curbs which are covered with roofing membrane.

.11 Expansion provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 3048 mm (10 ft) and provide uniform joint spacing with no joints allowed within 610 mm (24") of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 25.4 mm (1") deep, filled with sealant concealed within joints.

.5 Wall Flashing Installation

.1 General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to NRCA recommendations and as indicated. Through-wall flashing: Installation of through-wall flashing is specified in Division 4.

.6 Installation of Roof Accessories

.1 Incorporate devices to which roofing and flashing may be secured.

.2 Install work to ensure that roofing and flashings will be properly applied to maintain building envelope weather-tight.

.7 Tolerances:

.1 Installation tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 6 mm in 6 m (1/4 inch in 20 feet) on slope and location lines as indicated and within 3.2 mm (1/8") offset of adjoining faces and of alignment of matching profiles.

3.3 SITE QUALITY CONTROL

.1 Non-Conforming Work:

.1 Defective materials or quality of work, whenever found, at any time prior to acceptance of the work, shall be rejected regardless of previous inspection. Inspection will not relieve responsibility but is a precaution against oversight or errors.

.2 Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to the satisfaction of the Consultant at no additional cost to the Owner.

3.4 CLEANING

.1 Clean work area daily in accordance with Section 01 74 00.

.2 Remove all excess materials from site as Work proceeds and at completion.

.3 On completion of the Work remove all tools, containers, surplus materials, equipment, waste, etc., and leave Site neat, clean and tidy to the satisfaction of the Owner.

.4 Remove deposits, stains or protections and wash metals left unpainted and exposed to view as recommended by manufacturer of metal or paint finish.

.5 Clean and make good surfaces soiled or otherwise damaged as a result of Work of this Section at no additional cost to the Owner.

.6 Leave surfaces clean and ready for subsequent Work.

3.5 PROTECTION

- .1 Protect Work of this Section during remaining construction to ensure that work will be left without damage or deterioration other than natural weathering.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 1.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 SECTION INCLUDES

- .1 Firestopping, smoke seals and accessories.

1.3 RELATED SECTIONS

- .1 Section 04 20 00 - Unit Masonry: penetrations in rated masonry assemblies.
- .2 Section 07 92 00 - Joint Sealants: non-rated joint sealants.
- .3 Section 09 21 16 - Gypsum Board Assemblies: penetrations in rated gypsum board assemblies.
- .4 Section 23 33 16 – Fire Dampers
- .5 Section 26 01 13 – Electrical Contract General Requirements

1.4 REFERENCES

- .1 ASTM E84-05: Standard Test Method for Surface Burning Characteristics of Building Materials.
- .2 ASTM E119-05a: Standard Test Methods for Fire Tests of Building Construction and Materials.
- .3 ASTM E814-02: Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
- .4 ASTM E2174-04: Standard Practice for On-Site Inspection of Installed Fire Stops.
- .5 CAN/CGSB-19.13-M87: Sealing Compound, One Component, Elastomeric, Chemical Curing.
- .6 CAN/CGSB-19.24-M90: Multicomponent, Chemical Curing Sealing Compound.
- .7 CAN/ULC-S102-03: Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .8 ULC-S115-95 (R2001): Standard Method of Fire Tests of Firestop Systems.
- .9 CAN/ULC-S702-97: Standard for Thermal Insulation, Mineral Fibre, for Buildings.
- .10 Underwriters' Laboratories of Canada: List of Equipment & Materials.

1.5 SYSTEM DESCRIPTION

- .1 Firestopping and smoke seals is a complete and integrated system. Bid as a separate work scope and include all firestopping and smoke seal requirements as specified herein and shown on the drawings.

- .2 Provide firestopping and smoke seals within mechanical (i.e., inside ducts, dampers) and electrical assemblies (i.e., inside bus ducts) as part of the work of Divisions 21, 22, 23, 25, 26, 27 and 28 respectively. Firestopping and smoke seals around the outside of such mechanical and electrical assemblies where they penetrate rated fire separations shall be part of the work of this Section.
- .3 Firestopping Materials: tested to ULC-S115 to achieve the required fire rating in accordance with ULC or Warnock Hersey Design Numbers.
- .4 Work of this Section comprises firestopping and smoke seal materials and systems to provide closures to fire and smoke at openings around penetrations, at unpenetrated openings, at projecting or recessed items, and at openings and joints within fire separations and assemblies having a fire-resistance rating, including openings and spaces at perimeter edge conditions.
- .5 Provide seals to form draft tight barriers to retard the passage of flame and smoke.
- .6 The installed seal shall provide and maintain a fire resistance rating equivalent to the rating of the adjacent floor, wall or other fire separation assembly to the requirements of and acceptable to the authorities having jurisdiction, and the Consultant.
- .7 ULC systems used must provide a flame, temperature in cable and cable tray penetrating and hose stream rating in accordance with those outlined in the applicable codes and provide an effective barrier against the passage of flame, smoke and gases.
- .8 All firestopping seals except for wall joints in visible areas must be of an easily identifiable colour, to be clearly distinguished from other building materials.
- .9 For firestopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control, use an elastomeric seal. Do not use a cementitious or rigid seal at such locations, unless penetrant is isolated by firestop pipe insulation or mechanical movement isolators.
- .10 Firestopping and smoke seals at joints and spaces designed and required to allow movement: A flexible, elastomeric seal suitable to withstand the required movement and capable of returning to original configuration without damage to the seal and without adhesive or cohesive failure; do not use a cementitious or rigid seal at building movement joints, sway joints, deflection spaces, control joints, expansion joints, and other such locations, unless used to minimize non-moving part of seal (i.e., firestop mortar deck flute fill).

1.6 SUBMITTALS

- .1 Submit Shop Drawings and Product data as specified in Section 01 33 00.
- .2 Product Data: sealant manufacturer's installation instructions and standard drawings, indicating ULC or WHI test designations.
- .3 Shop Drawings: Indicate sizes of openings, nature of penetrations, and tested method of firestop and smoke seal protection being proposed.
- .4 Shop Drawings are to be sealed, signed and dated by manufacturer's design engineer.
- .5 Submit shop drawings to Consultant and to the authority having jurisdiction for their review and approval.

1.7 CERTIFICATES

- .1 Submit certification as specified in Section 01 33 00.
- .2 Certificate: sealant manufacturer's letter of certification verifying that Products meet or exceed specified requirements.

1.8 TEST REPORTS

- .1 Submit test reports as specified in Section 01 33 00.
- .2 Test Reports: certified laboratory reports, indicating that Products proposed for use conform to ASTM E814 and ULC-S115, and are so classified by the Underwriter's Laboratories of Canada or Warnock-Hersey International.

1.9 QUALITY ASSURANCE

- .1 Manufacturer's Design Engineer: a registered professional engineer licensed to practice in the Place of the Work and having a minimum of 10 years documented experience designing firestop and smoke seal systems.
- .2 Applicator: approved and acceptable to sealant material manufacturer.
- .3 Firestopping compounds shall not contain volatile solvents or require special application to protect plastic pipe from firestopping compound.

1.10 PRE-INSTALLATION MEETING

- .1 Prior to commencement of firestopping, arrange and conduct a pre-installation meeting as specified in Section 01 31 00.
- .2 Pre-installation Meeting: discuss proposed methods and materials to be used in all instances.
- .3 Representatives of the Owner, Consultant, Contractor, installer, manufacturer and the authority having jurisdiction are to be in attendance.
- .4 Do not conduct meeting unless all identified parties are present.

1.11 MOCK-UPS

- .1 Construct job site mock-up as specified in Section 01 40 00.
- .2 Apply one sample seal on representative substrates on each site for each fire rating required at each type of wall, floor or roof construction.
- .3 Comply with project requirements as to thickness and density of application to achieve fire rating.
- .4 Proceed with installation only after Consultant has reviewed and accepted mock-up.
- .5 Acceptable mock-up may remain as part of the completed Work as standard.

1.12 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 61 00.

- .2 Deliver Products to the Place of the Work in their original unopened packages.
- .3 Store Products in an enclosed shelter, preventing damage to containers.

1.13 PROJECT CONDITIONS

- .1 Do not apply sealants when temperature of substrate material and surrounding air is below 5 degrees C (42 degrees F).
- .2 Maintain sealant at a minimum 18 degrees C (68 degrees F) for best workability.

2 PRODUCTS

2.1 MANUFACTURERS

- .1 Manufacturers of firestopping and smoke seals having Product considered acceptable for use:
 - .1 3M Canada
 - .2 Tremco
 - .3 A/D Fire Protection Systems Inc.
 - .4 Dow-Corning Canada Inc.
 - .5 Hilti Canada.
- .2 Substitution Procedures: refer to Section 01 25 00.

2.2 MATERIALS

- .1 Firestop Sealant, Type A: non-sag; asbestos-free; single component sealant composed of high temperature ceramic fibers and organic and silica binders; ULC labelled; to ULC-S115 and CAN/ULC-S102-M.
- .2 Firestop Sealant, Type B: three component; epoxidized polyurethane terpolymer; accommodating joint movement of +40/-25%; ULC labelled; to CAN/CGSB-19.24-M and ULC-S115.
- .3 Firestop Sealant, Type C: three component; self-levelling; chemically curing polyurethane sealant; ULC labelled; to ULC-S115.
- .4 Firestop Sealant, Type D: single component; low modulus; silicone rubber; moisture curing; ULC labelled; to CAN/CGSB-19.13-M and ULC-S115.
- .5 Firestop Sealant, Type E: single component; modified polyurethane; moisture curing; ULC labelled; to CAN/CGSB-19.13-M and ULC-S115.
- .6 Primer: as recommended by sealant manufacturer for specific material, substrate and end use.
- .7 Firestop Insulation: to CAN/ULC-S702, Type 2; mineral fibre manufactured from rock or slag, suitable for manual application:
 - .1 Density: 72 kg/m³ when tested to ASTM C303.
 - .2 Combustibility: Noncombustible to CAN/ULC-S114.

- .3 Melt Temperature: greater than 1,175 degrees C (2,385 degrees F).
- .4 Surface Burning Characteristics: to CAN/ULC-S102, maximum flame spread of 0, smoke developed of 0.
- .5 Moisture Sorption: 0.04 percent when tested to ASTM C1104.
- .6 Smoulder Resistance: 0.01 percent when tested to CAN/ULC-S129.

2.3 COMPONENTS

- .1 Provide firestopping and smoke sealing systems to ULC-S115 and as described below:
 - .1 Asbestos free materials and systems fully capable of maintaining an effective barrier against gases, flame and smoke in compliance with ULC-S115, not exceeding opening sizes stated.
 - .2 Service Penetration Assemblies: certified by ULC-S115 and used by ULC Guide 40 U19. Service components listed as certified in this guide are noted under Label Service of ULC.
 - .3 Fire resistance rating of fire stopping material assembly must meet or exceed the fire resistance rating of the floor or wall section being penetrated.
 - .4 Firestopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal; do not use a cementitious or rigid seal at such locations.
 - .5 Damming and back up materials, supports and anchoring devices shall be to manufacturer's recommendations, and in strict accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
 - .6 Sealants: non-sagging type for vertical joints.

3 EXECUTION

3.1 EXAMINATION

- .1 Confirm compatibility of surfaces to receive sealant materials.
- .2 Verify that surfaces of openings are sound, clean, dry, and ready to receive application of sealant.
- .3 Verify that penetration elements are securely fixed and properly located.
- .4 Commencement of installation means acceptance of existing conditions.

3.2 PREPARATION

- .1 Protect adjacent surfaces and equipment from damage.
- .2 Clean contact surfaces of dirt, dust, grease, oil, loose material, or other matter that may affect bond of sealant.
- .3 Remove incompatible materials that affect bond by scraping, brushing, water or solvent cleaning, or sandblasting.

3.3 PENETRATION SIZING

- .1 The following shall regulate sizing of service penetrations to be fire stopped, in an effort to standardize and minimize penetration sizes:
 - .1 Sleeve single, circular penetrations except in fire rated gypsum wallboard, under work of mechanical and electrical Subcontractors.
 - .2 Multiple penetrations of circular elements are defined as more than one circular penetration having a maximum space of 100 mm (4") between closest faces of such penetrating elements. Forming of such multiple penetrations is responsibility of respective sections whose service penetrates the rated assembly, and such formed opening shall be a square or rectangular frame around a group of penetrations in which maximum clearance between outer penetration element and face of opening shall be 25 mm (1"). This also applies to single circular penetrations in fire rated gypsum wallboard. Fire rated pipe insulation, where applied is to be considered penetrant requiring above mentioned amounts.
 - .3 Square penetrations shall be created in same manner as the above mentioned multiple circular penetrations, but the edge clearance may be increased to maximum 50 mm (2").
 - .4 Exception: At fire dampers, clearances are governed by testing authorities' requirements.

3.4 APPLICATION

- .1 Install mineral fibre insulation in compacted thicknesses required by ULC design. Compress insulation approximately 33 percent.
- .2 Apply sealant in strict accordance with manufacturer's instructions and ULC certification.
- .3 Coordinate and cooperate with adjacent, contiguous and related materials trades, such as concrete, drywall, plumbing, conduit, electrical wiring, communication systems, etc., to ensure a proper and timely installation.
- .4 Seal holes or voids made by penetrating items to ensure an effective fire and smoke barrier.
- .5 Seal all intersections and all penetrations of floors, ceilings, walls and columns.
- .6 Seal around all cutouts for lights, cabinets, pipes and plumbing, ducts, electrical boxes, etc.
- .7 Wrap non-insulated heated pipes that may be subject to movement with a non-combustible smooth material to permit the pipe to move without damaging the firestopping and smoke seal.
- .8 Maintain the integrity of any insulation and vapour retarders on insulated pipes and ducts at the fire separation.
- .9 Where floor openings exceed 100 mm (4") in width and may be subjected to traffic or loading, install cover plate systems capable of supporting same loading as floor.
- .10 Apply tags on each mechanical and electrical seal, either on penetrant(s), on seal or next to seal, at Subcontractor's option. Wall seals require tags on each side. Tag floor seals on the top only. Tags need not exceed 3 sq.in. in size but shall state seal number, installation date, installer's initial and the following text, "Firestop system not to be severed unless prepared to repair immediately".

3.5 FIELD QUALITY CONTROL

- .1 Perform field testing and inspection as specified in Section 01 45 00.
- .2 Conduct inspections to ASTM E2174.
- .3 Examine finished penetrations to ensure proper installation before concealing or enclosing any areas of work.
- .4 Keep areas of work accessible until inspection has been completed.
- .5 Manufacturer's Field Service: inspect to verify and confirm that systems installation is in strict accordance with manufacturer's and ULC requirements.
- .6 Correct unacceptable work and provide further inspection to verify compliance with requirements.

3.6 CLEANING

- .1 Immediately remove all spots, smears, stains, residues, adhesives, etc., from the work of this Section and from upon adjacent areas or surfaces which resulted from the work of this Section.
- .2 Upon completion of firestopping, remove debris, trash, containers, residue, remnants and scraps from the Place of the Work.
- .3 Cleaning to be free of volatile solvents. Leave the Work in a clean and satisfactory condition.

3.7 PROTECTION

- .1 After installation, and until Owner occupancy, protect the rated firestop systems from damage.
- .2 Remove damaged materials and replace with new, undamaged Product, at no additional cost to Owner.

3.8 SCHEDULES

| LOCATION | FIRE RATING | ULC ASSEMBLY |
|-------------------------------------|-------------|-------------------------------|
| 1. Main floor lobby walls | 1 hours | SP325, SP326, SP383, SP196 |
| 2. Stair and service core perimeter | 1 hours | |
| 3. Floor to floor assembly | 1 hours | |

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 1.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 SECTION INCLUDES

- .1 Joint Sealants.

1.3 RELATED SECTIONS

- .1 Section 04 20 00 - Unit Masonry: sealants used in conjunction with masonry.
- .2 Section 06 20 00 – Finish Carpentry
- .3 Section 06 40 00 - Architectural Woodwork: sealants used in conjunction with counters and casework.
- .4 Section 07 84 00 - Firestopping: firestop sealants.
- .5 Section 08 11 00 – Metal Doors and Frames: sealants used in conjunction with hollow metal frames.
- .6 Section 08 51 13 – Aluminum Windows: sealants used in conjunction with window frames.
- .7 Section 08 80 00 – Glazing: sealants used in conjunction with glazing methods.
- .8 Section 09 21 16 - Gypsum Board Assemblies
- .9 Section 09 51 00 - Acoustical Ceilings: sealants used in conjunction with suspended metal ceiling systems.

1.4 REFERENCES

- .1 ASTM C920-05: Standard Specification for Elastomeric Joint Sealants.
- .2 CAN/CGSB-19.13-M87: Sealing Compound, One Component, Elastomeric, Chemical Curing.
- .3 CAN/CGSB-19.17-M90: One Component Acrylic Emulsion Base Sealing Compound.
- .4 CAN/CGSB-19.22-M89: Mildew Resistant Sealing Compound for Tubs and Tiles.
- .5 CAN/CGSB-19.24-M90: Multicomponent, Chemical Curing Sealing Compound.

1.5 SYSTEM DESCRIPTION

- .1 Remove sealant from existing joints indicated and clean joints.

- .2 Seal all areas indicated on Drawings, in list following and where required to make building watertight and weathertight:
 - .1 Exterior and interior of masonry control joints. If these are not indicated assume 8000 mm (26'-0") on centres for full height of wall.
 - .2 Abutting masonry walls.
 - .3 Both sides of hollow metal frames.
 - .4 Interior and exterior of aluminum window and door frames.
 - .5 All pipes, grilles and equipment passing through walls.
 - .6 Joint where two different materials abut.
 - .7 Plumbing fixtures.

1.6 SUBMITTALS

- .1 Submit Product data and samples as specified in Section 01 33 00.
- .2 Submit manufacturers' test data as specified in Section 01 45 00.

1.7 QUALITY ASSURANCE

- .1 Applicator: a recognized specialized applicator having skilled mechanics, thoroughly trained and competent in all phases of caulking work, and a member in good standing of the Caulking Contractor's Association of Ontario.

1.8 PRE-CONSTRUCTION MEETING

- .1 Conduct a pre-construction meeting as specified in Section 01 31 00.
- .2 Representatives of the Consultant, Contractor, applicator, and sealant manufacturer(s) are to be in attendance.
- .3 Confirm prior to application that correct Products and methods are being used in specific instances.

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 61 00.
- .2 Deliver and store Products in undamaged and original containers, with labels intact and showing the manufacturer's name, brand, colour, etc.
- .3 Ensure at time of use that Products are still within recommended shelf life.
- .4 Maintain storage area at a temperature in accordance with manufacturer's recommendations.

1.10 ENVIRONMENTAL CONDITIONS

- .1 Do not install solvent curing sealants in enclosed building spaces.
- .2 Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.11 WARRANTY

- .1 Submit extended warranties in accordance with the General Conditions of the Contract.
- .2 Extended System Warranty: for a period of 2 years, including coverage against delamination, cracking, running, loss of adhesion and cohesion, blistering, peeling, colour change and staining.
- .3 Extended Manufacturer Warranty: for a period of 10 years, including coverage against failure of the sealant material to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, maintain stability, or not cure.

2 PRODUCTS

2.1 MANUFACTURERS

- .1 Manufacturers of joint sealants having Products considered acceptable for use:
 - .1 Canadian General Electric.
 - .2 CSL Silicones Inc.
 - .3 Dow Corning.
 - .4 PRC Chemicals.
 - .5 Sika Canada Inc.
 - .6 Tremco Canada.
- .2 Substitution Procedures: refer to Section 01 33 00.

2.2 MATERIALS

- .1 Sealant A: 2-part, polysulphide; CAN/CGSB-19.24-M, Type 2, Class B
- .2 Sealant B: (non-sag, for non-glazing) 2-part, polysulphide; CAN/CGSB-19.24-M, Type 2, Class A
- .3 Sealant C: (non-sag, for glazing) 1-part, acrylic emulsion latex CAN/CGSB-19.17-M.
- .4 Sealant D: 1-part, chemical curing, silicone CAN/CGSB-19.22-M
- .5 Sealant E: 1-part, moisture curing, polyurethane CAN/CGSB-19.13-M
- .6 Joints In Bathrooms, Laundries, Etc.
 - .1 Sealant: Mildew Resistant
 - (1) Silicone Sanitary Sealant (1702 Series) by Canadian General Electric.
 - (2) 786 by Dow Corning.
 - (3) Tremoil 600 by Tremco
- .7 Thinners and Primers: type compatible with appropriate sealant and substrate as recommended by manufacturer.
- .8 Cleaning material: As recommended by manufacturer.

- .9 Joint backing material: preformed, compressible, resilient, non-staining foam compatible with primers, sealants, outsize 30%, polyethylene, extruded closed cell foam, Shore "A" hardness 20, tensile strength 20-30 psi, such as PRC Backer Rod or equal. Outsize 50%, polyethylene, extruded open cell foam, Shore "A" hardness 10, tensile strength 140-150 psi, such as PRC open cell.
- .10 Bond breaker: where joint configuration does not allow for proper depth/width ratio with the use of backer rod (see Section 3.2.5.) - a pressure sensitive plastic tape such as 3M #226 or #481 which will not bond to the sealant shall be placed at the back of the joint.
- .11 Sealant Colours: as selected by Consultant from manufacturers' standard colour range.

3 EXECUTION

3.1 EXAMINATION

- .1 Report to the Consultant, in writing, defects of surfaces or work prepared by other trades and unsatisfactory site conditions.
- .2 Commencement of work implies total acceptance of surface and site conditions.
- .3 Thoroughly examine surfaces scheduled to receive sealants to ensure that they are dry, clean, level; free from cracks, ridges, dusting, scaling, carbonation, mortar droppings, parging, curing compounds, rust, grease, oil, paint, or other foreign material likely to impair adhesion, performance or appearance.
- .4 Test substrate for adhesion and staining if any doubt exists.
- .5 Verify at the site that joints and surfaces have been provided as specified under the work of other sections; and that joint conditions will not adversely affect execution, performance or quality of completed work; and that they can put into acceptable condition by means of preparation specified in this section.
- .6 Ascertain that sealers and coatings applied to sealant substrates are compatible with sealant used and that full bond between the sealant and substrate is attained.
- .7 Request samples of the sealed or coated substrate from their fabricators for testing of compatibility and bond if necessary.
- .8 Verify that specified environmental conditions are ensured before commencing work.
- .9 Ensure that releasing agents, coating or other treatments have either not been applied to joint surfaces or that they are entirely removed.
- .10 Defective work resulting from application to unsatisfactory joint conditions will be considered the responsibility of those performing the work of this section.
- .11 Protect adjacent Products from damage and make good any resulting damage in accordance with the Contract Documents.

3.2 PREPARATION

- .1 Remove dust, paint, loose mortar and other foreign matter and dry joint surfaces.
- .2 Remove dust, silt, scale, and coating from ferrous metals by wire brush, grinding or sandblasting.
- .3 Remove oil, grease, and other coating from non-ferrous metals.

- .4 Prepare concrete, masonry, glazed and vitreous surfaces as recommended by sealant manufacturer.
- .5 Examine joint sizes and modify to achieve proper width-to-depth ratio.
- .6 For joints wider than 50 mm (2"), contact sealant manufacturer's representative for recommendations.
- .7 Install backer rod or apply bond breaker tape to achieve correct joint configuration.
- .8 Where necessary to prevent staining, mask adjacent surfaces with tape prior to priming and application of sealant.
- .9 Prime sides of joint in accordance with manufacturer's directions, immediately prior to sealing.
- .10 Prior to application, test each sealant with proposed substrate for indications of staining or poor adhesion.
- .11 At locations where another surface will cover the sealed joint (e.g. cove base) ensure the sealant is finished flush with adjacent surfaces.

3.3 QUALITY OF WORK

- .1 Quality of work shall be in accordance with good practice and in strict compliance with the recommendations of the manufacturer of materials being used.
- .2 Check work area for adequate light and heat.
- .3 Carefully mask adjacent surfaces, materials and items not scheduled to receive sealant, taking care to see that masking remains intact until application is complete. Remove masking immediately upon completion of caulking.
- .4 Do not apply sealant to substrate until thoroughly cured and dried.

3.4 APPLICATION

- .1 Prime sides of joints before placing joint backing. Use bond breaker where joint backing not required.
- .2 Mix and apply sealant in strict accordance with manufacturer's directions and under supervision of manufacturer's field representative.
- .3 Sealants shall be of gun grade or knife grade consistency to suit joint condition.
- .4 Apply sealants in accordance with manufacturer's directions, using a gun with proper size nozzle. Use sufficient pressure to fill voids and joints solid, as indicated on Drawings.
- .5 Form surface of the sealant with full bead, smooth, free from ridges, wrinkles, sags, and embedded impurities. Neatly tool surface to a slight concave joint.
- .6 Clean adjacent surfaces immediately and leave work neat and clean. Remove excess and droppings using recommended cleaners as work progresses. Remove masking tape immediately after tooling of joints.
- .7 In masonry cavity construction with an air seal, vent sealed joints from cavity to beyond external face of wall.
- .8 Superficial pointing with the skin bead is not acceptable.

- .9 Provide test results of pull test performed by the manufacturer representative before completion of sealant work.
- .10 Promptly, as the work proceeds and upon completion, clean-up and remove from the Place of the Work masking tapes, rubbish and surplus material.

3.5 SCHEDULE

- .1 Sealant AE:
 - .1 Masonry to metal
 - .2 Masonry to masonry
 - .3 Masonry to stucco
 - .4 Masonry to wood
 - .5 Metal to metal
 - .6 Wood to stucco
- .2 Sealant B:
 - .1 Glass to all materials
- .3 Sealant C E:
 - .1 Gypsum board to gypsum board
 - .2 Gypsum board to wood
- .4 Sealant D:
 - .1 Plumbing fixtures to wall and floor surfaces

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 1.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 SECTION INCLUDES

- .1 Supply only of:
 - .1 Steel Frame Products including frames, transom frames (glazed or panelled), side light and window assemblies, fire labelled and non-labelled as indicated on drawings and door schedule.
 - .2 Steel doors, swing type, flush, glazed or louvred, fire labelled, with or without temperature rise ratings, and non-labelled as indicated on drawings and door schedule.
- .2 Provide:
 - .1 Steel frame products including frames, transom frames (glazed or panelled), sidelight and window assemblies, fire labelled and non-labelled as indicated on drawings and door schedule.

1.3 RELATED WORK NOT INCLUDED IN THIS SECTION

- .1 Section 04 20 00 – Unit Masonry: Building in and grouting frames into concrete unit masonry.
- .2 Section 06 20 00 – Finish Carpentry: Installation of frames, doors, surface mounted hardware and finishing hardware.
- .3 Section 07 92 00 – Joint Sealants: sealing joints between frames and other building components.
- .4 Section 08 70 00 – Hardware: Supply of finishing hardware.
- .5 Section 08 80 00 – Glazing.
- .6 Section 09 21 16 - Gypsum Board Assemblies: Gypsum board partitions.
- .7 Section 09 90 00 – Painting and Coating.

1.4 REFERENCES

- .1 ASTM A568/A568M-06a: Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
- .2 ASTM A653/A653M-03: Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .3 CAN/CGSB-1.181-99: Ready-Mixed Organic Zinc-Rich Coating.
- .4 CGSB 41-GP-19Ma: Rigid Vinyl Extrusions for Windows and Doors.

- .5 CAN/CSA-G40.21-04: Structural Quality Steel.
- .6 NFPA 80-1999: Fire Doors and Windows.
- .7 CAN4-S104-M80: Fire Tests of Door Assemblies.

1.5 REGULATORY REQUIREMENTS

- .1 Install fire labelled steel doors and frames products to NFPA 80.

1.6 SHOP DRAWINGS

- .1 Submit shop drawings as specified in Section 01 33 00.
- .2 Shop Drawings: indicating type of door, material, steel core thickness, mortises, reinforcements and glazed openings and details. Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and in door schedule.

1.7 QUALITY ASSURANCE

- .1 Supply material manufactured to standards of Canadian Steel Door and Frame Manufacturers Association (CSDFMA) "Canadian Metric Guide for Steel Doors and Frames" (Modular Construction).
- .2 Fire rated doors frames glazing stops and fire door hardware shall bear U.L.C. labels. Refer to architectural drawings for location of fire rated assemblies. All hollow metal work in fire separations and fire walls shall be in accordance with NFPA 80 and CAN4-S104.

1.8 REJECTIONS

- .1 Defective materials whenever found at any time prior to final acceptance of the work shall be rejected regardless of previous site review. Site review will not relieve Contractor from responsibility but is a precaution against oversight and error.
- .2 Remove and replace defective materials and work of other trades affected by this replacement at no additional cost to the Owner.

1.9 WARRANTY

- .1 Materials and quality of work shall be warranted by Manufacturer in accordance with the CSDFMA members standard warranty for steel doors and frames.

2 PRODUCTS

2.1 MATERIALS

- .1 Doors
 - .1 Acceptable Materials: All and only steel doors and frames product manufactured by CSDFMA members are eligible for use on this project.
 - .2 Minimum requirements for fire doors are that individual manufacturer's proprietary designs must be successfully tested to CAN4-S104-M.
 - .3 Fire Rated Doors assembly and fire rated glazing stops, material and construction approved by ULC.

- .4 Interior Door Faces: 1.2 mm (18 gauge) base thickness as Commercial grade steel to ASTM A568, Class 1, hot-dip galvanized to ASTM A653, ZF75 (A25) coating designation, known commercially as "Colourbond", "Satincoat" or "Galvanneal". Minimum base steel thickness shall be as per Table 1 / CSDFMA.
 - .5 Use Z275 (G90) fully galvanized door faces on door numbers indicated on door schedule.
 - .6 Cores for non-insulated interior doors: honeycomb structural core consisting of kraft paper having 20 mm (3/4") cell size to thickness indicated to ULC Guide 40U8.8.
- .2 Frames
- .1 Frames: 1.6 mm (16 gauge) base thickness steel, zinc wipe coated steel for interior door frames and fully galvanized to Z275 (G90) for exterior door frames.
 - .2 Frames shall be blanked, reinforced, drilled, and tapped for mortised, templated hardware minimum steel thickness.
 - .3 Mortised cutouts shall be protected with steel guard boxes minimum steel thickness 1.2 mm (18 Gauge).
 - .4 Frames shall be reinforced, where required, for surface mounted hardware. Drilling and Hardware reinforcing minimum steel thickness 3.5 mm (10 Gauge), tapping is by others on site, at time of installation.
 - .5 Provide for appropriate anchorage to floor and wall construction. Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb. For rebate opening heights up to and including 1520 mm (60") provide two anchors, and an additional anchor for each additional 760 mm (30") of height or fraction thereof, except as indicated below. Frames in previously placed concrete masonry or structural steel shall be provided with anchors located not more than 150 mm (6") from the top and bottom of each jamb, and intermediate anchors at 660 mm (26") on centre maximum. Minimum anchors steel thickness 1.6 mm (6 Gauge).
 - .6 Each door opening shall be prepared for single grey or black stud neoprene door silencers, three for single door openings, and two for double door openings.
 - .7 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
 - .8 Fire labelled frame products shall be provided for those openings requiring fire protection ratings, as scheduled on the drawings. Such products shall be tested to CAN4-S104-M, ASTM E152, or NFPA 252 and listed by a nationally recognized agency having a factory inspection service and shall be constructed as detailed in Follow-Up Service Procedures / Factory Inspection Manuals issued by the listing agency to individual manufacturers.
 - .9 Corrugated Steel Frame Tee Anchors: Thickness and design approved by ULC.
 - .10 Glazing Stops in Fire Rated Frames: Commercial grade 1.5 mm (16 Gauge) sheet steel thickness and ULC approved design. All approved design.
 - .11 Glazing Stops-Non-Fire Rated Doors and frames: Minimum 0.8 mm (20 gauge) base thickness sheet metal with zinc finish as per door, tamperproof on exterior doors, screw fixed on interior doors.

- .12 Reinforcing Channel: To CAN/CSA-G40.21, Type 300W.
- .13 Primer: For touch up, rust inhibiting primer to CAN/CGSB-1.181.
- .14 Specialty trims: "J" shaped electro-galvanized steel trims, to cover cut ends of concrete blocks where new doors cut into existing walls. Custom shape and size trims to suit door and wall conditions.

2.2 FABRICATION

- .1 Fabricate doors, panels, screens, and frames as detailed in accordance with Canadian Steel Door and Frame Manufacturers Association, "Specifications for Commercial Steel Doors and Frames", for insulated, hollow steel and honeycomb core construction, except where specified otherwise.
- .2 Fabricate fire rated doors and frames in accordance with details, approved shop drawings and ULC requirements at the time of printing.
- .3 Provide temperature rise doors where indicated in the door schedule, Doors shall have fire rated mineral cores as manufactured by RODIX or Georgian Pacific.
- .4 Stiffen interior doors with honeycomb core, laminated to face sheets under pressure. Insulate exterior doors, using manufacturer's recommended adhesive and pressure.
- .5 Fabricate interior doors and frames of wipe coat galvanized steel.
- .6 Fabricate interior steel frames in minimum thickness of 1.6 mm (16 gauge) thick sheet steel.
- .7 Grind welded corners and joints to flat plane, fill with metallic paste filler and sand to uniform smooth finish.
- .8 Close tops of exterior doors with steel caps in minimum thickness 1.6 mm (16 gauge) so they are flush with face edges. Close top of interior doors with PVC caps.
- .9 Mortise, reinforce, drill and tap doors and reinforcements to receive hardware using templates provided by finish hardware supplier.
- .10 Doors to have tack welded and filled seams, ground smooth. Tack weld 6 in. on centre.
- .11 Make provision for glass where indicated and provide glazing stops.
- .12 Provide astragals for pairs of doors in accordance with ULC requirements.
- .13 Protect strike and hinge reinforcements using guard boxes welded to frames.
- .14 Weld in two channel spreaders per frame, to ensure proper frame alignment.
- .15 Provide for anchorage of frames to floors. Provide 1.6 mm (16 gauge) angle clips, with two holes for floor anchorage welded to frame.
- .16 Reinforce head of frames wider than 1200 mm (4' - 0").
- .17 Provide frames with manufacturer's proprietary anchorage system suitable to secure frame rigidly to wall assembly. Secure frames set into previously constructed concrete or masonry openings by countersunk expansion bolts at same centres as for adjustable Tee-anchors. Reinforce frame at fastening location to prevent indentation of frame by fastening device.

- .18 Construct rail and stile doors in same manner as flush doors.
- .19 Construct matching panels in same manner as doors.
- .20 Chemically treat surfaces of plain steel doors and frames and apply one coat of primer.
- .21 Attach ULC labels to doors and frames requiring fire rating.
- .22 Install three (3) bumpers on strike jamb for each single door and two bumpers at head for pairs of doors.

3 EXECUTION

3.1 INSTALLATION

- .1 This part does not apply to this Section. Doors and frames shall be installed by Section 06 20 00.
- .2 Install fire rated frames, doors and fire door hardware to NFPA 80.

3.2 GLAZING INSTALLATION

- .1 Refer to Section 08 80 00 for glazing.

3.3 ADJUSTING AND CLEANING

- .1 Adjust operable parts for correct function.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 1.
- .2 Report in writing to the Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 SUMMARY

- .1 Section Includes:
 - .1 Provide all hardware as below:
 - (1) 51 butt hinges;
 - (2) 1 universal washroom kit
 - (3) 1 Closer
 - (4) 1 panic set
 - (5) 1 cylinder to be keyed the same as the classroom (for teachers closet in room 101)
 - (6) 6 passage locksets with occupancy indicator deadbolt (change rooms)
 - (7) 5 classroom locksets
 - (8) 9 overhead stops
 - .2 Provision of supply of Door Hardware (Finish Hardware) covered under the Finish Hardware Allowance - Section 01 21 01.
- .2 Related Sections:
 - .1 Section 06 20 00 – Finish Carpentry: Installation of hardware.

1.3 REFERENCES

- .1 CSA- Canadian Standards Association
- .2 NFPA- National Fire Protection Association
 - .1 NFPA 80 – Standard for Fire Doors and Fire Windows
- .3 ULC - Underwriters' Laboratories of Canada
 - .1 CAN4-S104 – Standard Method for Fire Tests of Door assemblies
 - .2 CAN4-S105 – Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104

1.4 SUBMITTALS

- .1 Templates: Upon award of Contract, furnish promptly to the applicable trades, any patterns, templates, template information and manufacturer's literature required to the proper preparation for the application of hardware, in ample time to facilitate the progress of the work.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials undamaged, in original wrappings or containers with manufacturer's labels and seals intact.
- .2 Pack finishing hardware for each floor, etc., where possible, in the same carton complete with all screws, expansion shields and necessary fittings for fixing same.
- .3 Clearly label cartons and packages designating contents and locations for which each item is intended. Indicate on packing memos carton in which each item is packed.

1.6 REJECTIONS

- .1 Defective materials or quality of work whenever found at any time prior to final acceptance of the work shall be rejected regardless of previous inspection. Inspection will not relieve responsibility but is a precaution against oversight and error.
- .2 Remove and replace defective materials and work of other trades affected by this replacement, at no additional cost to the Owner.

1.7 EXTRA MATERIALS

- .1 At the completion of the Work, supply Owner with the following:
 - .1 Two (2) sets of manufacturer's instructions for door closers, locksets, door holders and panic hardware.

2 PRODUCTS

2.1 MATERIALS

- .1 Provide new materials in perfect condition, free from defects impairing durability or appearance. In every case hardware shall be of quality design, and finish suitable for the purpose for which it is intended.
- .2 Fastenings
 - .1 Provide hardware complete with screws, bolts, expansion shields and other fastening devices as required for the satisfactory installation and operating of the hardware.
 - .2 Provide fastening devices of the same finish as the hardware which is to be fastened.
- .3 Keying
 - .1 Lay out the keying system for the building in consultation with the Consultant. Keying system shall include keying alike, keying differently, keying in groups, master keying and grand master keying locks as required.
 - .2 Keying chart and related explanatory data shall be prepared and submitted to the Consultant for his approval, and lock work shall not be commenced until written confirmation of keying arrangements is received from the Consultant.

2.2 SHOP FINISHES

- .1 Provide hardware of type and finish in accordance with, and equal in all respects to the samples of hardware and finishes approved by the Consultant.
- .2 Metal finishes shall be free from defects, clean and unstained, and of a uniform colour and finish for each type of finish required.

3 EXECUTION

3.1 ADJUSTING

- .1 The services of a competent mechanic shall be provided without additional cost to the Owner.
- .2 Mechanic: inspect the installation of all hardware furnished under this Section and supervise all adjustments (by the trades responsible for fixing) which are necessary to leave hardware in perfect working order.

3.2 DEMONSTRATION

- .1 Demonstrate proper care of hardware to Owner as specified in Section 01 77 01, including:
 - .1 lubrication of locksets,
 - .2 adjustments of door closers,
 - .3 cleaning, and
 - .4 general maintenance.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 1.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 SECTION INCLUDES

- .1 Supply and install automatic swing door operators as detailed on drawings. Co-ordinate installation and operation of new work with existing doors, frames, and controls such as card access system, to suit owners requirements and maintain continued public access to premises during work.

1.3 RELATED SECTIONS

- .1 Section 06 20 00 – Finish Carpentry: Installation of hardware for hollow metal and wood doors and frames.
- .2 Section 06 40 00 – Architectural Woodwork: Supply and Installation of hardware for millwork and casework.
- .3 Section 08 70 00 – Hardware: Supply of door hardware.
- .4 Section 26 05 19 – Wires and Cables
- .5 Section 26 05 33 –Conduits, Conduit Fastenings, and Conduit Fittings
- .6 Section 26 27 26– Wiring Devices

1.4 SUBMITTALS

- .1 Submit shop drawings as specified in Section 01 33 00, specifically provide the following:
- .2 Shop Drawings: showing assembly and installation details, methods and location of fastenings.

1.5 QUALITY ASSURANCE

- .1 Door operator shall be installed by manufacturer's authorized and trained personnel. The work shall be done in strict compliance with the manufacturer's recommendations.
- .2 Products will comply with UL listed standard 325, CSA standards and all OBC standards.

1.6 WARRANTY

- .1 Components shall be warranted to be free of defects in materials or workmanship under normal use for a period of two (2) years from the date of Substantial Performance. During the period of this warranty the manufacturer, will repair or replace any components or parts thereof found to be defective in material or workmanship if any necessary return charges are prepaid. Components repaired or replaced under this warranty are warranted only for the remainder of the period covered by this warranty.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials undamaged, in original wrappings or containers with manufacturer's labels and seals in tact.
- .2 Clearly label cartons and packages designating contents and locations for which each item is intended. Indicate on packing memos carton in which each item is packed.

1.8 REJECTIONS

- .1 Defective materials or quality of work whenever found at any time prior to final acceptance of the work shall be rejected regardless of previous inspection. Inspection will not relieve responsibility but is a precaution against oversight and error.
- .2 Remove and replace defective materials and work of other trades affected by this replacement, at no additional cost to the Owner.

1.9 EXTRA MATERIALS

- .1 At the completion of the Work, supply Owner with the following:
 - .1 Two (2) sets of wrenches.
 - .2 Two (2) sets of manufacturer's instructions.

2 PRODUCTS

2.1 AUTOMATIC SWING DOOR OPERATORS

- .1 Automatic swing door operators shall be "Power Swing", self contained, surface mounted system, as manufactured by Besam Inc. and supplied and installed by Hi-Techdoor Automation of Guelph, Ontario, (519) 824-5331.
- .2 Operator Housing: The operator shall be completely contained in a 150 x 150 mm (6" x 6") extruded aluminum housing. The housing shall extend across entire door opening. Where located on a leaf of a double door, it shall extend over both doors. All aluminum sections shall be of 6006-T6 alloy and shall have a minimum wall thickness of 4 mm (0.156"). All exposed surfaces shall be finished to match existing door frames. The operator housing shall provide a seal against dust, dirt and moisture. Operator housing shall extend the full width of the door frames.
- .3 Finish: Stainless Steel.
- .4 Electrical Motor: Electric motor shall be minimum 1/4 HP, 120 V and shall be equipped standard with a built in thermal overload protection and shall not exceed 5 Amps.
- .5 Operator Assembly: Operator shall be non-handed and the power transmission shall be servo unit type with one moving part. Helical/mesh or chain driven system will not be accepted.
- .6 Electric Control: A self-contained, 100% solid state integrated circuit shall control the operation and switching of the swing door power operator. The electronic control shall provide low voltage power supply for all means of operation. No external or auxiliary low voltage source shall be allowed. The control shall include time delay (adjustable between 1 to 60 seconds) for normal cycle. Plug-in relays, resistors, contacts, etc., will not be accepted.
- .7 Push Buttons: Large 100 mm diameter flush mount.

- .8 Function Switch: Provide keyed function switch located on door frame at 1500mm A.F.F. with the following set points:

- .1 Off: No power to operator or buttons.

2.2 OPERATION

- .1 Power Open: The automatic door operator shall be powered by a force transmitted by the electric motor to the servo unit and shall be connected by way of an adjustable arm linkage to the door. A constant opening pressure shall be maintained at all times. Both opening speed and backcheck must be individually adjustable. External/manual stops will not be accepted. The automatic door system shall function as a manual door closer in the event of a power failure, and allow for manual operation at all times, requiring no more than 5 - 7 pounds force on opening manually.
- .2 Spring Close: The automatic door operator shall be spring closed action. The spring shall be non-handed and designed to counter-act wind and stack conditions, and return the door to its fully closed position. Both closing speed and latching shall be individually adjustable, without the need to change resistors or any other components.
- .3 The automatic door system shall be self-contained, requiring no remote pumps or compressors. Pneumatic tubing will not be accepted.
- .4 Operator must be adjusted with sufficient backcheck to prevent wind from damaging the door.
- .5 Push and go feature will not be accepted.
- .6 Manual reset buttons will not be accepted.
- .7 Operator must be electro-hydraulic technology to ensure longer life with lower maintenance.

2.3 FASTENINGS

- .1 Provide hardware complete with screws, bolts, expansion shields and other fastening devices as required for the satisfactory installation and operating of the hardware.
- .2 Provide fastening devices of the same finish as the hardware that is to be fastened.

2.4 SHOP FINISHES

- .1 Provide hardware of type and finish in accordance with, and equal in all respects to the samples of hardware and finishes approved by the Consultant.
- .2 Metal finishes shall be free from defects, clean and unstained, and of a uniform colour and finish for each type of finish required.

3 EXECUTION

3.1 EXAMINATION

- .1 Verify that the openings are plumb and are dimensioned properly. Ensure adequate support has been provided for the operator header. Proceed with the installation only after conditions have been deemed satisfactory.

3.2 INSTALLATION

- .1 Install equipment in accordance with manufacturer's installation guidelines.

- .2 Adjust equipment to ANSI 156.10.
- .3 Refer to Division 26 for wiring, connections and installation standards. Provide wiring diagrams and schematics.

3.3 ADJUSTING

- .1 The services of a competent mechanic shall be provided without additional cost to the Owner.
- .2 Mechanic: inspect the installation of hardware furnished under this Section and supervise adjustments (by the trades responsible for fixing) which are necessary to leave hardware in perfect working order.

3.4 DEMONSTRATION

- .1 Demonstrate proper care of hardware to Owner as specified in Section 01 79 00, including:
 - .1 lubrication,
 - .2 adjustments,
 - .3 cleaning, and
 - .4 general maintenance.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions, and the General Requirements of Division 1.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 INTENT

- .1 Provide all articles, labour, materials, equipment, transportation, hoisting, and incidentals noted, specified or required, to complete the work of this Section.

1.3 SECTION INCLUDES

- .1 Provide all of the glazing materials and products indicated on the drawings and room finish schedule including but not limited to the following:
 - .1 Insulated Glazed Units
 - .2 Safety glass
 - .3 Fire rated glass
 - .4 Mirrors
 - .5 Glazing gasketry, sealants, tapes, vision strips
 - .6 Glazing compounds and glazing putty.

1.4 WORK INSTALLED IN THIS SECTION BUT FURNISHED BY OTHERS

- .1 All items required for glazing installation supplied by windows, door, and frame contractor.

1.5 REFERENCES

- .1 CAN/CGSB-12.1-M90: Tempered or Laminated Safety Glass
- .2 CAN/CGSB-12.3-M91: Flat, Clear Float Glass
- .3 ISO 25537:2008 Glass in Building – Silvered, Flat-Glass Mirror
- .4 CAN/CGSB-12.8-97: Insulating Glass Units
- .5 CAN/ULC-S106-15: Standard Method for Fire Tests of Window and Glass Block Assemblies
- .6 ANSI Z97.1: American National Standard for Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test
- .7 CAN/ULC-S104-15: Standard Method for Fire Tests of Door Assemblies

- .8 ASCE 7 – Minimum Design Loads for Buildings and Other Structures
- .9 ASTM C-162: Standard Terminology of Glass and Glass Products
- .10 ASTM C-1048: Standard Specification for Heat-Treated Flat Glass – Kind HS, Kind FT Coated and Uncoated Glass
- .11 ASTM C-1376: Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass
- .12 ASTM E-2188: Standard Test Method for Insulating Glass Unit Performance
- .13 ASTM E-2189: Standard Test Method for Testing Resistance to Fogging in Insulating Glass Units
- .14 ASTM E-2190: Standard Specification for Insulating Glass Unit Performance and Evaluation

1.6 REJECTIONS

- .1 Defective materials or quality of work whenever found at any time prior to final acceptance of the work shall be rejected regardless of previous inspection. Inspection will not relieve responsibility but is a precaution against oversight and error.
- .2 Remove and replace defective materials and work of other trades affected by this replacement, at no additional cost to the Owner.

1.7 WARRANTY

- .1 Manufacturer's Warranty for Coated-Glass Products: Manufacturer's standard form, made out to the glass fabricator, in which the coated glass manufacturer agrees to replace coated glass units that deteriorate during normal use within the specified warranty period. Deterioration of the coated glass is defined as peeling and/or cracking, or discoloration that is not attributed to glass breakage, seal failure, improper installation, or cleaning and maintenance that is contrary to the manufacturer's written instructions. Warranty Period: 10 years from date of Substantial Completion.
- .2 Manufacturer's Warranty on Insulating Glass: Manufacturer's standard form in which the insulating glass unit manufacturer agrees to replace insulating-glass units that deteriorate during normal use within the specified warranty period. Deterioration of insulating-glass units is defined as an obstruction of vision by dust, moisture, or a film on the interior surfaces of the glass caused by a failure of the hermetic seal that is not attributed to glass breakage, improper installation, or cleaning and maintenance that is contrary to the manufacturer's written instructions. Warranty Period: 5 years from date of Substantial Completion.
- .3 Manufacturer's Warranty on Laminated Glass: Manufacturer's standard form in which the laminated glass manufacturer agrees to replace laminated glass units that deteriorate during normal use within the specified warranty period. Deterioration of laminated glass is defined as defects, such as discoloration, edge separation, or blemishes exceeding those allowed by ASTM C 1172 that are not attributed to glass breakage, improper installation, or cleaning and maintenance that is contrary to the manufacturer's written instructions. Warranty Period: 10 years from date of Substantial Completion.
- .4 Warrant mirrors for a minimum of 5 years against silver deterioration.

1.8 SUBMITTALS

- .1 Shop Drawings and Product Data:
 - .1 Product data on glass types specified – structural, physical, and environmental properties, size limitations, special handling or installation requirements.
- .2 System Description:
 - .1 Glass and glazing materials shall provide continuity of building enclosure vapour and air barrier.
 - .2 Size of glass to withstand dead loads and positive and negative live loads acting normal on plane of glass.
 - .3 Limit glass deflection to 1/200 (confirm) or flexure limit of glass with full recovery of glazing materials; whichever is less.
- .3 Samples: Submit 2 – 300x300mm size, illustrating glass plastic unit's colouration and design.
- .4 Quality Assurance:
 - .1 Standards
 - (1) FGMA Standard
 - (2) IGMAC Standard

2 PRODUCTS

2.1 MANUFACTURERS

- .1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:
 - .1 Acceptable Glass Manufacturers:
 - (1) AGC Glass Company North America; www.us.agc.com
 - (2) Guardian Industries Canada Corp.; www.guardian.com
 - (3) Pilkington Building Products; www.pilkington.com
 - (4) TGP Technical Glass Products; www.fireglass.com
 - (5) Vitro Architectural Glass; www.vitroglazings.com
 - (6) Viracon; www.viracon.com
 - .2 Acceptable Glass Fabricators:
 - (1) Oldcastle
 - (2) Trulite
 - (3) Saand
 - .3 Acceptable Sealant Manufacturers:
 - (1) The Dow Chemical Company; www.dow.com
 - (2) Sika Canada Inc.; www.can.sika.com
 - (3) Tremco (Canada) Limited; www.tremcosealants.com

2.2 MATERIALS

- .1 Provide new materials in perfect condition, free from defects impairing strength, durability or appearance.
- .2 Verify and confirm, to the Consultant, that the glass being installed in the designated lights is of the type, weight and quality specified.

2.3 SAFETY GLASS

- .1 Tempered safety glass (TGL): 6 mm (1/4") thick; to CAN/CGSB-12.1-M, Type 2, heat treated.
- .2 Laminated safety glass: 6 mm (1/4") thick; to CAN/CGSB-12.1-M.

2.4 FIRE RATED GLASS

- .1 Fire Rated Glass (CGL):
 - .1 Laminated fire-rated and impact safety-rated ceramic glazing (CGL):
 - (1) Properties:
 - (a) Thickness: 5/16".
 - (b) Weight: 4 lbs/ft².
 - (c) Approximate Visible Transmission: 85 percent.
 - (d) Approximate Visible Reflection: 9 percent.
 - (e) Fire-rating: 20 minutes to 120 minutes.
 - (f) Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).
 - (g) STC Rating: Approximately 38 dB.
 - (h) Positive Pressure Test: UL 10C; passes.
 - (i) Surface Finish: Standard Grade, polished.
 - (2) Fire rating classified and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with ULC Standards CAN/ULC S-104 and CAN/ULC S-106.
 - (3) Acceptable Product and Manufacturer:
 - (a) FireLite Plus as manufactured by Nippon Electric Glass Company Ltd. and distributed by Technical Glass Products, www.fireglass.com
 - (b) Or equivalent by Keralite product by Vetrotech a Saint-Gobain Company

2.5 MIRRORS

- .1 Mirrors: 6 mm type 18 tempered glass Blue label, to ISO 25537:2008; c/w galvanized steel back; as follows:
 - .1 Over Lavatories: 457 mm x 610 mm (18" x 24") over each lavatory, stainless steel frame with concealed wall hangers.
 - .2 Over Vanities: 914 mm (36") high by full width of vanities, polished edges with tamperproof fasteners.

2.6 ACCESSORIES

- .1 Glazing sealant shall be Tremco "Proglaze". P.R.C. "Rubber Calk 2000" or approved equal.

- .2 Glazing Tape:
 - .1 Lites under 1900 mm (75") united inches Tremco "440" tape or approved equal.
 - .2 Lites over 1900 mm (75") united inches Tremco "Polyshim" tape or approved equal.
- .3 Setting blocks: Neoprene or EPDM with a Shore "A" hardness of 80-90 durometer.
- .4 Shims and spacers: as recommended by the glass manufacturer.

3 EXECUTION

3.1 EXAMINATIONS

- .1 Report to the Consultant, in writing, all defects of work prepared by other trades and unsatisfactory site conditions.
- .2 Commence the work of this division when surfaces specified to receive glazing are dry, clean, level; free from cracks, ridges, dusting, scaling, carbonation, mortar droppings, parging, curing, compounds, grease, oil, or other foreign material liable to impair adhesion, performance, or appearance.
- .3 Commencement of work implies total acceptance of all surface conditions.
- .4 Waive any after claims by failure to comply with the above procedure of examination.

3.2 BREAKAGE

- .1 Make good any and all breakage resulting from faulty quality of work.

3.3 QUALITY OF WORK

- .1 Remove protective coatings and clean contact surfaces with solvent and wipe dry.
- .2 Apply primer-sealer to contact surfaces.
- .3 Place setting blocks as per manufacturer's instructions.
- .4 Install glass, rest on setting blocks, ensure full contact and adhesion at perimeter.
- .5 Install removable stops, without displacing tape or sealant.
- .6 Provide edge clearance of 3 mm (1/8") minimum.
- .7 Insert spacer shims to center glass in space. Place shims at 600 mm (24") OC and keep 6 mm (1/4") below sight line.
- .8 Apply cap bead of sealant at exterior void.
- .9 Apply sealant to uniform and level line, flush with sightline and tooled or wiped with solvent to smooth appearance.
- .10 Do not cut or abrade tempered, heat treated, or coated glass.

3.4 GLAZING (EXTERIOR)

.1 Combination method - tape/sealant:

- .1 Cut glazing tape to proper length and set against permanent stops, 6 mm (1/4") below sightline. Install horizontal strips first; extend over entire width of opening before applying vertical strips. Weld corners together by butting tape and dabbing with sealant.
- .2 Fill gap between glass and applied stop with sealant to depth equal to bite of frame on glass but not more than 12 mm (1/2") below sightline.

3.5 GLAZING (INTERIOR)

.1 Dry method - tape/tape:

- .1 Cut glazing tape to length and install against permanent stop, project 1.5 mm (1/16") above sightline.
- .2 Place glazing tape on free perimeter of glass in same manner described above.

3.6 CLEANING

- .1 Remove all debris and tools from site upon completion and acceptance of the work.
- .2 Final cleaning of glass will be done by the Contractor at the completion of the Work.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 1.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 SECTION INCLUDES

- .1 Non-load-bearing steel stud partitions
- .2 Ceiling and bulkhead framing
- .3 Wall furring
- .4 All gypsum wallboard
- .5 Gypsum wallboard trims

1.3 RELATED SECTIONS

- .1 Section 05 40 00 – Cold-Formed Metal Framing.
- .2 Section 06 10 00 - Rough Carpentry: Wood support systems.
- .3 Section 09 51 00 - Acoustical Ceilings.

1.4 REFERENCES

- .1 CAN/CGSB-71.25-M88: Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.
- .2 CAN/CSA-A82.27-M91: Gypsum Board.
- .3 CSA A82.31-M1980: Gypsum Board Application.
- .4 Gypsum Drywall Construction Handbook by Canadian Gypsum Company.
- .5 Manual of Gypsum Wallboard Construction by Gypsum Drywall Contractors International.

1.5 QUALITY ASSURANCE

- .1 Employ fully trained mechanics who are regularly employed in this field.

1.6 REJECTIONS

- .1 Defective materials or quality of work whenever found at any time prior to acceptance of the work shall be rejected regardless of previous inspection. Inspection will not relieve responsibility, but is a precaution against oversight and error.

- .2 Remove and replace defective materials and work of other Trades affected by this replacement, at no additional cost to the Owner.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 61 00.
- .2 Deliver and store Products in a dry area under cover, in original wrappings, cartons or containers clearly marked as to type, colour and manufacturer.
- .3 Store gypsum board flat. Take care to avoid undue sagging damage to ends, edges, or surfaces. Avoid stacking unequal lengths together.
- .4 Store gypsum board so that it is not in contact with new concrete floors - use dunnage at 400 mm (16") OC to raise board piles.

1.8 PROJECT CONDITIONS

- .1 Co-operate in co-ordinating work of other Sections with work of this Section, in order that the work may proceed in an orderly and effective manner.

2 PRODUCTS

2.1 MANUFACTURERS

- .1 Manufacturers of gypsum products having Products considered acceptable for use:
 - .1 CertainTeed.
 - .2 Canadian Gypsum Company.
 - .3 G-P Gypsum Company.
- .2 Manufacturers of metal studs, track, trim and accessories having Products considered acceptable for use:
 - .1 Bailey Metal Products.
 - .2 Canadian Gypsum Company.
 - .3 Chicago Metallic.
 - .4 Gordon Arch. Alum. Specialties.
 - .5 Pittcon Industries.
 - .6 Fire Trak Corp.

2.2 MATERIALS

- .1 Steel Studs: Minimum 0.55 mm (25 ga.) hot dipped or electro-galvanized sheet steel at 400 mm (16") OC, to ASTM C645; knockout pass-through holes at 460 mm (18") OC; Flanges minimum 30 mm (1¼") wide, edges bent back 90 degrees and doubled over; single length floor to ceiling.

- .2 Floor and Ceiling Track (standard application): Minimum 0.55 mm (25 ga.) hot dipped or electro-galvanized sheet steel at 400 mm (16") OC, to ASTM C645; Leg design minimum 25 mm (1") high; width to suit studs. Provide deflection track as required to suit deflection anticipated by structural conditions.
- .3 Ceiling Track (deflection application): Inner and outer deflection type tracks; minimum 0.91 mm (20 ga) x size to fit 92 mm (3 5/8") stud, and full galvanized G60 steel; by Bailey or approved equal. Refer to Standard Details.
- .4 Ceiling track (curved walls): Two 0.55 mm (25 ga.) continuous angles, crimped/cut to suit shape.
- .5 Ceiling Deflection Track and Firestop System: Fire Trak System by Fire Trak Corp., Kimball, MN (1-800-394-9875). System shall include 16 gauge galvanized steel ceiling runner profile (Shadowline, Cavity Shadowline, Reveal or Cavity Reveal) and Fire Trak Stud Clips.
- .6 Furring Channels: 19 mm, 22 mm (3/4", 7/8") - minimum .55 mm (25 gauge) G90 galvanized steel at 400 mm (16") OC.
- .7 Fasteners: Manufacturer's standard, suitable for application intended.
- .8 Tie Wire: 1.6 mm (16 gauge) galvanized soft annealed steel wire.
- .9 Hangers: 4.1 mm (No. 8) galvanized wire.
- .10 Carrying Channels: 39 mm x 19 mm - 1.6 mm (1½" x 3/4" - 16 gauge) G90 galvanized steel channel, for bulkhead construction.
- .11 Ceiling Suspension Systems
 - .1 Rigid "X" drywall suspension system by CGC Inc. or approved equal.
 - .2 System shall be comprised of 30 mm x 24 mm (1½" x 15/16") tee sections of 0.60 mm (24 gauge) steel and 73 mm x 22 mm (2" x 7/8") cross channels of 0.38 mm (26 gauge) hot dipped galvanized steel.
- .12 Furring Clips: Snap-on clips - 2.6 mm (12 gauge) wire.
- .13 Partition Attachment to T-bar: Use partition attachment clips PACS15 (standard edge) or PACR15 (Reveal Edge) by CGC Interiors.
 - .1 Securement Channel: 0.55 mm (25 gauge) galvanized steel - 50 mm x 25 mm (2" x 1") by Bailey or approved equal.
 - .2 Fasteners: Non-powder activated as recommended by manufacturer, suitable for wall composition by Rawl Tapcon or approved equal.
- .14 Gypsum Board: to CAN/CSA A82.27-M, as follows:
 - .1 Moisture and mold resistant wall panels conforming to ASTM C1658, glass mat water-resistant gypsum panel.
 - (1) 16mm (5/8") tapered edge, straight cut ends.
 - (2) 13mm (1/2") tapered edge, straight cut ends.
 - (3) Acceptable Products:

- (a) DensArmour Plus by Georgia-Pacific Gypsum
 - (b) Glass-Mat Panels Mold Tough by CGC
- .2 Fire Resistant Board (Type "X"): Minimum 16 mm (5/8") thick, tapered edges, straight cut ends, type X., identified for use in a ULC tested assembly.
 - .3 Abuse-Resistant Board: 16 mm (5/8") Sheetrock Abuse-resistant gypsum panels; tapered edges; panel weight minimum 2500 lbs./MSF
 - .4 Impact Resistant Board: 16 mm (5/8") high density core 40 bls. Hardness "Fiberbond" by Louisiana - Pacific (Phone: 1-800-411-2500 / 902-625-3070)

2.3 ACCESSORIES

- .1 Corner Bead, Bailey Tear off L Trim
- .2 Screws: Self-drilling, self-threading case hardened steel; length as recommended by board manufacturer for each application.
- .3 Adhesive: High strength, waterproof, compatible with materials; to CAN/CGSB-71.25-M.
- .4 Joint Filler: Casein, vinyl or latex base, slow setting, as recommended by board manufacturer.
- .5 Joint Tape: 50 mm (2") wide perforated paper as recommended by board manufacturer.
- .6 Primer Sealer: Alkyd based material recommended by board manufacturer.
- .7 Texture Finish and Primer - Sealer: Water based spray finish recommended by board manufacturer.

3 EXECUTION

3.1 EXAMINATION

- .1 Thoroughly examine all surfaces scheduled to receive work of this Section to see that they are secure, rigid, true and not liable to impair performance or appearance of this Trade's work.
- .2 Commencement of work implies total acceptance of surface and site conditions.

3.2 PREPARATION

- .1 Protect work of other trades from damage resulting from work of this trade.
- .2 Make good any resulting damage, to the satisfaction of the Consultant, at no additional cost.
- .3 Maintain uniform temperature in work area, adequate for work being performed, as recommended by materials manufacturer.
- .4 Keep temperature as uniform as possible with deflectors or screens.
- .5 Provide air circulation if humidity is excessive. Avoid high temperature with low humidity. Avoid force drying.
- .6 Allow concrete and masonry to dry thoroughly before installing gypsum board.
- .7 Protect installed materials from weather and dampness.

- .8 Replace any damaged work before further work proceeds.
- .9 Promptly, as the work proceeds and upon completion, clean-up and remove from the site all rubbish and surplus material resulting from work of this trade.

3.3 QUALITY OF WORK

- .1 Erect framing level, plumb and true; to a tolerance of 5 mm in 3 metres (1/4" in 10'), and square with adjoining work.

3.4 APPLICATION

- .1 Framing System
 - .1 Metal Stud Partitions
 - (1) Place studs vertically at 400 mm (16") centres and not more than 50 mm (2") from abutting walls, openings, and each side of corners. Install studs in tracks at floors and ceiling.
 - (2) Provide freedom for deflection under beams and structural slabs.
 - (3) Permanently attach studs for cornice height partition to top and bottom track.
 - (4) Full-height stud each side of opening.
 - (5) Erect track at head and/or sill of opening to accommodate intermediate studs above and/or below opening in same manner and spacing as wall studs. Screw fasten members together adjacent to openings.
 - .2 Deflection Head Allowance
 - (1) Allow for a maximum of 2" deflection under beams and structural slabs by utilizing outer and inner top tracks as per Standard Details in this Section.
 - .3 Fire Dampers in Fire Rated Partitions
 - (1) Frame openings for fire dampers required by the Mechanical Contractor. Provide a 13 mm (1/2") drywall filler piece inside the perimeter of opening before installation of the damper so as to maintain the partition fire rating.
 - .4 Ceiling Suspension System
 - (1) Hangers for suspended gypsum board ceilings shall support the grillage independent of walls, columns, pipes, ducts: erect plumb and securely anchor to the structural frame or imbed into concrete slabs.
 - (2) Install angle moulding at wall perimeter at a level above the finished ceiling line equal to the total thickness of wallboard to be used. Install only on walls perpendicular to cross channels.
 - (3) Hang main tees in parallel rows spaced 1220 mm (4'-0") apart and supported by hanger wires spaced 1220 mm (4'-0") apart at same level as angle moulding. Main tees in adjacent rows must have cross tee slots in perpendicular alignment.
 - (4) Install cross-channels by snap locking into position in perpendicular rows spaced 400 mm (16") apart and not less than 200 mm (8") from parallel walls. Fasten ends of cross-channels to angle moulding with screws or pop rivets.
 - (5) Fire rated assemblies shall have additional cross-channels within 200 mm (8") of all butt joints and openings for ducts or light fixtures. Allowable percentage of openings and additional wallboard enclosures shall conform to U.L.C. design criteria.

- .2 Wall Furring
 - .1 Attach furring channels to masonry or concrete surfaces at 400 mm (16") OC and not more than 100 mm (4") from corners and openings.
 - .2 Wallboard Application: Always leave a 3 mm (1/8") to 6 mm (1/4") gap between wall board and floor.
- .3 Single Layer Board
 - .1 Screw-on Application
 - (1) Erect gypsum board horizontally or vertically on walls; across framing on ceilings; and secured to the framing with drywall screws at:
 - (2) Ceilings: 300 mm (12") OC
 - (3) Walls:
 - (a) 300 mm (12") OC along ends of board
 - (b) 200 mm (8") OC at perimeters of board
 - (c) 300 mm (12") OC through centre of board.
 - (4) Where it must be applied parallel, support or furring must be provided at maximum 400 mm (16") OC.
 - (5) Allow for 1/4" gap between bottom of gypsum board and top of floor.
 - (6) Ceiling board: 12.7 mm (1/2") minimum thickness.
 - .2 Adhesive Application
 - (1) Apply panel adhesive in 6 mm (1/4") beads to face of framing members or masonry substrate, using caulking gun. Avoid adhesive squeeze-out at joints.
 - (2) Erect gypsum board immediately, press firmly into place and drive supplementary screw fasteners at 600 mm (24") centres.
 - (3) Apply adhesive in well ventilated area. Avoid open flame.
 - .3 Screw-on Application
 - (1) Apply base layer horizontally and screw fasten. Apply face layer vertically and screw fasten in the same manner as base layer.
 - (2) Screw fastening spacing shall be at 300 mm, 600 mm (12", 24") centres.
 - (3) Locate joints over framing and secure with screws.
 - .4 Adhesive Application
 - (1) Adhere base layer to framing with 6 mm (1/4") adhesive beads.
 - (2) Laminate face layer to base layer, using Panel Adhesive (Joint Filler).
- .4 Tilebacker Board
 - .1 Fasten to framing with screws at 200 mm (8") centres where ceramic tile finish is called for on stud partitions.
 - .2 Apply 50 mm (2") glass fibre tape over joints and corners, embed with mortar or adhesive used to set tile.
- .5 Control Joints

- .1 Gypsum board surfaces should be isolated with control joints or other stress relief where:
 - (1) partition or furring abuts a structural element or dissimilar wall or ceiling;
 - (2) ceiling abuts a structural element, dissimilar wall or partition or other vertical penetration;
 - (3) construction changes within the plane of the partition or ceiling;
 - (4) partition or furring run exceeds 9 m (30');
 - (5) ceiling dimensions exceed 15 m (50') for drywall in either direction;
 - (6) exterior soffit dimensions exceed 9 m (30') in either direction;
 - (7) wings of "L", "U" and "T" -shaped ceiling areas are joined;
 - (8) expansion or control joints occur in the structural elements of the building.
- .2 Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.
- .3 Leave a 13 mm (1/2") continuous opening between gypsum boards for insertion of surface-mounted joint.
- .4 Interrupt wood floor and ceiling plates with a 13 mm (1/2") gap, wherever there is a control joint in the structure.
- .5 Do not attach steel studs on one side of control joint.
- .6 Provide separate supports for each control joint flange.
- .7 Provide an adequate seal behind control joint where sound and/or fire ratings are prime considerations.
- .8 Agree on exact locations of joints with the Consultant.
- .9 Use drywall screws to fasten board to framing.
- .10 Minimum fastener length to provide:
 - (1) 10 mm (3/8") minimum penetration into steel framing.
 - (2) 16 mm (5/8") minimum penetration into wood framing.
- .11 Drive screws perpendicular to face of board with sufficient penetration of screw head to sink below the surface of board without breaking the paper face.
- .12 Start securing board from the centre and work towards perimeter.
- .13 Hold board firmly to framing while fastening.
- .14 Do not set unlike edges together; always mate square to square or tapered to tapered edges.
- .15 Install casing bead at junction with dissimilar materials.

3.5 FINISHING

- .1 Install corner bead and other metal trims as required to finish board.
- .2 Fill and tape joints and fill over fastenings. Sand lightly.

- .3 Where painted surfaces are required fill and tape all joints and nail holes in the conventional manner. Allow to dry thoroughly and then skim coat all board surfaces by mixing the joint compound slightly thinner than for joint taping. Lightly cover the entire board surface using a trowel or board knife. Immediately scrape the excess joint compound off to fill surface texture and variations. Allow the skim coat to dry completely then carefully sand away any ridges in preparation for painting.
- .4 Leave finished work smooth, plumb and true ready for painting (vinyl wall covering) by others.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 1.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 INTENT

- .1 Provide all articles, labour, materials, equipment, transportation, hoisting and incidentals noted, specified or required, to complete the work of this Section.

1.3 SECTION INCLUDES

- .1 Provide all ceramic tile and required accessories as indicated on the drawings, room finish schedule, and colour schedule, including but not limited to, the following:
 - .1 Porcelain floor tiles.
 - .2 Ceramic wall tiles.
 - .3 Porcelain base.
 - .4 Grouting.
 - .5 Adhesives.
 - .6 Setting materials: Sand, cement, lime.
 - .7 Ceramic accessories.
 - .8 cleaning of ceramic tile installation.

1.4 RELATED SECTIONS

- .1 Section 04 20 00 – Unit Masonry.
- .2 Section 09 21 16 – Gypsum Board Assemblies.
- .3 Section 22 13 13 Sanitary Drains –

1.5 REFERENCES

- .1 ANSI A108.5-2005: Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
- .2 ANSI A118.3-2005: Water Cleanable Tile Setting and Grouting Epoxy.
- .3 ANSI A118.4-2005: Latex-Portland Cement Mortar.
- .4 ANSI A118.6-2005: Ceramic Tile Grouts.

- .5 ASTM C370-88 (2006): Standard Test Method for Moisture Expansion of Fired Whiteware Products.
- .6 ASTM C372-94 (2001): Standard Test Method for Linear Thermal Expansion of Porcelain Enamel and Glaze Frits and Fired Ceramic Whiteware Products by the Dilatometer Method.
- .7 ASTM C373-88 (2006): Standard Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products.
- .8 ASTM C424-93 (2006): Standard Test Method for Craze Resistance of Fired Glazed Whiterwares by Autoclave Treatment.
- .9 ASTM C484-99 (2003): Standard Test Method for Thermal Shock Resistance of Glazed Ceramic Tile.
- .10 ASTM C485-83 (2003)e1: Standard Test Method for Measuring Warpage of Ceramic Tile.
- .11 ASTM C499-78 (2003): Standard Test Method for Determining Facial Dimensions and Thickness of Flat, Rectangular Wall and Floor Tile.
- .12 ASTM C501-84 (2002): Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser.
- .13 ASTM C502-04: Standard Test Method for Wedging of Flat, Rectangular Ceramic Wall and Floor Tile.
- .14 ASTM C609-90 (2000): Standard Test Method for Measurement of Small Colour Differences between Ceramic Wall or Floor Tile.
- .15 ASTM C648-04: Standard Test Method for Breaking Strength of Ceramic Tile.
- .16 ASTM C1026-87 (2002): Standard Test Method for Measuring Frost Resistance of Ceramic Tile to Freeze Thaw Cycling.
- .17 ASTM C1027-99 (2004): Standard Test Method for Determining Visible Abrasion Resistance of Glazed Ceramic Tile.
- .18 ASTM C1028-06: Standard Test Method for Evaluating the Static Coefficient of Friction of Ceramic Tile, and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method.
- .19 CAN/CGSB-75.1-M88: Tile, Ceramic.
- .20 Terrazzo Tile & Marble Association of Canada (TTMAC): Tile Specification Guide 09300 -2002.

1.6 REJECTIONS

- .1 Defective materials or quality of work whenever found at any time prior to acceptance of the work shall be rejected regardless of previous inspection. Inspection will not relieve responsibility, but is a precaution against oversight and error.
- .2 Remove and replace defective materials and work of other Trades affected by this replacement, at no additional cost to the Owner.

1.7 PERFORMANCE REQUIREMENTS

- .1 All installation assemblies will be composed of materials from the same manufacturer and be completely compatible. The completed assembly will meet the service requirements “extra-heavy” or “heavy” passing ASTM C627 cycles 1 thru 14 as described in the Tile Council of America Handbook 1997 (page number 10) and recognized by TTMAC (tile, Terrazzo, Marble Association of Canada) and the CTCIA.
- .2 Install tiles to comply with ANSI A108.5 (80% uniform bonding mortar contact between the tile and the substrate. 95% uniform bonding mortar contact for exterior application).
- .3 Provide only those products that meet or exceed the performance standard of CAN/CGSB-75.1-M, as follows:
 - .1 Factor of sliding friction on a dry surface using a leather test surface to be 0.50.
 - .2 Factor of sliding friction on a wet surface using a leather test surface to be 0.60.
 - .3 Factor of sliding friction on a dry surface using a rubber test surface to be 0.70.
 - .4 Factor of sliding friction on a wet surface using a rubber test surface to be 0.65.
- .4 Provide only those products that meet or exceed the performance standards as described in the specified ASTM Standards.

1.8 SUBMITTALS

- .1 Submit manufacturer test and performance data as specified in Section 01 33 00.
- .2 Manufacturer Test and Performance Data: indicating slip resistance, compressive strength, water absorption, coefficient of expansion, conductivity, and other pertinent values for each type of tile specified.
- .3 Do not commence work until the performance data sheets are reviewed.

1.9 SAMPLES

- .1 Submit samples as specified in Section 01 33 00.
- .2 Selection Samples: duplicate set of available tile sizes, shapes, and colours for selection by Consultant.

1.10 CLOSE-OUT SUBMITTALS

- .1 Submit three (3) copies of the manufacturer's maintenance instructions, for porcelain floor and ceramic wall tile, to the Consultant upon completion of the ceramic installation. Refer to Section 01 78 10.

1.11 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 61 00.
- .2 Deliver and store Products in original cartons, clearly marked as to type, colour and manufacturer.
- .3 Store Products in a warm, dry area.

- .4 The Tile Contractor will be responsible to insure the timely arrival of installation materials on site and he will order the appropriate approved materials with sufficient lead time to insure that no delays are incurred due to late material procurement.

1.12 WARRANTY

- .1 Manufacturer's Extended Warranty: Submit a written warranty stating that the products used on each assembly will be free from manufacturing defects so that these products will not breakdown or deteriorate for a period of five (5) years from the date of substantial completion when installed in accordance with the manufacturers written specifications and guidelines.

2 PRODUCTS

2.1 MANUFACTURERS

- .1 Substitution Procedures: as specified in Section 01 33 00.

2.2 MATERIALS

- .1 Porcelain Floor Tile: 305mm x 610mm (12" x 24") size; Global Collection by Royal Mosa or accepted alternate, colours as selected by Consultant from supplier's full range of colours.
- .2 Ceramic Wall Tile: 100mm x 400mm (4" x 12") size; Colour + Dimension Series by Olympia or accepted alternate, colours as selected by Consultant from supplier's full range of colours.
- .3 Porcelain Base: 100mm (4") x length of tile size, to match floor tile.
 - .1 Colour as selected by Consultant from supplier's full range of colours to match floor tile.
 - .2 All walls in spaces calling for porcelain tile shall have matching porcelain wall base including on walls that call for ceramic tile.
- .4 Grout:
 - .1 Floor: Laticrete Tri-Poly Fortified Sanded Grout (1500 Series) or Laticrete Tri-Poly Fortified Unsanded Grout (1600 Series) gauged with Laticrete 1776 Admix Plus as manufactured by Laticrete International Inc., complete with grout sealer compatible with and recommended by manufacturer.
 - .2 Wall: Latex Grout ANSI A118.6 for Latex Portland Cement Grout.
- .5 Adhesives: Wall and Floor/Concrete, Blockwall, Cement Backer Board, Drywall Laticrete 4237 Latex thin-set. Mortar additive mixed with Laticrete 211 Crete Filler powder. (ANSI A118.4 for Latex Thinset Mortars).
- .6 Plywood Substrates: Laticrete 333 super flexible admix with Laticrete Drybond floor/wall thinset, or Latapoxy 210 modified epoxy adhesive.
- .7 Trim and Control Joints: Schluter - Systems Trims and Control Joints or approved equal by Bengard Manufacturing Ltd.
- .8 Outside Corner Trim: Schluter - "Jolly" anodized aluminum trim for all outside corners on tile surfaces.
- .9 Transition Trim: Schluter - "Reno" extruded aluminum edge trim for barrier free access.
- .10 Control Joint: Schluter - "Dilex" BWS for control joints, colour to match adjacent grout.

- .11 Perimeter Control Joint: Schluter - "Dilex" - BWA for control joints at perimeter and around columns.

3 EXECUTION

3.1 EXAMINATION

- .1 Before starting the work, examine existing surfaces to be covered and report to the Consultant, in writing, all defects of work prepared by others and unsatisfactory existing conditions.
- .2 Do not commence until surfaces specified to receive tile are dry, clean, level: free from cracks, ridges, dusting, scaling, carbonation, mortar droppings, parging, curing compounds, grease, oil, or other foreign material liable to impair adhesion, performance or appearance.
- .3 Commencement of work implies total acceptance of surface conditions.
- .4 Dry or dusty concrete or masonry surfaces shall be wet down or washed and excess water removed just prior to the application of finish.
- .5 Waive the right to any after claims by failure to comply with the above procedure of examination.

3.2 BREAKAGE

- .1 Make good any and all breakage resulting from faulty materials or installation.

3.3 QUALITY OF WORK

- .1 Ceramic tile application shall comply with TTMAC Tile Specification Guide 09300, the Tile Council of America Handbook for Ceramic Tile Installation, and relevant ANSI Standards.
- .2 Provide 80% uniform bonding mortar contact between the tile and the substrate for interior applications and 95% uniform bonding mortar for exterior application.
- .3 Install ceramic tiles over a "crack-free" substrate. All concrete joints or cracks should be in direct alignment with the tile expansion joints.
- .4 Control Joints
 - .1 For interior ceramic tile the control joint should be placed every 4.88 – 6.10 metres (16'-20') apart.
 - .2 All area control joints should also be placed around perimeter, around columns and where tile abuts other hard materials. Control joints must always be placed directly over all slab control and expansion joints.
- .5 The ambient air temperature and structural base temperature should be no less than 12 degrees C (56 degrees F) during application of ceramic tile and during curing period. Epoxy mortars and grouts require temperatures between 10 degrees and 30 degrees C (50 degrees and 90 degrees F).
- .6 Neatly cut tile around fitments, fixtures and drains. Form intersections, corners and returns accurately.
- .7 Make joints in tile uniform in width, subject to normal variance in tolerance allowed in tile size. Joints shall be watertight without voids, cracks, excess mortar, or grout. Joints between sheets to be of same width as joints between individual tiles.
- .8 All internal angles of base to be square . External angles to be bullnose. Bullnose to be from full size tile.

- .9 Where floor tile is required to be laid so floor slopes to drains it will be this Contractor's responsibility to ensure that the slopes are achieved and that no water ponds or lodges behind ridges. Use Laticrete 3701 Latex Mortar Admix with Laticrete 226 thick bed mortar as per manufacturer's instructions to achieve required consistencies and a 5 year warranty mortar bed.
- .10 Sound tile after setting; remove and replace hollow backed tile.
- .11 Allow minimum 24 hours after setting prior to grouting. Do not permit foot traffic for a minimum of 48 hours.
- .12 Completed work shall be free of broken, damaged or faulty tile.
- .13 Carry out layout of tile in accordance with the Consultant's approved tile colour percentages and patterns.
- .14 Pattern to be uninterrupted through doorways
- .15 All tiles should be fully embedded with at least 95% coverage of mortar on the back of tiles. Backbutter tiles larger than 200 x 200 mm (8" x 8") in size.

3.4 CLEANING AND PROTECTION

- .1 Protect the ceramic tile work during the period of construction.
- .2 Remove all excess material and debris from the site and thoroughly wash and clean the tile work upon completion of the ceramic tile installation.
- .3 Do not use muriatic acid for cleanup.
- .4 Protect the finish floor installation with a suitable and durable material or by keeping traffic off the floor until the area is ready for occupancy.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions, and the General Requirements of Division 1.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 INTENT

- .1 Provide all articles, labour, materials, equipment, transportation, hoisting, and incidentals noted, specified, or required, to complete the work of this Section.

1.3 SECTION INCLUDES

- .1 Provide all acoustic tile and required accessories as indicated on the working drawings, room finish schedule, including but not limited to the following:
 - .1 Acoustic Tile
 - .2 "T" Grid Suspension System

1.4 RELATED SECTIONS

- .1 Section 09 21 16 - Gypsum Board Assemblies.
- .2 Mechanical and Electrical Divisions: for installation of grilles, diffusers, lighting and additional requirements

1.5 REFERE NCES

- .1 ASTM C635-00: Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- .2 ASTM C636-04: Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
- .3 ASTM E84-06: Standard Test Method for Surface Burning Characteristics of Building Materials.
- .4 ASTM E1264-98: Standard Classification for Acoustical Ceiling Products.

1.6 SAMPLES

- .1 Submit minimum 300 mm x 300 mm (1'-0" x 1'-0") samples of acoustic tile, as required for completion of the work for the Consultant's review before proceeding with the acoustic tile work.
- .2 Submit samples of acoustic products in type specified for approval by the Consultant.

1.7 CLOSE-OUT SUBMITTALS

- .1 Submit two copies of the manufacturer's maintenance directions for each type of acoustic panel or tile.

1.8 PERFORMANCE REQUIREMENTS

- .1 Design and install the ceiling system to support the weight of the light fixtures, maximum deflection of 1/360 of the span.
- .2 Submit a letter stating that the ceiling system is capable of supporting the light fixtures. This letter is required to obtain Ontario Hydro-Electric Commission approval.

1.9 REJECTIONS

- .1 Defective materials or quality of work whenever found at any time prior to acceptance of the work shall be rejected regardless of previous inspection. Inspection will not relieve responsibility, but is a precaution against oversight and error.
- .2 Remove and replace defective materials and work of other Trades affected by this replacement, at no additional cost to the Owner.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 61 00.
- .2 Deliver acoustic tile and materials in undamaged and original containers and make certain that the storage area is dry.

1.11 EXTRA MATERIALS

- .1 Furnish the Owner with 2 percent extra materials of each type of ceiling tile to be used for future repair work.

2 PRODUCTS

2.1 MANUFACTURERS

- .1 Armstrong World Industries Limited (Ceiling Tile and Suspension)
- .2 CGC Limited (Ceiling Tile and Suspension)
- .3 Bailey Metal Products (Suspension)

2.2 ACOUSTIC CEILING TILE TYPE 1

- .1 Suspension system: to ASTM C635; Prelude XL 15/16" by Armstrong, Colour: white.
- .2 Acoustical Panels: to ASTM E1264, Cortega 823 Fireguard by Armstrong (610mm x 1220mm x 16mm), Colour: white.

3 EXECUTION

3.1 EXAMINATIONS

- .1 Report to the Consultant, in writing, all defects of work prepared by other trades and on unsatisfactory site conditions.

- .2 Do not commence the work of this Division until this Contractor has thoroughly examined all areas to receive an acoustic tile installation and has ascertained the compatibility of the installation of his material with the other trades involved directly or indirectly with this work, and has found the areas in a condition suitable for the commencement.
- .3 Consult and co-operate with trades whose work precedes or follows his work to permit an orderly and effective procedure in the execution of the work of this section.
- .4 Commencement of the work of this Section implies total acceptance of all applicable conditions by the Acoustic Tile Contractor.
- .5 Waive the right to any after claims by failure to comply with the above procedure of examinations.

3.2 QUALITY OF WORK AND APPLICATION

- .1 Install the tile and suspension system to ASTM C636, and in accordance with the manufacturer's specifications.
- .2 Plumb and square finish work with adjoining work.
- .3 Lay the work out, in accordance with the Consultant's approved reflected ceiling plan, symmetrical within each area to obtain uniform borders of at least half the acoustic panel size.
- .4 Distribute variations in shades of finish from several cartons of panels uniformly over the ceiling area.
- .5 Erect the suspension system level with tolerance of 3 mm (1/8") in 3600 mm (12').
- .6 Exposed main tees shall be as long in length as practical to minimize joints. Joints shall be tight, square flush, and reinforced with splines. Distribute jointing over the ceiling area.
- .7 Use edge moulding or shadow moulding where ceiling abuts vertical surfaces as indicated on the drawings. Use corner moulding along external edges at ceiling steps.

3.3 CLEANING AND PROTECTION

- .1 Be responsible for protection of all materials and work of this trade from damage during period of construction.
- .2 Be responsible for the protection of the work of other Contractors (trades) from damage resulting from work of this trade. He shall make good any resulting damage, to the satisfaction of the Consultant at his own expense.
- .3 Promptly, as the work proceeds and on completion, clean-up and remove from the premises all rubbish and surplus materials resulting from the foregoing work.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with Instructions to Bidders, the General Conditions of the Contract as amended by the Supplementary Conditions including all Sections outlined in Division 00 – Procurement and Contracting Requirements and Division 01 - General Requirements.

1.2 SUMMARY

- .1 Provide all articles, labour, materials, equipment, transportation, hoisting and incidentals noted, specified or required, to complete the work of this Section.
- .2 Section Includes: Provide all articles, labour, materials, equipment, transportation, hoisting and incidentals noted, specified or required, to complete the work of this Section as indicated on the working drawings & room finish schedule, including but not limited to the following:
 - .1 Sheet Vinyl
 - .2 Luxury vinyl plank
 - .3 Rubber Base
 - .4 Adhesives and Surface Preparation
 - .5 Reducer Strips
 - .6 Transition Mouldings
- .3 Include levelling of existing surfaces as required to achieve slopes and/or finished floor elevations as noted on drawings.

1.3 REFERENCES

- .1 ASTM F1066-04: Standard Specification for Vinyl Composition Floor Tile.
- .2 ASTM F1303-04: Standard Specification for Sheet Vinyl Floor Covering with Backing.
- .3 ASTM F1861-02: Standard Specification for Resilient Wall Base.
- .4 ASTM F1913-04: Standard Specification for Sheet Vinyl Floor Covering without Backing.

1.4 SUBMITTALS

- .1 Submittals under this Section shall be in accordance with Section 01 33 00.
- .2 Product Data:
 - .1 Submit manufacturer's technical product data for each type of ceiling unit and suspension system required, special installation requirements including special procedures, perimeter conditions requiring special attention. Include safety data sheets for reference on Site.
- .3 Selection Samples: duplicate 1'-0" x 1'-0" size samples, illustrating available colours and patterns for selection by Consultant.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 61 00.
- .2 Deliver and store materials undamaged in original wrapping or cartons.
- .3 Store materials in warm, dry room; stack rolled sheet goods on end, stack tiles not more than four (4) cartons high.

2 PRODUCTS

2.1 MATERIALS

- .1 Floor Leveller: Mapei “Ultra-Plan” or “Plani-Patch” as recommended by the manufacturer for the specific application.
- .2 Patching compound: “Pro Patch” polymer modified patching compound, manufactured by Proma Adhesives Inc.
- .3 Sheet Vinyl to ASTM F1913:
 - .1 Thickness/Wearlayer: 2.0 mm (0.080 inch)
 - .2 Test data:
 - (1) Flexibility (ASTM F137): Passes
 - (2) Chemical Resistance (ASTM F925): Passes
 - (3) Static Load Limit (ASTM F 970): Passes 250 psi
 - (4) Resistance to Heat (ASTM F1514): $\Delta E \leq 8$
 - (5) Resistance to Light (ASTM F1515): $\Delta E \leq 8$
 - (6) Residual Indentation (ASTM F1914): Passes
 - (7) Static Coefficient of Friction (ASTM D 2047): ≥ 0.5 SCOF
 - (8) Flammability (ASTM E648, Critical Radiant Flux): Class 1 (≥ 0.45 W/cm²)
 - .3 Allow for colours and patterns as per finish plans.
 - .4 Acceptable products and manufacturers:
 - (1) Palettone PUR by Polyflor.
 - (2) Mipolam Affinity by GerFloor
 - (3) IQ Optima by Tarkett
- .4 Luxury Vinyl Tile Flooring:
 - .1 Test data:
 - (1) Classification: ASTM F1700 Class III Type B
 - (2) Wear layer thickness: 0.76mm (0.03”)
 - (3) Total thickness: 3 mm (0.118”)
 - (4) Flexibility: conforms to ASTM F137
 - (5) Dimensional Stability: conforms to ASTM F2199
 - (6) Static Load: conforms to ASTM F970
 - (7) Residual Indentation: conforms to ASTM F1914
 - (8) Flammability: conforms to ASTM E648
 - (9) Slip Resistance: conforms to ASTM D2047
 - (10) Smoke Density: conforms to ASTM E662

- (11) Resistance to Light: conforms to ASTM F1515
- (12) Chemical Resistance: conforms to ASTM F925
- (13) Resistance to Heat: conforms to ASTM F1514
- .2 Acceptable products and manufacturers:
 - (1) Allura Dryback Luxury Vinyl by Forbo Canada
- .3 Colour:
 - (1) Grey Giant #60280DR7, form the Wood Collection
- .5 Rubber Base: to ASTM F1861; 4" high by Armstrong or Johnsonite; colour integrated rubber wall base. Colour: refer to finish plans.
- .6 Transition Mouldings: suitable for wheel traffic and ADA compliant (Barrier free); as follows:
 - .1 CTA-XX-H: ¼" carpet to 1/8" resilient.
 - .2 CTA-XX-J 5/16" carpet to substrate
 - .3 CTA-XX-K 3/8" ceramic to 1/8" resilient.
 - .4 CTA-XX-L 3/8" ceramic to ¼" carpet.
- .7 Flooring Adhesive:
 - .1 Use manufacturer's specified adhesive only.
- .8 Base Adhesive
 - .1 Johnsonite #960 wall base adhesive for porous wall surfaces (unpainted) gypsum or masonry substrates).
 - .2 Johnsonite #945 contact bond adhesive for non-porous wall surfaces (metal, painted, ceramics, etc.).
 - .3 Refer to Drawings for locations and sizes.

3 EXECUTION

3.1 EXAMINATIONS

- .1 Verification of Conditions:
 - .1 Examine all work of other Sections upon which the Work of this Section depends.
 - .2 Do not proceed with installation until all wet work such as concrete and painting has been completed and thoroughly dried.
 - .3 Report in writing to the Project Manager any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work of this Section.
 - .4 Do not proceed with Work of this Section until all unsatisfactory conditions have been rectified and site conditions are ready to receive work.
 - .5 Commencement of work implies acceptance of existing conditions and work by others.

3.2 QUALITY OF WORK

- .1 Install resilient flooring employing mechanics with the necessary training and experience as certified by the manufacturer.
- .2 Do not commence laying Resilient base until just prior to completion of the building when all trades (except painter) has completed their work.
- .3 Temperature of room and material shall be maintained at a minimum 20 degrees C (70 degrees F) 72 hours before, during and at least 72 hours after installation.
- .4 Concrete slabs shall be a minimum of 28 days old before commencing application and be below 2½% moisture content at centre of slab and free of surface moisture.

3.3 PREPARATION

- .1 Clean floor and base surfaces to be covered: using a vacuum cleaner. Remove all substances deleterious to adhesive bond.

3.4 APPLICATION

- .1 Adhesive
 - .1 Apply adhesive uniformly with an approved notch-tooth spreader at the Manufacturer's recommended rate. Do not spread more adhesive than can be covered before initial set takes place.
- .2 Base
 - .1 Install base on top of flooring.
 - .2 Install top set cove base in accordance with manufacturer's recommendations. Set base in adhesive tightly against wall and floor surfaces. Space joints uniformly.
 - .3 Accurately scribe around door-frames, fitments and other obstructions.
 - .4 Install base at all columns, walls and built-in fitments, in rooms where base is indicated.
 - .5 Form external corners and end stops from preformed units. Internal corners to be coped (not mitered) to produce a tight fit.

3.5 MAINTENANCE

- .1 Furnish Owner with two copies of manufacturer's maintenance instructions.

3.6 ADJUSTMENTS

- .1 Work shall be examined approximately ten days after completion and all adjustment of defects made good.

3.7 CLEANING AND PROTECTION

- .1 Clean work area daily in accordance with Section 01 74 00.
- .2 Protect all resilient flooring work during period of construction.

- .3 Upon completion of the resilient flooring installation, remove all excess tiles, clipping, etc. and remove any dirt spots and foreign materials to the satisfaction of the Project Manager.
- .4 Protect the finished floor with suitable and durable material or by keeping traffic off the floor until the building or room is ready for occupancy.
- .5 Upon completion of work, remove equipment and debris resulting from the work of this Section.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with Instructions to Bidders, the General Conditions of the Contract as amended by the Supplementary Conditions including all Sections outlined in Division 00 – Procurement and Contracting Requirements and Division 01 - General Requirements.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 INTENT

- .1 Provide all articles, labour, materials, equipment, transportation, hoisting and incidentals noted, specified or required, to complete the work of this Section.

1.3 SECTION INCLUDES

- .1 Supply and installation of the indoor resilient multipurpose surfacing.
- .2 Moisture Control System on existing slabs on grade designated for new resilient flooring.
- .3 References for the correct construction and preparation of concrete slabs to receive resilient flooring.
- .4 Transition mouldings.

1.4 REFERENCE STANDARDS

- .1 ASTM F1869: Standard Test Method for Measuring Moisture Evaporation Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- .2 ASTM F2170: Standard Test Method for Determining Relative Humidity In Concrete Floor Slabs Using In-Situ Probes.
- .3 ASTM F710: Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- .4 ACI 302.2R-06: Guideline for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.

1.5 SUBMITTALS

- .1 Product Data:
 - .1 Resilient flooring manufacturer's promotional brochures, specifications and installation instructions.
 - .2 Moisture control system and installation instructions for preparing substrate.
- .2 Closeout Submittals:
 - .1 Submit three (3) copies of the indoor resilient multipurpose surfacing and manufacturer's maintenance instructions.
 - .2 Submit three (3) copies of the material and installation warranties as specified.

1.6 QUALITY ASSURANCE

.1 Qualifications:

- .1 The indoor resilient multipurpose surfacing shall have been actively marketed for a minimum of ten (10) years.
- .2 The indoor resilient multipurpose surfacing shall be manufactured in an ISO 9001 certified plant.
- .3 The indoor resilient multipurpose surfacing shall be manufactured in an ISO 14001 certified plant.
- .4 The indoor resilient multipurpose surfacing supplier shall be an established firm experienced in the field and appointed as a distributor by the manufacturer of the indoor resilient multipurpose surfacing.
- .5 The installer of the indoor resilient multipurpose surfacing shall have experience in the field installing indoor resilient multipurpose surfacing and have worked on at least five (5) projects of similar size, type and complexity.

.2 Certifications:

- .1 Installer to submit the indoor resilient athletic surfacing manufacturer's or distributor's certification attesting that they are an approved installer of the indoor resilient multipurpose surfacing.
- .2 The indoor resilient multipurpose surfacing manufacturer to submit official ISO 9001 certification for the facility in which the indoor resilient multipurpose surfacing is manufactured.
- .3 The indoor resilient multipurpose surfacing manufacturer to submit official ISO 14001 certification for the facility in which the indoor resilient multipurpose surfacing is manufactured.

.3 Testing:

- .1 Tests shall be relative for multipurpose use with certificates from independent testing resources to be made available upon request. Test results shall be no more than five (5) years old and performed according to ASTM and/or EN standard testing procedures.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Refer to Section 01 61 00.

.2 Delivery:

- .1 Material shall not be delivered until all related work is in place and finished and/or proper storage facilities and conditions can be provided and guaranteed stable according to Tarkett Sports' recommendations.

.3 Storage:

- .1 Store the material in a secure, clean and dry location. Maintain temperature between 55°F and 85°F. Store the indoor resilient athletic surfacing rolls in an upright position on a smooth flat surface immediately upon delivery to job site. Rolls shipped in rigid protective cardboard containers can be laid horizontally prior to unpacking and installation.

1.8 PROJECT/SITE CONDITIONS

- .1 It is the responsibility of the general contractor/construction manager to maintain project/site conditions acceptable for the installation of the indoor resilient multipurpose flooring.
- .2 The area in which the indoor resilient multipurpose surfacing will be installed shall be dry and weather tight. Permanent heat, light and ventilation shall be installed and operable.
- .3 All other trades shall have completed their work prior to the installation of the resilient athletic flooring. The general contractor shall maintain a secure and clean working environment before, during and after the installation. Suspension of other trades' work may be authorized providing their work will not damage the new flooring.
- .4 Maintain a stable room temperature of at least 65°F for a minimum of one (1) week prior to, during and thereafter installation.
- .5 An effective low-permeance vapor barrier is placed directly beneath the concrete subfloor. For "on" or "below grade" installations, it is recommended to provide a permanent vapor barrier resistant to long term hydrostatic pressure/moisture exposure. Protrusions should be sealed to prevent moisture migration into the slab. Moisture should not be allowed to enter the slab after the completed construction.
- .6 Concrete subfloor surface pH level within the 7 to 10 range dependent upon installation type.
- .7 Concrete subfloor should be no greater than 1/8" within a 10 ft diameter. This tolerance can be measured in accordance with ASTM E1155. A specified (F_F) of 50 and an (F_L) of 30 should reach this degree of floor flatness and floor level. There is no numerical correlation between F numbers and the deviation from the straight edge; however the above specified numbers should achieve a flat floor with minimal deviation in the slab. Reference ACI 117 and ACI 302.1R. The general contractor should provide a certificate of compliance with the above recommendations.
- .8 Concrete subfloor must be clean and free of all foreign materials or objects including, but not limited to, curing compounds and sealers.
- .9 Fill cracks, grooves, voids, depressions, and other minor imperfections with Ardex (or equal) cement-based patching/leveling compounds. Follow the manufacturer's directions. Moveable joints must be treated utilizing specific transitioning joint devices depending upon the architect's recommendations. Follow current ASTM F710 guidelines for the preparation of concrete slabs to receive resilient flooring.
- .10 Refer to ACI 302.2R "Guidelines for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials" for concrete design and construction.
- .11 Concrete slab shall be fortified with continual steel reinforcement. Fiber reinforcement alone shall not be considered adequate fortification.

1.9 WARRANTY

- .1 Materials:
 - .1 The indoor resilient athletic surfacing shall be covered by the manufacturer against product defects for fifteen (15) years and for moisture and vapor tolerance for (10) years from date of Substantial Completion. A 3rd party limited warranty shall also be provided as reinforcement. The manufacturer of the indoor resilient multipurpose surfacing must provide this.

.2 Installation:

- .1 The installation of the indoor resilient multipurpose surfacing shall be covered against poor workmanship and faulty installation by a two (2) year written, limited warranty provided by the contractor performing/overseeing the installation, commencing from the date of Substantial Completion.

1.10 ADDITIONAL MATERIALS

- .1 Furnish to the owner additional materials containing a total of at least 1% of each different color or design of the indoor resilient athletic surfacing used on the project.

2 PRODUCTS

2.1 MANUFACTURERS

- .1 The resilient athletic surfacing material shall be Tarkett- Sports- Omnisport 6.5 or 8.3 with GreenLay. Colour to be Maple. Supplied by Advantage Sport, Jim Tremble (519-746-7468). All other installation accessories and related components must either be made or approved by the indoor resilient athletic surfacing manufacturer. Refer to floor plans for location.

2.2 MATERIALS

- .1 OmniSports 5.0 with by 1.3mm (3/64”) Tarkolay underlayment by Tarkett Sports North America (S. L. Marcella Carpets Ltd., Waterloo, ON. Embossing of wood design and solid colours must be the same; varying embossing or surface textures will not be allowed. Printing of wood design shall closely resemble standard wood strip flooring in size, color, board length and grain appearance. The wood design shall be protected by a clear layer of pure PVC (Polyvinyl Chloride) and Top Clean, a factory applied UV cured urethane treatment. Intermediate layers shall be fortified with a non-woven fiberglass grid for increased dimensional stability. The foam force reduction layer shall be high-density closed cell PVC foam with honeycomb embossing, and is applied in one continuous manufacturing process. Laminated or adhered foam layers will not be allowed. Field constructed products will not be accepted. Flooring will contain anti-fungal treatment.
- .1 Physical properties of the indoor resilient athletic surfacing shall conform to the following minimums:

| | | |
|---------------------------------|-----------|----------------------------------|
| Width | ----- | 6'6" (2m) |
| Length | ----- | 85' (25.9m) approx.. |
| Total Thickness | ----- | 6.5mm or 8.3mm |
| Vertical Deformation | PASSED | 1.3 (EN 14809) |
| Rolling Load | PASSED | 0.30 (EN 1569 {11/1999}) |
| Friction | PASSED | 99 (EN 13036-4) |
| Fungus Resistance | Excellent | Treated for permanent resistance |
| Abrasion Resistance | PASSED | 0.10 (EN ISO 5470-1 {06/1999}) |
| Sound Insulation | Excellent | +/-19dB (ISO 717/2) |
| In Room Sound Insulation | Excellent | 61dB (NF S31-074) |
| Ball Rebound | PASSED | ASTM F2772 >90% |
| Shock Absorption | PASSED | ASTM F2772 Category 2 |

- .2 Colour: As available from the indoor resilient athletic surfacing manufacturer's standard range.
- .3 Hardwood Design Series: A wood look design as available from the indoor resilient athletic surfacing manufacturer's standard range.
- .4 Texture: Texture to remain consistent between solid colours and wood design when blending colours.
- .2 Welding Rod:
 - .1 As supplied by the indoor resilient athletic surfacing manufacturer or supplier. Color to blend with the indoor resilient athletic surfacing color or design. All seams shall be welded to create a monolithic and impermeable surface.
- .3 Adhesive:
 - .1 As approved by the indoor resilient athletic surfacing manufacturer.
- .4 Rubber Base: to ASTM F1861; 4" high by Armstrong or Johnsonite colour integrated rubber wall base. Colour selected from standard colour offerings.
- .5 Transition Mouldings: suitable for wheel traffic and ADA compliant (Barrier free); as follows:
 - .1 CTA-XX-H: 1/4" carpet to 1/8" resilient.
 - .2 CTA-XX-K 3/8" ceramic to 1/8" resilient.
 - .3 CTA-XX-L 3/8" ceramic to 1/4" carpet.
- .6 Base Adhesive
 - .1 Johnsonite #960 or equal as recommended by rubber base manufacturer wall base adhesive for porous wall surfaces (unpainted) gypsum or masonry substrates).
 - .2 Johnsonite #945 or equal as recommended by rubber base manufacturer contact bond adhesive for non-porous wall surfaces (metal, painted, ceramics, etc.).

3 EXECUTION

3.1 EXAMINATIONS

- .1 It is the responsibility of the general contractor/construction manager to ensure that project/site conditions are acceptable for the installation of the indoor resilient athletic flooring.
- .2 Verify that the area in which the indoor resilient athletic surfacing will be installed is dry and weather tight. Verify that permanent heat, light and ventilation is installed and operable.
- .3 Verify that all other work that could cause damage, dirt and dust or interrupt the normal pace of the indoor resilient athletic flooring installation is completed or suspended.
- .4 Verify that there is a stable room temperature of at least 65°F.
- .5 Verify that there are no foreign materials or objects on the subfloor and that the subfloor is clean and ready for installation.

- .6 Direct Full Spread Adhering to Concrete Sub-floor: moisture content less than 6 pounds/1,000 ft²/24 hours when tested using calcium chloride per ASTM F 1869 or no more than 83% RH when tested per ASTM F2170.
- .7 If both tests are performed, use the highest value. Do not average the results of the tests. Report all field test results in writing to the General Contractor, Architect, and End User prior to installation.
- .8 Verify that the concrete subfloor surface pH level is within the 7-10 range.
- .9 Document the results indicating the slab is within manufacturer's tolerances for slab deviation.

3.2 PREPARATION

- .1 Mechanically prepare the entire surface to obtain minimum IRCI concrete surface profile of 3 (CSP 3). Substrate must be prepared by mechanical means such as shot blasting.
- .2 Broom sweep and vacuum the prepared surface.
- .3 Install the moisture control system followed by a Portland cement based floor finish underlayment in strict accordance with the manufacturer's technical recommendations.

3.3 INSTALLATION

- .1 The installation area shall be closed to all traffic and activity for a period to be set by the indoor resilient athletic surfacing installer. The indoor resilient athletic surfacing installation shall not begin until the installer is familiar with the existing conditions.
- .2 All necessary precautions should be taken to minimize noise, smell, dust, the use of hazardous materials and any other items that may inconvenience others.
- .3 Install the indoor resilient athletic surfacing in strict accordance with the indoor resilient athletic surfacing manufacturer's written instructions.
- .4 Install the indoor resilient athletic surfacing minimizing cross seams. Provide a seam diagram during the submittal process for approval prior to installation.
- .5 Install appropriate threshold plates or transition strips where necessary.

3.4 CLEANING

- .1 Remove all unused materials, tools, and equipment and dispose of any debris properly. Clean the indoor resilient athletic surfacing in accordance with the manufacturer's instructions.

3.5 PROTECTION

- .1 If required, protect the indoor resilient athletic surfacing from damage using coverings approved by the manufacturer until acceptance of work by the customer or their authorized representative.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 1.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 INTENT

- .1 Provide all articles, labour, materials, equipment, transportation, hoisting and incidentals noted, specified or required, to complete the work of this Section.

1.3 SECTION INCLUDES

- .1 Supply labour, material, and equipment for the complete and finished application of terrazzo to all areas indicated on the Room Finish Schedule, drawings and specification.
 - .1 Terrazzo Floors and Bases
 - .2 Curing Compounds and Admixes
 - .3 Surfacing and Grouting
 - .4 Cleaning and Sealing

1.4 RELATED SECTIONS

- .1 Section 04 20 00 – Unit Masonry.
- .2 Section 09 30 00 – Tiling.

1.5 REFERENCES

- .1 ASTM A185-02: Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
- .2 CAN/CGSB-25.20-95: Surface Sealer for Floors.
- .3 CAN/CSA-A3001-03: Cementitious Materials for Use in Concrete.
- .4 Terrazzo, Tile and Marble Association of Canada (TTMAC): 2002 Terrazzo Specification Guide.

1.6 SAMPLES

- .1 Submit minimum 300 mm X 300 mm (1'-0" X 1'-0") samples, of terrazzo in colours and types specified for review by the Consultant.

1.7 QUALITY ASSURANCE

- .1 Installers: use mechanics with terrazzo training and experience as certified by the Terrazzo, Tile and Marble Association of Canada.

1.8 REJECTIONS

- .1 Defective materials or quality of work whenever found at any time prior to acceptance of the work shall be rejected regardless of previous inspection. Inspection will not relieve responsibility but is a precaution against oversight and error.
- .2 Remove and replace defective materials and work of other Trades affected by this replacement, at no additional cost to the Owner.

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 61 00.
- .2 Store materials in a warm dry room, undamaged, in original containers or cartons, and in an area that will not interfere with the work of other trades.

2 PRODUCTS

2.1 MATERIALS

- .1 It is intended that the materials for Terrazzo Flooring will match the existing flooring. Patched areas to blend into existing floor. Divider strips to be located to match existing.
- .2 Portland Cement: to CAN/CSA-A3000,
 - .1 Type 10, grey for underbed, topping colour to match existing flooring.
- .3 Sand, fine and coarse aggregates:
 - .1 To CSA A23.1/A23.2.
 - .2 Clean, washed, locally available.
 - .3 Oval aggregate.
- .4 Marble Chips: sound, free from dust and to match existing flooring. Graded in accordance with TTMAC standard. Abrasion resistance to ASTM C241/C241M.
- .5 Colour Pigments: Non-Fading Mineral Pigments to match existing flooring colours.
- .6 Waterproof/Sealer: non-staining, to CAN/CGSB-25.20.
- .7 Divider Strips: 32 mm (1¼") deep, standard B type. (Aluminum, brass, zinc) provided with necessary anchorage devices.
- .8 Non-Slip Aggregate: silicone carbide or aluminum oxide chips (Maximum Size No. 1) added to terrazzo topping; colour to match existing terrazzo flooring where existing
- .9 Non-Slip Strips: fine aluminum oxide with cement mixture.
- .10 Non-Slip Strip Channels: 10 mm x 10 mm (3/8" x 3/8"), 0.91 mm (0.036") thickness, dove tailed shaped channels with anchor tabs.
- .11 Reinforcing Mesh: to ASTM A185, 50 mm x 50 mm (2" x 2"), No. 16 x No. 16, steel, electric welded, galvanized after fabrication.

- .12 Slip Sheet: 0.05 mm (2 mil) thick polyethylene film.
- .13 Curing Compound: non-staining, as recommended by TTMAC.

3 EXECUTION

3.1 EXAMINATION

- .1 Report to the Consultant, in writing, any defects of work prepared by other trades and unsatisfactory site conditions.
- .2 Do not commence work of this Division until surfaces specified to receive terrazzo are dry, clean level; free from cracks, ridges, dusting, scaling, carbonation, mortar droppings, parging, curing compounds, grease, oil, or other foreign material liable to impair adhesion, performance or appearance.
- .3 Commencement of work implies total acceptance of all surface conditions by the Terrazzo Flooring Contractor.
- .4 Waive any after claims by failure to comply with the above procedure of examination.

3.2 SUBSTRATE TREATMENT

- .1 Bonded Terrazzo
 - .1 Clean base slab and saturate with water.
 - .2 Remove free water.
 - .3 Apply a slurry consisting of a thick paste of cement and water immediately preceding application of underbed.
- .2 Floating Terrazzo
 - .1 Broom clean base slab.
 - .2 Fill voids with loose sand.
 - .3 Apply 1 ply polyethylene film over sand.
 - .4 Lap joints 100 mm (4").
 - .5 Install mesh reinforcing over polyethylene. Lap mesh joints 50 mm (2") and nail or staple to wood flooring.
- .3 Underbed: 1 part cement to 4 parts sand. Wet and mix thoroughly.
 - .1 Apply over substrate; make allowance for terrazzo topping 19 mm (3/4").
 - .2 Allow a minimum 24 hours cure period before applying terrazzo topping.
 - .3 Use a maximum 18 litres (4 gallons) of water per bag of cement.
- .4 Divider Strips
 - .1 Install divider strips in underbed while it is still in a plastic state. Set strips true and level.

- .2 Divide floor area into panels 760 mm (2'-6") square approximately.
- .3 Separate terrazzo from resilient flooring and carpet floor areas.
- .4 Consultant to provide divider pattern layout.

3.3 TERRAZZO TOPPING

- .1 Terrazzo topping shall consist of 91 kg (200 lb.) of marble chips to 1 bag 36 kg (80 lb) of cement mixed dry.
- .2 Topping shall be minimum 16 mm (5/8") thick.
- .3 Topping shall contain integral waterproofing agent.
- .4 Soak underbed, minimum of 24 hours after installation, remove excess water, and apply a slurry of cement and colour using same proportions as topping.
- .5 Wet topping mixture, mix and apply to underbed while slurry is still wet. Sprinkle wetted marble chips to match sample. Roll with heavy rollers (minimum 91 g (200 lbs.)). Hand trowel to level topping flush with top of divider strips.
- .6 Surface and grout terrazzo when it has set sufficiently hard. Surface by machine rubbing with No. 24 grit or finer abrasive block. Use plenty of water during grinding.
- .7 Flush terrazzo surfaces with water only, after initial grinding.
- .8 Apply grout to fill voids. Mix grouts in same proportions of cement and colour as topping.
- .9 Allow grout to cure for 48 hours.
- .10 Resurface using No. 120 grit abrasive blocks and plenty of water.
- .11 Remove grout residue, scrub terrazzo with clean water and dry. Dry thoroughly with vacuum cleaner.
- .12 Apply first application of sealer immediately, in accordance with manufacturer's instructions, wipe off excess sealer before it dries.
- .13 Apply second application of sealer prior to completion of project, in same manner as first coat. Clean terrazzo as previously specified.
- .14 Apply two coats of surface finish.

3.4 NON-SLIP TERRAZZO TOPPING

- .1 Install non-slip terrazzo in the following areas:
- .2 Mix abrasive chips integrally through topping in proportion 1 part abrasive chips to 2 parts marble chips.
- .3 Immediately following initial rolling, sprinkle abrasive chips so that finished surface contains 20 kg (40 lbs) of non-slip aggregate per 10 sq.m. (100 sq.ft.) of floor area. Apply in two passes, right angle to each other. Lightly roll and trowel into topping.

3.5 TERRAZZO BASES

- .1 Apply underbed consisting of 1 part cement to 4 parts sand and sufficient water to form a stiff mix.
- .2 Install cove base dividers in line with floor dividers.
- .3 Apply terrazzo topping in a similar manner as for floors; omit sprinkling of surface chips and rolling.
- .4 Topping to match floor topping.

3.6 CLEANING

- .1 Upon completion and acceptance of all work of this Section remove from the site all debris tools and equipment of this Trade.

3.7 PROTECTION

- .1 Protect all terrazzo work during period of construction.
- .2 Be responsible for the protection of the work of other trades during and after the installation of the terrazzo work.
- .3 Traffic is prohibited on terrazzo floors for a period of 24 hours after installation. Protect newly ground floors from damage and staining.
- .4 Correct all defects to the satisfaction of the Consultant.
- .5 Protect the finished floor with suitable material, plywood, plastic or by keeping traffic off the floor until the building or area is ready for occupancy.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with Instructions to Bidders, the General Conditions of the Contract as amended by the Supplementary Conditions including all Sections outlined in Division 00 – Procurement and Contracting Requirements and Division 01 - General Requirements.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 SECTION INCLUDES

- .1 Complete painting of all surfaces noted on drawings, on Room Finish Schedule and as follows:
 - .1 Interior:
 - .1 Gypsum surfaces
 - .2 Metal surfaces - prime painted and galvanized, including but not confined to hollow metal doors and frames, access panels, exposed piping, exposed structure.
 - .3 Masonry surfaces
 - .4 Concrete surfaces

1.3 RELATED SECTIONS

- .1 Section 07 92 00 – Joint Sealants.

1.4 REFERENCES

- .1 CAN/CGSB-1.57-2003: Interior Alkyd Semi-gloss Enamel.
- .2 CAN/CGSB-1.100-99: Interior Flat Latex Paint.
- .3 CAN/CGSB-1.119-2000: Interior Latex Primer-Sealer.
- .4 CAN/CGSB-1.175-97: Polyurethane Interior Coating.
- .5 CAN/CGSB-1.188-2004: Emulsion Filler for Masonry Block.
- .6 CAN/CGSB-1.195-99: Interior Latex Semi-gloss Paint
- .7 CAN/CGSB-1.209-2003: Interior Latex Low Gloss Paint.
- .8 Environmental Choice Program ECP 07.89: Water-borne Surface Coatings.
- .9 Environmental Choice Program ECP 02.89: Solvent-borne Paints.
- .10 Master Painters Institute: Architectural Painting Specification Manual.
- .11 Steel Structures Painting Council.
- .12 C.P.C.A. – Canadian Painting Contractors Association – Painting Manual.
- .13 G.G.S.B. – Standard for Paint.

1.5 SAMPLES

- .1 Submit brush-outs 150 mm x 150 mm of each paint application, labelled as to product and location.
- .2 Proceed with painting and staining mock-up only when colour and finish has been approved.

1.6 QUALITY ASSURANCE

- .1 Employ fully trained workmen who are regularly employed in this field.
- .2 Comply with VOC limits set out by Green Seal Organization for all non-alkyd and non-epoxy coatings/paints.

1.7 REJECTIONS

- .1 Defective materials or quality of work, whenever found, at any time prior to acceptance of the work, shall be rejected regardless of previous inspection. Inspection will not relieve responsibility but is a precaution against oversight or errors.
- .2 Remove and replace defective materials and work of others affected by this replacement, at no additional cost to the Owner.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 61 00.
- .2 Bring materials to the site in the original unopened containers labelled to indicate the name of the manufacturer, brand, colour and quality of the contents.
- .3 Store thinners, loose soaked rags and similar combustible materials in closed containers. Remove from site or store in an assigned area.
- .4 Store paint materials at temperatures recommended by manufacturer.

1.9 PROJECT CONDITIONS

- .1 Cooperate in coordinating the work of other Sections with the work of this Section, so that the work may proceed in an orderly and effective manner.
- .2 If requested, provide proof of purchase of all paint materials needed for the job.

1.10 ENVIRONMENTAL CONDITIONS

- .1 Maintain minimum interior temperature of 18 degrees C during application and drying of paint and maintain until handover to Owner.
- .2 Do not paint when ambient air and surface temperatures are less than 15 degrees C for 24 hours before or during painting application.
- .3 Test for moisture content in each location immediately before commencing application of paint. Do not apply paint on surfaces where moisture content exceeds 14%. Promptly notify Consultant if such conditions exist.

1.11 SCHEDULING

- .1 Unoccupied Areas: Cooperate with other trades to minimize touch-ups, but to ensure completion prior to installation of floor coverings and furniture.
- .2 Occupied Buildings: Schedule painting to prevent disruption to occupants. Painting shall be carried out as arranged/agreed with Owner.

1.12 EXTRA MATERIALS

- .1 Supply one (1) litre of each finish material in each colour used at the Place of the Work, properly labelled.

1.13 TEST AREA

- .1 A room or area in the building will be designated by the Architect as a test area to establish standard or workmanship, texture, gloss and coverage.
- .2 Prior to any painting being started, request a meeting on Site between Architect, Contractor, Sub-contractor, to review conditions, surfaces, anticipated problems and to clarify quality of workmanship acceptable to Architect. Minutes are to be documented by the Contractor and distributed to all parties at the meeting.
- .3 Apply finishes to each type of surface within room with correct material, coats, colour, texture and degree of gloss in sample area and have same approved prior to providing Work of this Section. On concrete block walls complete one wall with block filler only, one wall with block filler and one finish coat, one wall with block filler and two finish coats.
- .4 Clearly mark area as the test area. Retain test area until after completion of Work. Test area to be minimum standard for the Work.
- .5 Failure to comply with the above will be cause for the Architect to request all Work previously painted to be repainted.

2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS AND PRODUCT

- .1 Paints, stains and varnish:
 - .1 General Paint
 - .2 Benjamin Moore
 - .3 Sherwin-Williams
 - .4 Zinsser
 - .5 Glidden
- .2 Water-based Epoxy:
 - .1 Sherwin-Williams B70W00211 Water-based Catalyzed Epoxy Extra White/Tint base
A/B60V00025-Water-based Catalyzed Epoxy Egg Shell or Semi-Gloss Hardener Part B

- .2 Glidden – 4420 - True Glaze Water born Epoxy / 4426 True Glaze Egg Shell or Semi-Gloss Converter
- .3 Latex Super Adherent Primer:
 - .1 General Paint 51-050 Premium Latex Plastic Primer
 - .2 Benjamin Moore #23-00 Freshstart Acrylic Primer Sealer
 - .3 Zinsser 1-2-3 Acrylic Primer Sealer
 - .4 Sherwin-Williams – B51WQ8850 – Adhesion Primer
 - .5 Glidden Latex Super Undercoat 94280
- .4 Interior Latex Block Filler:
 - .1 Glidden # 36250 Concrete Block Filler
 - .2 Sherwin-Williams B42W00046 Heavy Duty Block Filler
 - .3 General Paint 70-224 Premium Latex Block Filler
 - .4 Benjamin Moore #595-01 Latex Block Filler
- .5 Stain Suppressant Sealer/Primer Hi-Hide:
 - .1 General Paint, 60-200 X-Terminator 2 Later Sealer
 - .2 Zinsser BIN Primer, hi-hide (spot priming only)
 - .3 Sherwin-Williams B49WQ8820 Multipur LTX Primer
 - .4 Glidden Jammer 200
- .6 Rust Inhibiting Metal Primer:
 - .1 Sherwin-Williams B66-310 Pro-Cryl Universal Primer
 - .2 Devoe Coatings, Devflex 4020PF Direct to Metal Primer
- .7 Dry Fall:
 - .1 Benjamin Moore and Co. Ltd. #597-01 Sweep-Up Spray Latex Flat
 - .2 Glidden #10120 Spraymaster Latex Eggshell
 - .3 Sherwin-Williams B42W2 Waterborne Acrylic Dry Fall, Eggshell

2.2 MATERIALS

- .1 Colours shall be those selected by the Architect as per finish plan. All primers and undercoats may be tinted to no more than 25% of the intensity of the finish colour. Where deep/intense colours are specified, only colours from the nearest factory premixed colour selection shall be altered to match those specified. The application of Clear Base Deep Tints in either Primer or Finish is not acceptable.

- .2 All primer and paint must be delivered to the job site in manufacturer's original containers.
- .3 All materials used in this painting contract are to be applied according to product label directions and in accordance with information stated on the Products Data Specification sheet.
- .4 Unless otherwise indicated two coats of the specified finish paint are required.
- .5 Any work not conforming to the specification, or not meeting with the approval of the Architect, shall be removed, or corrected and or/repainted.

3 EXECUTION

3.1 INSPECTION

- .1 Verify that all surfaces and substrate conditions are ready to receive work, as per the instructions of the product manufacturer.
- .2 Minimum application temperatures for latex paints:
 - .1 Interior 7°C; Exterior 10°C.
- .3 Beginning of installation means acceptance of site conditions.

3.2 PREPARATION

- .1 The painting contractor shall be wholly responsible for the quality of his work and is not to commence any part of it until surface is in proper condition.
- .2 If the painting contractor considers any surface unsuitable for proper finishing, he is to notify the Architect of this fact in writing. He is not to apply any material until corrective measures have been taken or they have instructed him to proceed.
- .3 All surfaces are to be clean, dry, and free from contaminates such as, but not limited to oil, grease, or dust. If for any reason the surface cannot be cleaned, this condition shall be reported to the Architect promptly.
- .4 If the painting contractor has been instructed by the Architect to begin painting under conditions and circumstances he believes could result in poor performance and early failure of the coatings, he shall request an order to proceed in writing. The first coat of primer or finish should be applied soon after surface has been cleaned properly to prevent contamination of the substrate.
- .5 All manufacturers' directions must be followed regarding surface and product preparation. Product failure due to non-compliance and any indicated corrective measures shall be the Contractor's responsibility. Surface irregularities and blemishes shall be repaired with materials which match strength, and texture of surrounding surfaces.
- .6 Walls and Ceilings: Preparation shall consist of a strong solution of tri-sodium phosphate and water, followed by a clear water rinse.

- .7 Metal surfaces: Such as but not limited to; hollow metal doors and frames, ducts, metal roof decks. Solvent wash to remove protective oil films consistent with SSPC -SP1. All surfaces must be free of grease, oil, mildew, dirt and shall be cleaned in accordance with SSPC-SP1 Solvent cleaning. This method employs the use of emulsifiers or solvents to remove surface contaminants such as oil, grease, soil, cutting compounds, etc. Thoroughly scrub entire surface with solvent. Replace cleaning rags frequently to avoid spreading the surface contaminants around. Repeat process at least once. Use clean rags for final cleaning. Use this cleaning standard as a first step prior to any abrasive blasting standards.
- .8 Wooden surfaces: All surfaces must be free of grease, oil, wax, and dust. Use solvents to remove surface contaminants. Thoroughly scrub entire surface with solvent using steel wool or Scotch Brite pads. Replace cleaning rags frequently to avoid spreading the surface contaminants around. Repeat the process at least once. Use clean rags for final cleaning.
- .9 Walls and Ceilings: Loose or flaking paint must be removed, and feather edge sanded to produce a smooth uniform surface. Any defects should be filled with an appropriate patching compound. Bare surfaces or patch compound must be primed with specified primer. High gloss painted surfaces must be dulled with sandpaper especially those that are high gloss alkyd or urethane. Surfaces to receive paint must be finished to a level 5 finish.
- .10 Metal Surfaces: Such as, but not limited to previously painted hollow metal doors and frames, ducts, metal roof decks. Remove loose mill scale, non-adherent rust, scaling paint, and other foreign matter consistent with SSPC-SP2 by employing the use of scrapers, sandpaper, wire brushes, or hand impact tools. Bare surfaces must be primed with specified primer. High gloss painted surfaces must be dulled with sandpaper especially those that are high gloss alkyd or urethane.
- .11 Wooden Surfaces: All surfaces shall be free of loose or failing paint or clear coatings. Sand using 100 grit sand paper with the grain or employ a paint scraper in a manner consistent with removing the coating only so as to not damage the surface of the wood. Paint stripper may be employed taking care not to contact and damage adjacent surfaces. Sand surface to a final smoothness with the grain using 220 grit sandpaper wipe surface with a clean tack cloth to remove sanding dust. Spot prime any bare wood areas with the appropriate primer or clear coating.
- .12 Prepare surfaces in accordance with covering manufacturer's instructions.

3.3 APPLICATION

- .1 Perform mandatory surface cleaning and preparation prior to commencing this section.
- .2 Application of primers and finishes shall be by brush, roller, spray, or a combination of those methods.
- .3 On each designated substrate, apply in compliance with this specification, only the approved products or product combinations.
- .4 Exterior Precast – Previously Painted:
 - .1 Exterior grade latex super adherent primer: one coat
 - .2 Exterior grade water based catalyzed epoxy semi-gloss: two coats
- .5 Concrete Block – Previously Painted:
 - .1 Latex super adherent primer: one coat
 - .2 Water based catalyzed epoxy semi-gloss: two coats

- .6 Drywall Board
 - .1 Latex super adherent primer: one coat
 - .2 Water based catalyzed epoxy egg-shell or semi-gloss: two coats
 - .3 Ceilings are to receive egg-shell finish
- .7 Hollow Metal Doors/Frames
 - .1 Sherwin-Williams Pro-Cryl Universal Primer: one coat
 - .2 Water based catalyzed epoxy semi-gloss: two coats
- .8 Woodwork to be Stained and Varnished
 - .1 1-coat wood stain
 - .2 2-coats varnish (satin)
- .9 Apply products in accordance with manufacturer's instructions.
- .10 Sand lightly between coats to achieve required finish.
- .11 Do not apply finishes to surfaces that are not dry.
- .12 Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surfaces.
- .13 Finishes and number of coats specified in the schedule are intended to cover surfaces perfectly. If they do not, apply further coats until perfect coverage and colour are achieved as required.
- .14 Dark colours will require multiple coats to full saturation and coverage. Acceptance will be confirmed by Consultant.
- .15 Any areas exhibiting incomplete or unsatisfactory coverage shall have the entire plane painted. Patching will not be acceptable.
- .16 Walls needing repainting, entire wall/plane shall be painted to the satisfaction of the Architect.
- .17 Primer and subsequent top coats are to be products from same manufacturer unless otherwise stated in this specification.
- .18 Concrete Block: Block filler is to be applied at the minimum rate of 80 sq ft per gallon (1.63 m² per litre), or as required by block texture to completely fill block. **Pinholes will not be accepted.** Apply more block filler if necessary to completely fill the block before applying finish coats. Note that lightweight block requires more block filler to fill than standard weight block does and adjust application rate as required.
- .19 Paint gas piping on exterior of building.
- .20 Paint all exposed piping within school.
- .21 Paint all exposed structural steel.

3.4 PROTECTION

- .1 Protection (drop sheets, tarps, plywood decking and masking) for surfaces not being painted under this Specification shall be supplied and kept in place during the project. It will be the Contractor's responsibility to repair any and or all damaged surfaces.
- .2 Wall mounted electrical fixture face plates, such as but not limited to; receptacles, switch boxes, cover plates, etc. are to be removed before painting and are to be replaced at completion of painting.
- .3 Upon completion of a room or area, it shall be left in a clean and orderly condition and all paint splatters, contaminated rags and trash shall be removed.
- .4 Upon completion of the job, the Painting Contractor is to remove all surplus materials and scaffolds that relate to his trade from the premises.
- .5 It will be the Contractor's responsibility to ensure the rooms being painted have adequate fresh air for safe occupancy by workers.

3.5 CLEANING

- .1 As work proceeds, promptly remove paint where spilled, splashed or spattered.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 1.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 INTENT

- .1 The following prefabricated items to be supplied and installed:
 - .1 Whiteboards
 - .2 Tackboards.
 - .3 Aluminum trim.
 - .4 Projection Screens with all mounting brackets and accessories.
 - .5 Projector Mounting arm, brackets and accessories.

1.3 SUBMITTALS

- .1 Shop Drawings
 - .1 Submit shop drawings as specified in Section 01 33 00, specifically provide the following:
 - (1) Location, type, size and panel arrangement.
 - (2) Backing, hardware and anchor details.
 - (3) Frame, trim and accessories.

1.4 REJECTIONS

- .1 Defective materials or quality of work, whenever found, at any time prior to acceptance of the work, shall be rejected regardless of previous inspection. Inspection will not relieve responsibility but is a precaution against oversight or errors.
- .2 Approved Manufacturers: The manufacturers listed are only approved if they can provide the product as described.
- .3 Remove and replace defective materials and work of other trades affected by this replacement, at no additional cost to the Owner.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 61 00.
- .2 Deliver and store materials undamaged in original cartons or wrappings.
- .3 Store material in a secure, dry area.

2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- .4 ASI Visual Display Products: Mississauga, Ontario. Phone: 905-822-4287.
- .2 CPE Design Solutions: Contact: Robert Scheidler. Phone: 905-334-3925
- .3 Global School Products: Mississauga, Ontario. Phone: 905-565-9314.

2.2 MATERIALS

- .1 Manual projection screens:
 - .1 Heavy duty, spring roller operated, steel case. Pentagonal, flat back design, steel case with scratch-resistant white textured finish. Universal hanging brackets for attachment to wall or ceiling. Case 22 gauge steel with matching end caps with integral roller brackets.
 - .2 Screen size: 96 in x 96 in
 - .3 Locations: as shown on Drawings.
 - .4 Accessories:
 - (1) Chain Hangers
 - (2) All mounting hardware.
 - (3) Pull rods (1 each).
 - (4) Ceiling trim kits.
 - .5 Acceptable Products
 - (1) Luma 2 with AR, by Draper Shade and Screen Company Inc., Spiceland IN (distributed by First Vision, Toronto ON).
 - (2) Model C with CSR, by DA-Lite Screen Company, Warsaw IN.
- .2 "VDP" (video-digital-projector), mounting pipe and mount
 - .1 At locations shown on Drawings, provide Chief RPAU projector mount with Chief CMA 395 angled ceiling adapter and CMS extension pole.
 - .2 Mounting pipe shall have 1-1/2 in. NPS threads.
 - .3 VDP bracket mounting pipe to be mechanically fastened to existing precast beams where shown on Drawings, centered on projection.
 - .4 Bottom of VDP bracket mounting pipe to be level with top of projection screen. Projection screen to be mounted 4" below ceiling.
 - .5 Provide shop drawings.
 - .6 Shop paint exposed pipe flat black.

.3 Whiteboards

- .1 Whiteboards core shall be impregnated sound absorbing fibreboard, 12 mm (7/16") thick. Laminate under heat and pressure.
- .2 All whiteboards shall consist of face panel, core, balancing rear sheet, trim and chalk rails.
- .3 Face panel shall be 28 gauge high quality enamelling steel base with a porcelain enamel writing surface fused to a ground coat of not less than 0.076 mm (.003") nor more than 0.127 mm (.005") after firing at temperatures between 730 Deg C. (1350 Deg F) and 760 Deg C (1400 Deg 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 Deg glossometer. Colour: white.
- .4 Surface shall be washable. General household detergents shall not damage face panel in any manner. Surface shall be cleanable with acetone, alcohol, and cleaning fluid.
- .5 Balancing rear sheet shall be 28 gauge zinc coated stretcher leveled steel in one unjointed section. Overall thickness of whiteboard lamination shall not exceed 12.5 mm (1/2").
- .6 Vertical jambs shall be provided for all chalkboards/whiteboards, same length of board, complete with contour fittings and castings.
- .7 Trim shall be aluminum 6063T5 alloy with clear etched, anodized satin finish 0.051 mm (.002") satin finish, free from extruding draw marks and surface scratches. Perimeter trim shall be 19 mm (3/4") exposed face, weight of approximately 91 g (.20 lbs) per linear foot. Use A.S.P. Series 200 Trim, or approved equal. Use A.S.P. No. 207 divider bar – aluminum trim for adjacent whiteboard/whiteboard panels, whiteboard/tackboard panels to be 12.7 mm (1/2") exposed face and weight of approximately 113 g (.25 lbs) per linear foot. Use No. 206 map rail over all whiteboards. Use No. 200 perimeter to sides of whiteboard and around fixed tackboard.
- .8 Use No. 264 marker tray and end caps where whiteboard is located over architectural woodwork. Use No. 212 marker tray and end caps in all other whiteboard locations. Provide recessed marker tray for whiteboards in gymnasium.
- .9 Accessories manufacturer's standard:
 - (1) Map hooks every 90 mm o.c.

.4 Tackboards

- .1 All tackboards shall be 12.5 mm (1/2") factory prelaminated. One half the thickness indicated shall be A.S.P. natural cork, fine grain laminated to 6.25 mm (1/4") particleboard or Masonite substrate under mechanical pressure.
- .2 Maximum panel sizes shall be 1200 mm x 2400 mm (4' x 8'). Use bonding of materials by a waterproof adhesive that will not delaminate or rupture at the contact surfaces for all material bonding.
- .3 Trim shall be aluminum 6063T5 alloy with clear etched, anodized 0.051 mm (0.002") satin trim 0.051 mm (.002") satin finish, free from extruding draw marks and surface scratches. Weight shall be 90 g (0.20 lbs) per foot.

.4 All tackboards shall be mounted as per manufacturer's instructions. See drawing for location. Perimeter trim shall be 19 mm (3/4") exposed face.

.5 See plans for tackboard size, location, and number.

3 EXECUTION

3.1 EXAMINATION

- .1 Report to the Consultant, in writing, all defects of work prepared by other trades and on unsatisfactory site conditions.
- .2 Do not commence the work of this Division until surfaces, area, conditions specified or indicated on drawings, to receive manufactured specialties, are compatible with the manufacturer's installation requirements.
- .3 Commencement of work implies total acceptance of all preliminary installation requirements by the Contractor installing manufactured specialty items.
- .4 Waive any after claims by failure to comply with the above procedure of examination.

3.2 INSTALLATION

- .1 Carry out installation of information specialties by tradesmen with the necessary training and experience, and certified by the manufacturer or the Contractor.
- .2 Conform to manufacturer's printed installation instructions and/or shop drawings.
- .3 Install components to ensure a rigid, straight, square, plumb installation with horizontal lines level.
- .4 Securely attach aluminum trims to ensure that all fastenings are concealed.
- .5 Adhere tackboards to wall surface with an approved adhesive in egg-size blobs at approximately 200 mm (8") OC. Press tackboards firmly into adhesive, ensuring proper adhesion.
- .6 Join chalkboards together using steel spline and extruded polyvinyl slotted inserts to ensure a flush butt joint with a hairline appearance.

3.3 CLEANING AND PROTECTION

- .1 Be responsible for protection of all manufactured specialty work during period of construction.
- .2 Upon completion of installation of all manufactured specialty items remove all excess material, empty cartons, wrappings, etc. and remove any dirt spots and foreign material from the installed items, leaving them in a clean, usable condition.

3.4 CLEAN-UP

- .1 Upon the completion of work, remove from the site all surplus materials and debris caused by this work and leave the site in a clean condition to the satisfaction of the Consultant.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the Instructions to Bidders, the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 1.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 INTENT

- .1 The following prefabricated items to be supplied and installed:
 - .1 Toilet partitions
 - .2 Grab Bars
 - .3 Utility Shelf
 - .4 Backrests
 - .5 Wall mounted rail and wall pads
- .2 The following items to be supplied by the Waterloo Region District School Board and installed by Section 06 20 00.
 - .1 Paper towel dispensers.
 - .2 Soap dispensers.
 - .3 Toilet tissue dispenser.
- .3 Approved Manufacturers: The manufacturers listed are only approved if they can provide the product as described.

1.3 SUBMITTALS

- .1 Shop Drawings
 - .1 Submit shop drawings as specified in Section 01 33 00, specifically provide the following:
 - (1) toilet partitions, grab bars,

1.4 REJECTIONS

- .1 Defective materials or quality of work, whenever found, at any time prior to acceptance of the work, shall be rejected regardless of previous inspection. Inspection will not relieve responsibility, but is a precaution against oversight or errors.
- .2 Remove and replace defective materials and work of other trades affected by this replacement, at no additional cost to the Owner.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Refer to Section 01 61 00.
- .2 Deliver and store materials undamaged in original cartons or wrappings.
- .3 Store material in a secure, dry area.

1.6 WARRANTY

- .1 Contractor shall guarantee the installation and materials against defective material and workmanship for a period of two (2) years from the date of Substantial Completion.

2 PRODUCTS

2.1 MATERIALS

- .1 Provide new materials in perfect condition, free from defects impairing strength, durability or appearance.
- .2 Refer to the Architectural plans for location and required quantity of items specified.

2.2 TOILET PARTITIONS

- .1 Partitions, as shown on plans, shall be: floor mounted, overhead braced.
- .2 Metal compartments to be 20 gauge minimum galvanized steel, with honeycomb core, masonite reinforced and welded corners. Hardware to be installed with tamperproof screws and through bolted. Doors need to be un-lockable from the outside or by lifting up the door to release the catch. Provide continuous door stops or acceptable alternative. Overhead braces to be anti-grip design, 2080 mm above the floor. Provide anti-graffiti paint. Colour as selected by Architect from manufacturer's standard colour chart.
- .3 Stalls shall be of size on Drawings or suitable for the finished wall to wall distances provided. Verify on site. Equip each partition with doors hung on adjustable enclosed gravity type hinges; stainless steel or chrome plated substantial hardware including sliding latch, doorstop and keeper and bumper.
- .4 Approved Manufacturers:
 - .1 Bobrick, Model: Head Rail Braced Toilet Partition, (416)-298-1611.
 - .2 Hadrian Manufacturing Inc. (Steel), (416)-333-0300.
 - .3 Watrous Architectural Products (Plastic Laminate), (416)-438-6300.

2.3 GRAB BARS AT BARRIER FREE WASHROOMS

- .1 No. 1: 1¼ in. diameter stainless steel, 24 in. long straight bar, standard flange position at back of water closet.
- .2 No. 2: L-shaped bar as detailed 1¼ in. diameter stainless steel, 30 in. long horizontal and vertical 30 in. at side of water closet.
- .3 NOTE: Install No. 1 and No. 2 grab bars at each barrier free water closet.

.4 NOTE: Grab bars to be 18 gauge stainless steel tubing with Mandrel bends. Knurled grab bars to be peened grip full length of the tubing to within 4 in. of ends of bends. Secure concealed fastening grab bars with 2½ in. No. 14 screws to solid backing, capable of supporting a 500 lb pull. All accessories must comply with "Building Standards for the Handicapped 1997" of the Ontario Building Code as currently amended.

.5 Approved Manufacturers:

.1 ASI-Waterous

.2 Bobrick

.3 Frost

2.4 UTILITY SHELF

.1 Supply and install one (1) stainless steel shelf projecting not more than 100mm from finished wall, mounted not more than 1100mm above finished floors.

2.5 BACKREST AT UNIVERAL WASHROOMS

.1 Grab bar shall be Type-304 stainless steel with satin finish. Grab bar shall have 18-gauge 1.2mm (18-gauge) wall thickness and 30mm (1-1/4") outside diameter. Clearance between the grab bar and wall shall be 210mm (8-1/4"). Concealed mounting flanges shall be 3mm (11-gauge) stainless steel plate, 50 x 80mm (2" x 3-1/8") and equipped with six screw holes for attachment to wall. Flange covers shall be 0.8mm (22-gauge) stainless steel, 85mm (3-1/4") diameter, and shall snap over mounting flanges to conceal mounting screws. Ends of grab bar shall pass through concealed mounting flanges and be heliarc welded to form one structural unit. Grab bar shall be equipped with a 360 x 160 x 40mm (14-1/4" x 6-3/8" x 1-5/8") white polyurethane integral foam backrest.

.2 Mounting: vertically as shown on Drawings.

.3 Acceptable Manufacturers and models:

.1 Bobrick, Model B-5892

.2 Equivalents by Frost or ASI Watrous

2.6 WALL PADS AND RAILS

.1 Manufactured by: Gymnasium and Health Equipment Ltd. or Apple.

.1 Wall Pads – Removable SFM-1016 or 01016 (Apple). Removable pads to be 2" thick, 7' H.

.2 Wall Rail – VEL – 69C (aluminum rail) or 02011 (Apple) and VEL69B Velcro Strip.

2.7 HOOK

.1 Stainless steel utility hook, Model RH2112016 by Richelieu.

2.8 SANITARY NAPKIN DISPOSAL

.1 Surface mounted disposal, brushed stainless steel. Pivoting self closing lid. French/English napkin disposal label is embossed on lid.

.2 Acceptable product and manufacturer:

- .1 Surface Mounted Sanitary Napkin Disposal – Stainless – 622 by Frost.

3 EXECUTION

3.1 EXAMINATIONS

- .1 Report to the Consultant, in writing, all defects of work prepared by other trades and on unsatisfactory site conditions.
- .2 Do not commence the work of this Division until surfaces, area, conditions specified or indicated on drawings, to receive manufactured specialties, are compatible with the manufacturer's installation requirements.
- .3 Commencement of work implies total acceptance of all preliminary installation requirements by the Contractor installing manufactured specialty items.
- .4 Waive any after claims by failure to comply with the above procedure of examination.

3.2 INSTALLATION

- .1 Carry out installation of manufactured specialty items by tradesmen with the necessary training and experience and certified by the manufacturer or by the Contractor.
- .2 Conform to manufacturer's printed installation instructions and/or shop drawings.

3.3 CLEANING AND PROTECTION

- .1 Be responsible for protection of all manufactured specialty work during period of construction.
- .2 Upon completion of installation of all manufactured specialty items remove all excess material, empty cartons, wrappings, etc. and remove any dirt spots and foreign material from the installed items, leaving them in a clean, usable condition.

3.4 CLEAN-UP

- .1 Upon the completion of work, remove from the site all surplus materials and debris caused by this work and leave the site in a clean condition to the satisfaction of the Consultant.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with Instructions to Bidders, the General Conditions of the Contract as amended by the Supplementary Conditions including all Sections outlined in Division 00 – Procurement and Contracting Requirements and Division 01 - General Requirements.
- .2 Report in writing to the General Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work. Commencement of work implies acceptance of existing conditions and work by others.

1.2 SECTION INCLUDES

- .1 Supply and install interior manual window coverings.
- .2 Location: All window locations as indicated on plans.
- .3 Removal of existing blinds and turn blinds removed over to School Board.

1.3 RELATED SECTIONS

- .1 Section 06 20 00 – Finish Carpentry

1.4 REFERENCES

- .1 ASTM B209M-07: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
- .2 ASTM B221M-07: Standard Specification for Aluminum and Aluminum-Alloy Sheet Extruded Bars, Rods, Wire, Profiles, and Tubes.
- .3 NFPA 701-2004: Methods of Fire Tests for Flame Propagation of Textiles and Films.
- .4 ASTM G21: Standard Practice for Determining Resistance of Synthetic Polymeric Materials for Fungi.

1.5 SUBMITTALS

- .1 Submit shop drawings as specified in Section 01 33 00, specifically provide the following:
- .2 Shop Drawings: Indicate location, layout and show assembly and installation details, methods and location of fastenings.

1.6 QUALITY ASSURANCE

- .1 Products shall be installed by manufacturer's authorized and trained personnel. The work shall be done in strict compliance with the manufacturer's recommendations.
- .2 Products will comply with UL listed standard 325, CSA standards and all OBC standards.
- .3 Anti – Microbial Characteristics: "No Growth" per ASTM G21 results for fungi ATCC9642, ATCC 9644, ATCC 9645.

1.7 WARRANTY

- .1 Provide a warranty for roller window shades hardware, fabric, and assembly including parts and labour for period of 5 years from date of project substantial completion.

2 PRODUCTS

2.1 MATERIALS

- .1 Extruded aluminum: to ASTM B221M, 6063 alloy, T5 temper unless otherwise specified.
- .2 Sheet aluminum: to ASTM B209M, 3003 alloy H14 temper.
- .3 Bituminous coating: Fibrous asphalt emulsion.
- .4 Screw Fasteners: Non-corrosive type

2.2 PRODUCTS

- .1 Sunshade fabric to be 1% open weave flame retardant, 100% low V.O.C., Architect to choose colour when shop drawings are submitted. Seams if required, shall be equally spaced vertically to form material with equal widths.
- .2 Sample fabric type, colour and density to be reviewed and approved by the Consultant.
- .3 Manual Sun Shade: Manually operated sun shade shall have fascia and shade holder manually operated by chain and sprocket roller shade system with infinite positions. Each shade consisting of end brackets, shade tube, fascia, hem bar and fabric. Mounting shall be ceiling mounted with aluminum fascia and closure.
- .4 Motorized Sun Shade: Motorized sun shade similar to manual but with electric operating mechanism for gym windows and library windows.

2.3 COMPONENTS

- .1 Shade Roller Tube: Rigid roller tubes shall be all aluminum extruded aluminum available in 1- ½", or 2" to suit with reinforced internal ribs to provide maximum span without tube deflection. Tube size shall be as recommended by the manufacturer and as selected from Sun Projects weights and measures chart.
- .2 Drive Assembly: factory set for size and travel of shades; field adjustable complete with built-in stock absorber designed to prevent chain breakage.
- .3 Drive Chain: No. 10 stainless steel bead chain, continuous loop type, tested for 41 kg. of force.
- .4 Exterior Hem Bar: extruded aluminum with plastic end finials; dark brown finish.
- .5 Cassette: 0.60 galvanized steel snap on brackets for ceiling, wall or mounting brackets recessed mount in ceiling.
- .6 Cassette Box: Cassette design shall be a one-piece aluminum anodized extruded box closed on all four sides, top, back, sides and bottom return. Cassette sections to be square with internal groove to accommodate a self-cleaning brush to ensure fabric maintenance as well as a gap brush on top back side of cassette to provide for a light seal. Cassette end caps shall be 2 mm, Delrin plastic with four countersunk flat headed screw holes.

- .7 Provide appropriate cassette sections to suit window openings as required. Ensure proper clearance at operable window units.
- .8 Chain Drive: Shall consist of a heavy-duty commercial grade sprocket, spring brake assembly system contained within a retainer cap providing a smooth operating action with infinite positioning.
- .9 Operating Chain: Shall be No. 10 qualified heavy-duty stainless-steel bead chain, 90 lbs., load test, formed in a continuous loop with stops at highest and lowest positions to prevent over winding and unrolling.
- .10 Chain Hold Down: Operating chain shall be fully secured to SP spring loaded chain holder, colour: anodized. Chain retainer wall clip shall be provided to secure chain and prevent excess chain from dangling.

2.4 FABRICATION

- .1 Where multiple shades are provided between the frames of a single glazed unit, the shades shall be of equal width within that unit.
- .2 Removal of the shade must not require the disassembly of the shade unit.
- .3 Fabricate units to completely fill openings from head to sill and jamb-to-jamb, unless detailed otherwise.
- .4 Fabricate shade fabric to hang flat without buckling or distortion. Edges shall hang straight without curling or ravelling.

2.5 ASSEMBLY

- .1 Shade unit shall be supplied to site fully assembled complete with shade holder (back fascia).
 - .1 Mounting detail:
 - .1 Ceiling mounted on underside of the ceiling or bulkhead. Typical application unless otherwise required to suit conditions. Review alternate installation method with Architect for approval prior to installation.
 - .2 Shade Orientation:
 - .1 Regular-roll, shade cloth to roll at window side of roller.

2.6 FASTENINGS

- .1 Provide hardware complete with screws, bolts, expansion shields and other fastening devices as required for the satisfactory installation and operating of the hardware.
- .2 Provide fastening devices of the same finish as the hardware that is to be fastened.

2.7 SHOP FINISHES

- .1 Provide hardware of type and finish in accordance with, and equal in all respects to the samples of hardware and finishes approved by the Consultant.
- .2 Metal finishes shall be free from defects, clean and unstained, and of a uniform colour and finish for each type of finish required.

- .3 Exposed Aluminum: Painted to AAMA 2603, one-coat thermosetting fluoropolymer coating 0.02 mm thick, e.g. PPG Duracron; manufacturer's standard dark brown colour.

2.8 APPROVED MANUFACTURERS:

- .1 Altex SunProject Line, Vaughan, ON 888-836-6980
- .2 Solarfactive, Toronto, ON 416-421-3800
- .3 Hunter Douglas, Brampton, ON 1-800-265-8000
- .4 Louvolite Roller Shades System, Kitchener, ON 1-519-603-0230

3 EXECUTION

3.1 EXAMINATION

- .1 Verify that the openings are plumb and are dimensioned properly. Ensure adequate support has been provided for the operator header. Proceed with the installation only after conditions have been deemed satisfactory.

3.2 INSTALLATION

- .1 Install units to comply with the Manufacturer's instructions for the type of mounting and operation required. Provide units plumb, true and securely anchored in place with recommended hardware and accessories to provide smooth operation without binding.
- .2 Install units within the following tolerances:
 - .1 Maximum variation of gap at window opening perimeter: ¼", per 8' (+/- 1/8") of shade height.
 - .2 Maximum offset from level: 1/8"
 - .3 Follow Manufacturer's edge-clearance specifications for shades where the width-to-height (W:H) ratio exceeds 1:3.
- .3 Roller shades shall be installed level, plumb, square and true.
- .4 Adjust equipment to ANSI 156.10. Adjust and balance to operate smoothly, easily, safely and free from binding or malfunction throughout entire operational range.
- .5 Review with Architect, mounting locations and details at specified openings for approval to proceed.
- .6 Provide additional concealed wood blocking or other materials as required to anchor units to walls or underside of steel lintel as required.
- .7 Clean roller shade surfaces after installation, according to manufacturers written instructions.

3.3 ADJUSTING

- .1 Adjusting units for smooth operation. Adjust shade and shade cloth to hang flat without buckling or distortion. Replace any units or components which do not hang properly for operate smoothly.

3.4 CLEANING

- .1 Touch up damaged finishes and repair minor damage in order to eliminate evidence of repair. Remove and replace work that cannot be satisfactorily repaired.

- .2 Clean exposed surfaces, including metal and shade cloth, using non-abrasive materials and methods recommended by the shade cloth Manufacturer. Remove and replace work which cannot be satisfactorily cleaned.

3.5 DEMONSTRATION

- .1 Demonstrate operation method and instruct Owner's personnel in the proper operation and maintenance of the window shade system.
- .2 Demonstrate proper care of hardware to Owner as specified in Section 01 79 00, including:
 - .1 lubrication,
 - .2 adjustments,
 - .3 cleaning, and
 - .4 general maintenance.

END OF SECTION

1 GENERAL

1.1 INSTRUCTIONS

- .1 Comply with the General Conditions of the Contract, the Supplementary Conditions and the General Requirements of Division 01.

1.2 SUMMARY

- .1 Section includes: Provide all articles, labour, materials, equipment, transportation, hoisting, and incidentals noted, specified or required, to complete the work of this Section including but not limited to the following:
 - .1 LULA Elevator
- .2 Related sections: The following is included for reference only and shall not be presumed complete:
 - .1 Section 04 20 00- Unit Masonry
 - .2 Section 06 10 00 – Rough Carpentry
 - .3 Section 25 – Mechanical
 - .4 Section 26 - Electrical

1.3 REFERENCES

- .1 Abbreviations and Acronyms:
 - .1 LULA: Limited-Use/Limited-Application Definitions:
- .2 Reference Standards: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section. Where regulatory requirements use older version of a standard, comply with the version year adopted by the Authority Having Jurisdiction
 - .1 Canadian Standards Association (CSA):
 - .1 CSA B44 Elevator Code

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Administrative requirements shall be in accordance with General Conditions and Division 01.
- .2 Pre-installation Meetings:
 - .1 Convene pre-installation meeting one (1) week prior to beginning work of this Section , with Consultant, Contractor, Elevator contractor and other effected trades in accordance with Section 01 10 00 - Summary to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building construction subtrades.

1.5 SUBMITTALS

- .1 Submittals under this Section shall be in accordance with Section 01 33 00.
- .2 Product Data:

- .1 Submit manufacturer's Product data sheets for Products proposed for use in the Work of this Section. Include printed technical data, installation instructions and general recommendations for all materials and components. Include certification indicating compliance of materials with project requirements.
- .3 Shop Drawings:
 - .1 Submit drawings to be stamped and signed, after approval by the architect by professional engineer registered or licensed in Ontario, Canada.
 - .2 Indicate on drawings project layout, including details and information as follows:
 - .1 Size and location of machine and controller.
 - .2 Size and location of car, guide rails, buffers stands and other components in hoistway.
 - .3 Rail bracket spacing and maximum loads on guide rails.
 - .4 Reactions at points of support.
 - .5 Weights of principal components.
 - .6 Top and bottom clearance and over travel of car.
 - .7 Wiring diagrams with location of circuit breaker, switchboard panel or disconnect switch, light switch and feeder extension points in machine room.
 - .8 Location in hoistway for connection of travelling cables for car light and telephone .
 - .9 Location and size of access doors.
 - .10 Expected heat generation of equipment in machine room.
 - .11 Seismic design data and detailed calculations.
 - .12 Include on general arrangement drawings:
 - .1 Type, size, location of hoistway entrances showing details of fastening to hoistway structure.
- .4 Samples:
 - .1 Submit duplicate 305mm x 305mm (12"x12") samples for each exposed finish including but not limited to car wall panel finishes.
- .5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .6 Manufacturer's Instructions: submit manufacturer's installation instructions.

1.6 CLOSEOUT SUBMITTALS

- .1 Submittals under this Section shall be in conformance with Section 01 77 00.
- .2 Operation and Maintenance Data: submit operation and maintenance data for passenger elevator for incorporation into manual.
 - .1 Include description of elevator system's method of operation and control including group supervisory control system, motor control system, door operation, signals, firefighter's service, emergency power operation, and special or non-standard features provided.
 - .2 Provide parts catalogues with complete list of equipment replacement parts with equipment description and identifying numbers.
 - .3 Legible schematic wiring diagrams covering electrical equipment installed, including changes made in final work, with symbols listed corresponding to identity or markings on both machine room and hoistway apparatus.
 - .4 Instructions for maintenance of special finishes.

- .3 Wiring Diagrams and Manuals:
 - .1 Prior to substantial performance, supply to the Owner, one hard and one soft (electronic) sets of manuals describing in detail the operation of the equipment and special features.
 - .1 Detail the operation for special features such as independent service, emergency power operation, special emergency service, intercommunication, and security operation.
 - .2 Supply, as part of the manual, as-built drawings.
 - .2 In conjunction with the above, supply three copies and one AutoCAD disk of the as-built wiring and schematic diagrams.
 - .3 Prior to substantial performance, supply to the Owner, a manual detailing proper maintenance procedures for the equipment.
- .4 Operation and Maintenance Data: submit operation and maintenance data for passenger elevator for incorporation into manual.
 - .1 Include description of elevator system's method of operation and control including group supervisory control system, motor control system, door operation, signals, firefighter's service, emergency power operation, and special or non-standard features provided.
 - .2 Provide parts catalogues with complete list of equipment replacement parts with equipment description and identifying numbers.
 - .3 Legible schematic wiring diagrams covering electrical equipment installed, including changes made in final work, with symbols listed corresponding to identity or markings on both machine room and hoistway apparatus.
 - .4 Instructions for maintenance of special finishes.
- .5 Wiring Diagrams and Manuals:
 - .1 Prior to substantial performance, supply to the Owner, one hard and one soft (electronic) sets of manuals describing in detail the operation of the equipment and special features.
 - .1 Detail the operation for special features such as independent service, emergency power operation, special emergency service, intercommunication, and security operation.
 - .2 Supply, as part of the manual, as-built drawings.
 - .2 In conjunction with the above, supply three copies and one AutoCAD disk of the as-built wiring and schematic diagrams.
 - .3 Prior to substantial performance, supply to the Owner, a manual detailing proper maintenance procedures for the equipment.

1.7 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Manufacturer's:
 - .1 Manufacturer shall have a minimum of 5 years' experience having successfully supplied products required for the Work of this Section for other projects of similar size and complexity.

.2 Installer's:

- .1 Installer shall have a minimum of 5 years' continuous Canadian experience successfully completing projects similar in size and complexity as the Work of this Section. Submit proof of experience upon Consultant's request.
- .2 Employ fully trained and licensed mechanics for installation of the LULA Elevator, who are regularly employed in this field.

1.8 WARRANTY

- .1 Warrant the work performed, materials, performance, and workmanship for a period of two years from the date of Substantial Performance.
- .2 Correct defects which develop within the above mentioned time period.

2 PRODUCTS

- .1 The products of the following manufacturers are acceptable subject to conformance with the requirements of the Drawings, Schedules and Specification:
 - .1 Acceptable Manufacturers and Products:
 - .1 Delta 9000 LULA, Model 4854F by Delta Elevator Co. Ltd.
 - .2 Requests for substitutions shall be made in conformance with Section 01 25 00.
 - .3 Substitution Limitations: Comparable Products from manufacturers not listed herein may be accepted provided they meet requirements of this Specification. No further substitutions will be permitted.

2.2 PERFORMANCE REQUIREMENTS

- .1 Codes, By-laws, and Regulations:
 - .1 Provide equipment and perform work in accordance with all local, provincial and federal codes, by-laws, and regulations.
 - .2 Provide equipment and perform work in accordance with the latest edition of the B44 Safety Code for Elevators and any other code which may govern the installation.
 - .3 At the time of bid submission and during the contract provide written notification of any proposed changes in codes, by-laws, or regulations which may affect the work.
- .2 Permits and Certifications of Inspections:
 - .1 Arrange for all necessary permits, certificates, approvals, variances, and inspections.
- .3 Trademarks:
 - .1 Arrange that none of the car or hall equipment has any trademark, company name, or logo.
- .4 Barrier-free Access:
 - .1 Arrange the controls and fixtures to meet barrier-free access requirements Appendix E of the B44 Safety Code for Elevators (latest edition) and any other code which may govern the installation.

- .5 Fixtures:
 - .1 Unless indicated otherwise in the Specifications or Drawings, provide a choice of fixtures from a third party supplier and your standard products.
 - .2 Provide buttons with LED illumination and stainless steel targets.
- .6 Operation Controls:
 - .1 Provide equipment that will operate normally when the machine room and hoistway temperature is between 10 and 32 degrees Celsius.
 - .2 Provide equipment that will operate normally when the power supply is within 10 percent of its rated voltage.
- .7 Inspection and Acceptance:
 - .1 Provide a meter and test weights (full load) along with an adjuster and helper to assist the engineer with a final acceptance inspection.
- .8 Non-proprietary Equipment:
 - .1 If proprietary tools and/or information is required to maintain, adjust, or diagnose the equipment provide this to the Owner.
 - .2 Arrange the equipment such that there is no time, date, trip, or other counters that would shut down the equipment or change its operation.

2.3 MATERIALS

- .1 LULA elevator as follows:
 - .1 Hole-less Hydraulic
 - .2 Capacity: 635 kg.
 - .3 Rated Speed: 0.15 m/s.
 - .4 Car Inside Dimensions: 1219 mm wide x 1371 mm deep
 - .5 Hoistway Size: Refer to Architectural Drawings
 - .6 Operation: Automatic.
 - .7 Car Controls: Illuminated Type with faceplate in Stainless Steel #4 finish.
 - .8 Hall Call Stations: Illuminated type. Stainless steel #4 Cover Plates.
 - .9 Hoistway Entrances Size: 914 mm wide by 2032 mm high.
 - .10 Entrance Type: Two Speed Sliding, direction as shown on Drawings
 - .11 Door Operator: Automatic operator for hoistway and car. Opening and closing speed to suit handicapped requirements.
 - .12 Travel: Refer to Architectural Drawings.
 - .13 Stops: Refer to Architectural Drawings.

- .14 Openings: Refer to Architectural Drawings.
- .15 Power Supply: 208 VAC, 3 phase, 60 Hertz
- .16 Lighting Supply: 120 Volts, 60 Hertz, 15 Amp
- .17 Elevator(s) must comply with the CSA B44 Elevator Code version currently in effect, including Supplements). Elevator(s) must meet the Appendix E Accessibility requirements.
- .18 Hoistway, pit, overhead dimensions as per the Drawings.
- .2 Cab as follows:
 - .1 Shell Enclosure:
 - .1 Car Top: Minimum 1.5mm (16ga.) steel, white enamel finish
 - .2 Shell Walls: 1.5mm (16ga.) steel - cage frame type construction
 - .3 Strike Column: 1.5mm (16ga.) Stainless steel #4
 - .4 Fascia: 1.5mm (16ga.) Stainless steel #4
 - .5 Car Doors: 1.5mm (16ga.) Stainless steel #4 car door
 - .6 Provide plywood substrate at thickness to accommodate porcelain tile flooring in Section 09 30 00.
 - .2 Architectural Features:
 - .1 Side Walls: Raised fire-rated plastic laminate hang-on panels, colour to be selected by Consultant from manufacturers standard colours. Finish shall be matt, with a "58" code behind the colour finish.
 - .2 Ceiling: White Enamel Steel
 - .3 Front Return: Stainless steel #4
 - .4 Car Door: Stainless steel #4
 - .5 Base: Stainless steel #4
 - .6 Reveals: Black Baked Enamel Finish
 - .7 Finished Flooring: Refer to Drawings and division 09 sections.
 - .8 Hoistway Doors and Frames:
 - .1 At All Floors: Stainless steel #4
 - .3 Supplementary Features:
 - .1 Lighting: LED pot lights.
 - .2 Emergency Exit: Top exit in car top in accordance with CSA B44 Elevator Code
 - .3 Car sill(s): Extruded Aluminium
 - .4 Overall Height: 2134 mm (7' 0") (2134 mm clear inside)
 - .5 Car Operating Station: Top row of buttons located in compliance with CSA B44 Elevator Code Appendix E for accessibility
 - .6 Handrail: Located on all non-entrance walls:
 - .1 38 mm Flat Stainless Steel #4
 - .7 Pad Hooks: Included
 - .8 Protective Pads:
 - .1 Yes – One set
 - .4 Other Control Features:
 - .1 Battery Emergency Power for lowering of elevator and door opening.
 - .2 Door open button
 - .3 Independent Service: Key switch
 - .4 Phone Button to activate conversation
 - .5 Light key switch

- .6 Run stop Key switch
- .7 Access Key switch
- .5 Emergency Car Lighting: The emergency power unit shall illuminate the elevator car and provide current to the alarm bell in the event of normal power failure. The equipment shall comply with the requirements of the current CSA B44 Elevator Code.
- .6 Entrances: Shall be manufactured in accordance with procedures established by fire testing authorities and shall be labelled for a minimum of 1.5 hours.
- .7 Sight Guards: Sight guards shall be furnished on the leading edge of the doors to conceal the hoistway beyond the doors. Finish to match door panels.
- .8 Car Floor Indicator: One (1) to be installed in each car as part of the car station.
- .9 Hall Floor Indicator:
 - .1 Digital Dot Matrix Alphanumeric Display for each elevator to be installed at each landing.
- .10 Elevator Licence
 - .1 Mounted on: controller door
- .11 Car Lantern and Gong: A directional lantern visible from the corridor to be provided in the car entrance on the strike post side.
- .12 Braille floor designation tags placed beside corresponding floor buttons on the car station.
- .13 Independent service operation.
- .14 Pressure switch.
- .15 Firefighters' Emergency Operation: Provide all requirements for FEO Phase I in each elevator.
- .16 Battery Powered Lowering.
- .3 Cylinder and Plunger (Jack Unit):
 - .1 The jack(s) shall be designed and constructed in accordance with the applicable requirements of the CSA B44 Elevator Code. It (they) shall be of sufficient size to lift the gross load the height specified, and shall be factory tested to insure adequate strength and freedom from leakage.
 - .2 The jack unit(s) shall consist of the following parts: A plunger of heavy seamless steel tubing accurately turned and polished; a stop ring electrically welded to the plunger to prevent the plunger from leaving the cylinder; a packing seal of suitable design and quality; a drip ring around the cylinder top; a cylinder constructed of steel pipe complete with a pipe connection and air bleeder.
- .4 Roped Hydraulic Features:
 - .1 Safety: An instantaneous safety shall be provided which will be actuated by a friction governor and governor tension sheave. The instantaneous safety shall be automatic, and reset by running the car in the up direction.
 - .2 Governor: The governor shall be located in the hoistway overhead. The governor shall include an electrically activated means of manually tripping the governor from the machine room for annual no-load and five-year full-load safety tests. The design shall not require a governor access door.

- .3 Plunger(s), Cylinders(s), and Sheave(s): A sheave shall be located at the top of each plunger and shall be guided through its travel by a set of plunger rails. Each plunger and cylinder shall be installed plumb and shall operate freely with minimum friction.
- .4 Ropes: Minimum two (2) 9.5 mm aircraft cables. Ropes shall be fastened to the top of the cylinder jack stands, travel over the plunger sheave(s) and attach to the bottom of the elevator car frame.
- .5 Pumping Unit:
 - .1 The pumping unit shall be a unit of integral design and shall include an electric motor connected to a pump, a hydraulic control system, a storage tank, necessary piping connections, and a controller, all compactly designed as a single self-contained unit. The motor and pump assembly shall be mounted on a rubber isolated inner base.
- .6 Pump:
 - .1 The pump shall be a positive displacement screw type to give smooth operation and shall be designed and manufactured for elevator service.
- .7 Motor:
 - .1 The motor shall be of the alternating current, single or polyphase squirrel cage induction type and shall be of a design adapted to electro-hydraulic requirements.
- .8 Hydraulic Control System:
 - .1 The hydraulic control system shall be of compact design suitable for operation under the required pressures. The control valve shall be a manifold with up, down, and check valve sections. A control section including solenoid valves will direct the main valve and control up and down starting, transition from full speed to levelling speed, up and down stops, pressure relief and manual lowering. Down speed and up and down levelling will be controlled at the main valve sections. All of these functions shall be fully adjustable for maximum smoothness and to meet contract conditions. All control systems shall be pre-adjusted at the factory.
 - .2 The manual lowering feature shall permit lowering the elevator at slow speed in the event of power failure or for adjusting purposes.
- .9 Leveling Device:
 - .1 The elevator shall be provided with an automatic levelling device which brings the car to a stop within 6 mm (1/4") of the landing level regardless of load or direction of travel. Landing level will be maintained within the levelling zone irrespective of the hoistway doors being open or closed.
- .10 Storage Tank:
 - .1 The storage tank shall be constructed of steel, and shall be provided with a cover and a filter screen mounted over the suction inlet. Tank design shall incorporate a reserve capacity. An initial supply of oil sufficient for proper operation shall be provided.
- .11 Piping:
 - .1 Pipe of adequate size and thickness shall be installed between the pumping unit and the cylinder head. A shut off valve shall be provided for maintenance and adjusting purposes.
- .12 Controller:

- .1 A microprocessor controller shall be provided, including necessary starting switches of adequate size together with all relays, switches and hardware required to accomplish the operation specified. Overload protection shall be provided to protect the motor against overloading.
- .13 Car Stall Protective Circuit:
 - .1 A protective circuit shall be provided which will stop the motor and the pump and return the car to its lowest landing in the event the car does not reach its designed landing with a predetermined time interval. This circuit will permit a normal exit from the car but prevent further operation of the elevator until the issue has been corrected.
- .14 Wiring:
 - .1 All wiring and electrical interconnections shall comply with the governing codes. Insulated wiring shall have flame retardant and moisture proof outer covering, and shall be run in conduit, tubing or electrical wire-ways. Travelling cables shall be flexible and suitably suspended to relieve strain on individual conductors.
- .15 Hoistway operating devices:
 - .1 Normal terminal stopping devices shall be provided. When an emergency terminal stopping device is also required, it shall be furnished and the controller switches and circuitry arranged in accordance with the requirements of the CSA B44 Elevator Code.
- .16 Pit switch:
 - .1 An emergency stop switch shall be located in the pit.
- .17 Pit maintenance stand:
 - .1 Provide a non-removable means to mechanically hold the car above the pit floor to provide an area in the pit for maintenance and inspection as per requirements of the CSA B44 Elevator Code.
- .18 Platform:
 - .1 The car platform shall have a fabricated frame of formed and structural steel shapes, rigidly welded. Sub-flooring shall be wood floor. The underside of the platform shall be fireproofed. The platform shall be manufactured by a CWB certified shop and be equipped with an aluminium threshold.
- .19 Car frame:
 - .1 A suitable car frame fabricated from formed or structural steel members shall be provided with adequate bracing to support the platform and car enclosure. The crosshead or rope connection member shall be of sufficient strength to lift the fully loaded car.
- .20 Guides:
 - .1 Steel elevator guide rails shall be furnished to guide the car, erected plumb and securely fastened to the building structure.
 - .2 Sliding Guides: Guides shall be mounted on top and bottom of the car sling.
- .21 Door operation:

- .1 Doors on the car and at the hoistway entrances shall be power operated by means of a quality operator mounted on top of the car. The motor shall have positive control over the door movement for smooth operation. An infrared detector shall be provided to cause re-opening should an obstruction be sensed.
 - .2 Door operation shall be automatic at each landing with door opening being initiated as the car arrives at the landing and closing taking place after expiration of a time interval. A car door electric contact shall prevent starting the elevator away from the landing unless the car door is in its closed position.
 - .3 An approved positive interlock shall be provided for each hoistway entrance which shall prevent operation unless all doors for that elevator are closed and shall maintain the doors in their closed position while the elevator is away from the landing. Provide emergency access to the hoistway as required by governing Codes.
 - .4 At each landing served, a hoistway entrance of the type and size as previously described. Each entrance shall consist of flush hollow metal doors with build in hanger assembly, frames assembled for one piece unit installation, extruded aluminium sill, fascia, toe guard, hanger cover, header, hanger track assembly, and formed structural strut supports. Entrance design and construction must be in compliance with NBC 2006 requirements for fire labels.
 - .5 Sill supporting angles required for flush hoistway construction.
- .22 Telephone:
- .1 An ADA-approved AUTODIAL telephone shall be furnished and installed as part of the car station. A separate phone line to the elevator controller shall be provided and located in the elevator machine room under another section of the specifications.
- .23 Non-proprietary Controls:
- .1 Elevating device control equipment must be non-proprietary. If a site specific service tool or on-board diagnostic tool is required to render the control equipment non-proprietary, it must be provided with the elevating device. The tool must allow full access to fault codes and maintenance related parameters and must allow complete and thorough maintenance service to be performed by any properly licensed and qualified Elevator Contractor. The tool must come with a user's manual that also defines and explains all error codes, including required fixes. The service tool must remain property of the building owner.

2.4 ADDITIONAL FEATURES

- .1 Provisions for card reader and CCTV:
 - .1 Cab control panel is to be provided with a cut-out sized to suit and covered with a RFID compatible material that the reader can be mounted behind.
 - .2 Elevator controller to be compatible with access control features providing both restrictions of buttons that can be selected with floor selected tracking.
 - .3 Traveler cable to be Provided with provisions for future installation of an access control reader and a single CCTV camera.
- .2 Battery powered emergency lowering operation.
- .3 Hall position indication:
 - .1 Type: Digital dot matrix alphanumeric display at main egress level only.

3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions:
 - .1 Examine all work of other Sections upon which the Work of this Section depends.
 - .2 Report in writing to the Contractor any defects of surfaces or work prepared by other Sections which affect the quality or dimensions of the Work of this Section.
 - .3 Do not proceed with Work of this Section until all unsatisfactory conditions have been rectified and site conditions are ready to receive work.
 - .4 Commencement of Work implies complete acceptance of existing conditions and previous work performed by others.

3.2 INSTALLATION

- .1 Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheet.
- .2 Install hoistway, machine room, and other elevator materials and components in accordance with ASME A17.1/CSA B44, local codes, regulations and manufacturer's written instructions.
- .3 Install system components and connect to building utilities.
- .4 Accommodate equipment in space indicated.
- .5 Startup equipment in accordance with manufacturer's instructions.

3.3 FIELD QUALITY CONTROL

- .1 Conduct quality control in accordance with Section 01 45 00.
- .2 Site Tests and Inspections:
 - .1 Perform and meet tests required by ASME A17.1/CSA B44.
 - .2 Supply instruments and execute specific tests.
 - .3 Furnish test and approval certificates issued by jurisdictional authorities.
 - .4 At agreed time during twelve month warranty period, and with building normally occupied using normal building traffic, conduct tests to verify performance. Furnish event recording of hall call registrations, time initiated, and response time throughout entire normal working day.
- .3 Non-Conforming Work:
 - .1 Defective materials or quality of work, whenever found, at any time prior to acceptance of the work, shall be rejected regardless of previous inspection. Inspection will not relieve responsibility but is a precaution against oversight or errors.
 - .2 Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to the satisfaction of the Consultant at no additional cost to the Owner.

3.4 ADJUSTING

- .1 Adjust door opening and closing times to suit handicapped users in accordance with Owner instructions.
- .2 Adjust control system to cause elevators to answer hall calls during working day within performance criteria specified.
- .3 Adjust for smooth acceleration and deceleration of car so not to cause passenger discomfort.
- .4 Adjust automatic floor leveling feature at each floor to provide stopping zone of 1/4 inch (6 mm).

3.5 CLEANING

- .1 Clean work area daily in accordance with Section 01 74 00.
- .2 Remove all excess materials from site as Work proceeds and at completion.
- .3 On completion of the Work remove all tools, containers, surplus materials, equipment, waste, etc., and leave Site neat, clean and tidy to the satisfaction of the Owner.
- .4 Clean and make good surfaces soiled or otherwise damaged as a result of Work of this Section at no additional cost to the Owner.
- .5 Leave surfaces clean and ready for subsequent Work.

3.6 CLOSEOUT ACTIVITIES

- .1 Training:
 - .1 At completion of the job, provide a training session for the Owner consisting of a review of the documentation and operation of the equipment and features.

3.7 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by passenger elevator installation.

3.8 MAINTENANCE: 12 MONTHS

- .1 Provide maintenance of the equipment for a period of 12 months after Substantial Performance.
- .2 A quality maintenance service consisting of regular examinations at least once a month, adjustments and lubrication of the elevator equipment shall be provided by the Elevator Contractor after the elevator has been turned over for the owner's use for a period of 12 months.
- .3 All work shall be performed by competent employees during regular working hours of regular working days and shall include emergency 24 hour call back service. This service shall not cover adjustments or repairs due to negligence, misuse, abuse, or accidents caused by persons other than the Elevator Contractor. Only genuine parts and supplies as used in the manufacture and installation of the original equipment shall be provided.

END OF SECTION

Division 26 Common Requirements for Electrical

- 26 00 11 Electrical Specification Index
 - Common Contract Requirements for Electrical**
 - 26 01 15 Allowances and Fees
 - 26 01 16 Electrical Contract General Requirements
 - 26 01 17 Demolition and Renovation
 - 26 01 20 Commissioning and Integrated Testing of Life Safety and Fire Protection System
 - Common Work Results for Electrical**
 - 26 05 19 Wires and Cables
 - 26 05 20 Splitters, Junction, and Pull Boxes
 - 26 05 21 Outlet Boxes, Conduit Boxes and Fittings
 - 26 05 22 Wire and Box Connectors – 0 –1000 V
 - 26 05 33 Conduits, Conduit Fastenings and Conduit Fittings
 - 26 05 73 Short Circuit/Coordination Study
 - 26 05 75 Auxiliary Systems
 - Panelboards**
 - 26 24 16 Panelboards
 - 26 24 17 Moulded Case Circuit Breakers
 - Low-Voltage Distribution Equipment**
 - 26 27 26 Wiring Devices
 - Low-Voltage Circuit Protective Devices**
 - 26 28 13 Fuses – Low Voltage
 - 26 28 16 Disconnect Switches
 - Low-Voltage Controllers**
 - 26 29 13 Starters and Contactors
 - Lighting**
 - 26 51 13 Lighting Equipment
 - 26 51 16 Digital Occupancy & Daylight Control Systems

Division 28 Electronic Safety and Security

- Fire Detection and Alarm**
- 28 31 25 Fire Alarm System (Addressable)

END OF SECTION

Part 1 General

1.1 GENERAL INSTRUCTIONS

- .1 Comply with the General Conditions, Supplementary Conditions, and all of General Requirements, Mechanical and Electrical Divisions.

1.2 FEES

- .1 The contractor is to determine general inspection fees with Electrical Safety Authority and include as part of tender.

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 This Section covers items common to Electrical Divisions.**
- .2 This section supplements requirements of Division 1.
- .3 Furnish labour, materials, and equipment necessary for completion of work as described in contract documents.

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 electrical 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.
- .2 State in Tender, names of all Subcontractors proposed for work under this Division.

1.4 LIABILITY INSURANCE

- .1 This contractor must maintain and produce at the request of the consultant proof of proper insurance to fully protect the Owner, the Consultant and the Contractor from any and all claims due to accidents, misfortunes, acts of God, etc.

1.5 DRAWINGS

- .1 Electrical 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 conduits and ducts to accommodate structural conditions. Location of conduits and other equipment may be altered by the Consultant without extra charge provided change is made before installation and does not necessitate major additional material.

- .2 As work progresses and before installing fixtures and 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 fitments.
- .3 Electrical drawings are diagrammatic. 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. Conceal wiring, 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 Before commencing work, check and verify all sizes, locations, grades, elevations, levels and dimensions to ensure proper and correct installation. Verify existing/municipal services.
- .5 Locate all electrical equipment in such a manner as to facilitate easy and safe access to and maintenance and replacement of any part.
- .6 In every place where there is indicated space reserved for future or other equipment, leave such space clear, and install services so that necessary installation and connections can be made for any such apparatus. Obtain instructions whenever necessary for this purpose.
- .7 Relocate equipment and/or material installed but not co-ordinated with work of other Sections as directed, without extra charge.
- .8 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 the 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 equipment room drawings clearly showing all distribution equipment.
 - .3 Detailed layout drawings clearly showing conduit/feeder runs 78mm diameter or larger, including hangers or tray.
- .6 Provide CAD drawings (minimum file version AutoCAD 2013) in addition to hard copies.

1.7 QUALITY ASSURANCE

- .1 The installations of the division must conform to the latest edition of the Electrical Safety Code as well as its supplemental bulletins and instructions. Provide materials and labour necessary to comply with rules, regulations, and ordinances.
- .2 Complete underground systems in accordance with CSA C22.3 No. 7-94 except where specified otherwise.
- .3 Abbreviations for electrical terms: to CSA Z85-1983.
- .4 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 these sections are lists of “Alternate Equipment” manufacturers acceptable to Consultant if their product meets characteristics of specified described equipment.
- .2 Each bidder may elect to use “Alternate Equipment” from lists of Alternates where listed. Include for any additional costs to suit Alternated used.
- .3 When two or more suppliers/manufacturers are named in the Bid Documents, only one supplier/manufacture 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” unit is proposed and does not fit space allotted nor equal specified product in Consultant’s opinion, supply of specified described equipment will be required without change in Contract amount. 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.

1.9 EXAMINATION

- .1 Site Reviews
 - .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 Electrical Drawings show general arrangement of fixtures, power devices, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
 - .2 Consider Architectural, Mechanical, 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 Electrical 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 AND SCHEDULING

- .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 electrical items, make proper provision to avoid interferences in a manner approved by Consultant. Changes required in work specified in these sections caused by neglect to do so shall be made at no cost to Owner.
- .3 Arrange fixtures, conduit, ducts, and equipment to permit ready access to junction boxes, starters, motors, control components, and to clear openings of doors and access panels.
- .4 Furnish and install inserts and supports required by these sections 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 the electrical trade.
- .5 Adjust locations of ducts, conduits, equipment, fixtures, etc, to accommodate work from interferences anticipated and encountered. Determine exact route and location of each conduit and duct prior to installation.
 - .1 Make offsets, transitions, and changes in direction of ducts, and electrical raceways as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
 - .2 Supply and install pull boxes, etc, as required to effect these offsets, transitions, and changes in direction.

1.11 REQUEST FOR INFORMATION (RFI) PROCEDURES

- .1 RFIs shall be submitted to the consultant minimum two (2) weeks prior to answer being required. Failure to submit and RFI in a timely manner will forfeit delay claims and schedule extension requests by the contractor.

- .2 All RFIs will be submitted with the following information:
 - .1 RFI number
 - .2 Name of project
 - .3 Date of initiation
 - .4 Date response required by (minimum two (2) weeks)
 - .5 Subject
 - .6 Submitter's name
 - .7 Drawing/specification reference
 - .8 Photograph of the issue (if applicable)
 - .9 Description of the issue
 - .10 Contractor's proposed resolution

1.12 DRAW BREAKDOWN

- .1 This Contractor MUST submit a breakdown of the tender price into classifications to the satisfaction of the Consultant, with the aggregate of the breakdown totaling the total contract amount. **Each item must be broken out into material and labour costs.** Progress claims, when submitted are to be itemized against each item of the draw breakdown. This shall be done in table form showing contract amount, amount this draw, total to date, % complete and balance.
- .2 Breakdown shall be as follows:
 - .1 Permits and fees
 - .2 Mobilization (maximum 1%)
 - .3 Demolition
 - .4 Panelboards and miscellaneous distribution equipment
 - .5 Feeder conduits
 - .6 Branch conduits
 - .7 Feeder cables
 - .8 Branch wiring
 - .9 Lighting fixtures (interior)
 - .10 Emergency lighting
 - .11 Fire alarm system Devices
 - .12 Classroom control panels
 - .13 Starters, contactors and control devices
 - .14 Wiring for mechanical equipment
 - .15 Commissioning and Integrated System Testing**
 - .16 Electrical contractor closeout requirements (minimum of 3% but not less than \$5,000.00)
- .3 The breakdown must be approved by the Consultant prior to submission of the first draw.

- .4 Breakdowns not complying to the above will not be approved.
- .5 Breakdown must indicate total contract amount.
- .6 Mobilization amount may only be drawn when all required shop drawings have been reviewed by the consultant.**

1.13 SHOP DRAWINGS AND PRODUCT DATA

- .1 General
 - .1 Furnish complete catalog data for manufactured items of equipment to be used in the Work to Consultant for review within 14 days after award of Contract.
 - .2 Upon receipt of reviewed shop drawing, product is to be ordered immediately.
 - .3 Provide a complete list of shop drawings to be submitted prior to first submission.
 - .4 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.
 - .5 If material or equipment is not as specified or submittal is not complete, it will be rejected by Consultant.
 - .6 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.
 - .7 Submit all shop drawings for the project as a package. Partial submittals will not be accepted.**
 - .8 Catalog data or shop drawings for equipment, which are noted as being reviewed by Consultant or his Engineer shall not supersede Contract Documents.
 - .9 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.
 - .10 Check work described by catalog data with Contract Documents for deviations and errors.
 - .11 Shop drawings and product data shall show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances. e.g. access door swing spaces.

- .12 Shop drawings and product data shall be accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Manufacturer test data where requested.
 - .3 Manufacturer to certify as to current model production.
 - .4 Certification of compliance to applicable codes.
- .13 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.
- .14 **If a shop drawing is returned “reviewed as noted” this Contractor must provide written indication that the comments have been complied with.**
- .15 A partial list of shop drawings includes:
 - .1 Panelboards
 - .2 Fire alarm system Devices
 - .3 Luminaires
 - .4 Emergency battery units
 - .5 Starters, contactors and control devices
 - .6 Firestopping materials
 - .7 Classroom Control Panels
 - .8 Hand dryers
 - .9 Wiring devices
 - .10 Lighting Controls
 - .11 Co-ordination study
 - .12 Roof cone
 - .13 Integrated Life Safety System Testing Plan (ITP)
- .2 Submissions 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.

1.14 CARE, OPERATION AND START-UP

- .1 Instruct Consultant and operating personnel in the operation, care and maintenance of equipment.
- .2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components.
- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

1.15 VOLTAGE RATINGS

- .1 Operating voltages: to CAN3-C235-83.
- .2 Motors, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.16 PERMITS, FEES AND INSPECTION

- .1 The contractor is required to include in his tender all required inspection costs by the Electrical Safety Authority. Permit application is the responsibility of the contractor.
- .2 Reproduce drawings and specifications required by Electrical Safety Authority at no cost.
- .3 Notify Consultant of changes required by Electrical Safety Authority prior to making changes.
- .4 Furnish Certificates of Acceptance to Engineer from Electrical Safety Authority and other authorities having jurisdiction upon completion of work.
- .5 This contractor must furnish any certificates required to indicate that the work completed conforms with laws and regulations of authorities having jurisdiction.

1.17 MATERIALS AND EQUIPMENT

- .1 Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Safety Authority.
- .2 Factory assemble control panels and component assemblies.

1.18 ELECTRIC MOTORS, EQUIPMENT, AND CONTROLS

- .1 Supplier and installer responsibility is indicated in the Equipment Wiring Schedule on electrical drawings.
- .2 Control wiring and conduit is specified in the Electrical specifications except for conduit, wiring and connections below 50 V, which are related to control systems specified in the Mechanical specifications.

1.19 FINISHES

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
 - .1 Paint outdoor electrical equipment "equipment green" finish.
 - .2 Paint indoor switchgear and distribution enclosures light grey.
- .2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .3 Clean and prime exposed non-galvanized hangers, racks, fastenings, and conduits etc. to prevent rusting.

1.20 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates as follows:
- .2 Nameplates:
 - .1 Lamicaid 3 mm (1/8") thick plastic engraving sheet, black face, white core, mechanically attached with self tapping screws.

NAMEPLATE SIZES

| | | | |
|--------|-------------------------------|---------|---------------------------|
| Size 1 | 9 mm x 50 mm (3/8" x 2") | 1 line | 3 mm (1/8") high letters |
| Size 2 | 12 mm x 70 mm (1/2" x 2 1/2") | 1 line | 5 mm (3/16") high letters |
| Size 3 | 12 mm x 70 mm (1/2" x 2 1/2") | 2 lines | 3 mm (1/8") high letters |
| Size 4 | 20 mm x 90 mm (3/4" x 3 1/2") | 1 line | 9 mm (3/8") high letters |
| Size 5 | 20 mm x 90 mm (3/4" x 3 1/2") | 2 lines | 5 mm (3/16") high letters |
| Size 6 | 25 mm x 100 mm (1" x 4") | 1 line | 12 mm (1/2") high letters |
| Size 7 | 25 mm x 100 mm (1" x 4") | 2 lines | 6 mm (1/4") high letters |

- .3 Wording on nameplates labels to be approved by Consultant prior to manufacture.
- .4 Allow for average of twenty-five (25) letters per nameplate.
- .5 Identification to be English.
- .6 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .7 Nameplates for disconnects, starters and contactors must indicate equipment being controlled and voltage.

1.21 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour code: to CSA C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

1.22 CONDUIT AND CABLE IDENTIFICATION

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m (45') intervals.
- .3 Colour bands must be 25 mm (1") wide.

| | |
|----------------|--------------|
| | <u>Prime</u> |
| up to 208 V | yellow |
| Voice system | green |
| Data System | orange |
| Security | brown |
| Public address | black |
| Fire alarm | red |
- .4 This contractor must paint all system junction boxes and covers in conformance with the above schedule.

1.23 PROTECTION OF OPENINGS

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

1.24 WIRING TERMINATIONS

- .1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

1.25 MANUFACTURERS AND CSA LABELS

- .1 All labels must be visible and legible after equipment is installed.

1.26 WARNING SIGNS

- .1 To meet requirements of Electrical Safety Authority and Consultant.
- .2 Provide porcelain enamel signs, with a minimum size of 175 mm x 250 mm (7" x 10").

1.27 LOCATION OF OUTLETS

- .1 Do not install outlets back-to-back in wall; allow minimum 150 mm (6") horizontal clearance between boxes.
- .2 Change location of outlets at no extra cost or credit, providing distance does not exceed 3 m (10'), and information is given before installation.
- .3 Locate light switches on latch side of doors. Locate disconnect devices in mechanical and elevator machine rooms on latch side of door.

1.28 MOUNTING HEIGHTS

- .1 Mounting height of equipment is from finished floor to centreline of 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 electrical equipment at following heights unless indicated otherwise.
 - .1 Local switches: 1100 mm (43.3").
 - .2 Wall receptacles:
 - .1 General: 400 mm (16").
 - .2 Above top of continuous baseboard heater: 200 mm (8").
 - .3 Above top of counters or counter splash backs: 100 mm (4").
 - .4 In mechanical rooms: 1200 mm (48").
 - .3 Panelboards: as required by Code or 1400 mm (56").
 - .4 Voice/Data outlets: At height of adjacent outlet or at 400 mm (16").
 - .5 Fire alarm stations: 1200 mm (3' - 11").
 - .6 Fire alarm visual and signal devices: 2250 mm (88 ½").
 - .7 Television outlets: 400 mm (16").
 - .8 Thermostat: 1200 mm (3'-11").
 - .9 Clocks: 2100 mm (84").
 - .10 Heaters: 200 mm (8" AFF) to bottom of heater.
 - .11 Emergency call switches and/or pushbuttons: 900 mm (36").

1.29 LOAD BALANCE

- .1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
- .2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
- .3 Submit, at completion of work, report listing phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load. State hour and date on which each load was measured, and voltage at time of test.

1.30 CONDUIT AND CABLE INSTALLATION

- .1 Install conduit and sleeves prior to pouring of concrete. Sleeves through concrete shall be schedule 40 steel pipe, sized for free passage of conduit, and protruding 50 mm (2") beyond either side.
- .2 Install cables, conduits and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

1.31 FIELD QUALITY CONTROL

- .1 Conduct and pay for following tests:
 - .1 Power distribution system including phasing, voltage, grounding, and load balancing.
 - .2 Circuits originating from branch distribution panels.
 - .3 Lighting and its control.
 - .4 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
 - .5 Systems: fire alarm system, communications, security.
- .2 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.
- .3 Insulation resistance testing.
 - .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
 - .2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
 - .3 Check resistance to ground before energizing.
- .4 Carry out tests in presence of Consultant.
- .5 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .6 Submit test results for Consultant's review.

1.32 CO-ORDINATION OF PROTECTIVE DEVICES

- .1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings as indicated on drawings or as determined from co-ordination study.

1.33 GUARANTEE AND WARRANTY

- .1 At ready for takeover of this project this Contractor must provide a written guarantee indicating that any defects, not due to ordinary wear and tear or improper use which occur within the first two years from the date of ready for takeover will be corrected at the contractors expense.
- .2 **If the electrical sub-contractor's office is 50 kilometers (30 miles) or more from the project site, the sub-contractor is to provide a service/warranty work agreement for warranty period with a local electrical sub-contractor approved by Consultant. Include copy of service/warranty agreement in warranty section of operation and maintenance manual.**
- .3 Warranty period shall start from date of ready for takeover completion.
- .4 Refer to individual specification sections for information on any special manufacturer's equipment warranties.

1.34 SYSTEM START UP

- .1 Provide consultant with written notice verifying all equipment operation and installation is complete prior to scheduled start-up period.
- .2 Start up shall be in presence of the following: owner or representative, contractor, and manufacturer's representative. Each person shall witness and sign off each piece of equipment. Consultant's attendance will be determined by consultant.
- .3 Arrange with all parties and provide 72 hours notice for start up procedure.
- .4 Simulate system start up and shut down and verify operation of each piece of equipment.
- .5 These tests are to demonstrate that the systems and equipment installed are operational as specified.
- .6 The contractor must describe during the start up session the required maintenance for each piece of equipment according to the manufacturer.
- .7 The contractor must provide all necessary tools (including a digital multimeter) to successfully complete the start up procedure.

1.35 OPERATION AND MAINTENANCE MANUAL

- .1 Provide operation and maintenance data for incorporation into manual as specified in other Sections of this Division.
- .2 Operation and maintenance manual to be approved by, and final copies deposited with, Consultant before final inspection.

- .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.
 - .1 Manual(s) shall be in a three ring binder (minimum 50 mm (2") ring) labelled:
 - .1 Operation and Maintenance Manual.
 - .2 Project Name.
 - .3 Location.
 - .2 Make changes as required and re-submit as directed by Consultant.
- .3 Each manual must include (in "tabbed" sections) the following:
 - .1 Index
 - .2 List of General, Mechanical, Electrical Contractors and all associated sub-contractor names, addresses and contact numbers.
 - .3 List of suppliers and equipment wholesalers local to the project.
 - .4 Two year warranty letter for all parts, equipment and workmanship.
 - .5 List of manufacturers, spare parts list and source.
 - .6 Copy of typewritten schedules for all new and renovated panels.
 - .7 Copy of all substantial performance final certificates.
 - .8 Copy of electrical shop drawings which have been stamped and reviewed by Consultant.
 - .9 Electrical As-built drawings including contractor company's as built stamp.
 - .10 Coordination study shop drawings
 - .11 Any special warranties on equipment required (i.e. LED lighting, digital lighting control).
 - .12 Certificate of completion from all associated sub-contractors.
 - .13 System commissioning certificate and report.
- .4 Final Submittals:
 - .1 Upon acceptance of Operation and Maintenance Manual by the Consultant provide the following:
 - .1 Provide two (2) 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.

1.36 AS-BUILT DRAWINGS

- .1 Site records:
 - .1 Contractor shall provide 2 sets of reproducible electrical 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 field and contract changes to electrical systems.

- .2 On a weekly basis, transfer information to reproducible, revising reproducible 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 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 ELECTRICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (date).
 - .2 Submit hard copy to Consultant for approval. When returned, make corrections (if any) as directed.
 - .3 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.

1.37 DEMONSTRATION AND OPERATING AND MAINTENANCE INSTRUCTIONS

- .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 Manufacturers or their representatives are to provide demonstrations and instructions.
- .3 Use operation and maintenance manual, As-built drawings, audio visual aids, etc. as part of instruction materials.
- .4 Instruction duration time requirements as specified in appropriate sections.
- .5 Where deemed necessary, Consultants may record these demonstrations on video tape for future reference.

1.38 READY FOR TAKEOVER

- .1 Complete the following to the satisfaction of the consultant prior to request for ready for takeover.
 - .1 As-built Drawings.
 - .2 Maintenance Manuals.
 - .3 System Start up.
 - .4 Instructions to Owners.
 - .5 Final Certificates (Electrical Safety Authority, Fire Alarm, Integrated Life Safety Systems Commissioning, Coordination Study).

1.39 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.

1.40 REVISION TO CONTRACT

- .1 Provide the following for each item in a given change notice:
 - .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.

1.41 EQUIPMENT SUPPORTS

- .1 Equipment supports supplied by equipment manufacturer: shall be installed by the electrical contractor.
- .2 Equipment supports not supplied by equipment manufacturer: fabricate from structural grade steel meeting requirements of - Structural Steel Section. Submit structural calculations with shop drawings if necessary.
- .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. This installation of this pad shall be the responsibility of the electrical contractor.
- .4 This contractor shall be responsible for providing all anchor bolts and associated formed concrete bases for lighting standards as detailed.

1.42 SLEEVES

- .1 Pipe sleeves: at points where pipes pass through masonry, concrete, or fire rated assemblies and as indicated.
- .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.
- .4 Sizes: minimum 6 mm (1/4") clearance all around, between sleeve and conduit.
- .5 Terminate sleeves flush with surface of concrete and masonry walls, concrete floors on grade and 25 mm (1") above other floors.
- .6 Through foundation walls PVC sleeves are acceptable.
- .7 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 Fill future-use sleeves with easily removable filler.

1.43 FIRESTOPPING

- .1 Firestopping material and installation within annular space between conduits, ducts, and adjacent fire separation.
- .2 Provide materials and systems capable of maintaining effective barrier against flame, smoke, and gases.
- .3 Comply with the requirements of CAN4-S115-M35, and do not exceed opening sized for which they have been tested.
- .4 Systems to have an F or FT rating (as applicable) not less than the fire protection rating required for closures in a fire separation.
- .5 Provide “firewrap” blanket around services penetrating firewalls. Extent of blanket must correspond to ULC recommendations. In general wrap individual conduits with approved firewrap materials on each side of firewall. Refer to architectural drawings for FT ratings. Provide 1 and/or 2 layers of firewrap with transverse and longitudinal seams overlapped and/or butted (second layer offset from first layer). Cut edges are to be sealed with aluminum foil tape. Provide 50 mm stainless steel banding at 200 mm intervals. Install firewrap to manufacturers’ recommendations for proper FT rating. Acceptable manufacturers are 3M Firemaster ductwrap or approved equal.
- .6 The firestopping materials are not to shrink, slump or sag and be free of asbestos, halogens and volatile solvents.
- .7 Firestopping materials are to consist of a component sealant applied with a conventional caulking gun and trowel.
- .8 Firestop materials are to be capable of receiving finish materials in those areas, which are exposed and scheduled to receive finishes.
- .9 Firestopping shall be inspected and approved by local authority prior to concealment or enclosure.
- .10 Install material and components in accordance with ULC certification, manufacturers instructions and local authority.
- .11 **Submit product literature and installation material on firestopping in shop drawing and product data manual.**
- .12 Acceptable manufacturers:
 - .1 Rectorseal Corporation (Metacaulk)
 - .2 Proset Systems
 - .3 3M
 - .4 Hilti
 - .5 STI Firestop

Note: Fire stop material must conform to requirements of local authorities having jurisdiction. Contractor to confirm prior to application and ensure material used is compatible with that used by other trades on site.

- .13 Ensure firestop manufacturer representative performs on site inspections and certifies installation. Submit inspection reports/certification at time of ready for takeover.

1.44 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 Prime and touch up marred finished paintwork to match original.
- .4 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.

1.45 ACCESS DOORS

- .1 Supply access doors to concealed electrical equipment for operating, inspecting, adjusting and servicing.
- .2 Flush mounted 600 mm x 600 mm (24" x 24") for body entry and 300 mm 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 Installation:
 - .1 Locate so that concealed items are accessible.
 - .2 Locate so that hand or body entry (as applicable) is achieved.
 - .3 Installation is specified in applicable sections.
- .5 Acceptable materials:
 - .1 Le Hage
 - .2 Zurn
 - .3 Acudor
 - .4 Nailor Industries Inc.

1.46 DELIVERY STORAGE & HANDLING

- .1 Follow Manufacturer's directions in delivery, storage, and protection, of equipment and materials. Contractor to include all costs associated with delivery storage and handling in tender price.
- .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.

1.47 REPAIR, CUTTING, CORING AND RESTORATION

- .1 Be responsible for required digging, 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.
- .2 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.
- .3 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.
- .4 Cutting, patching, repairing, and replacing pavements, sidewalks, roads, and curbs to permit installation of work of this Division is responsibility of Section installing work.
- .5 Slots, cores 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.

1.48 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.

1.49 CLEANING

- .1 Clean interior and exterior of all electrical equipment provided including light fixture lenses.
- .2 In preparation for final acceptance, clean and refurbish all equipment and leave in operating condition.

1.50 ASBESTOS

- .1 If asbestos is suspected or identified cease all work in the immediate area in accordance with OHSA and notify consultant.
- .2 Each contractor and on site employee of the contractor shall have “asbestos awareness training”.
- .3 The Contractor shall ensure that employees who may come into contact with asbestos due to the nature of the work that they perform, have received training that enables them to recognize asbestos and that enables them to react in accordance with the Occupational Health and Safety Act and regulations thereto should contact with asbestos occur during the course of their work.
- .4 **It is the responsibility of the contractor to review the asbestos book in the building prior to starting any work.**

- .5 Existing occupied buildings (depending upon their age) may contain asbestos in thermal insulating materials and some manufactured products, such as vinyl asbestos floor tile. Any insulating materials, on pipes, fittings, boilers, tanks, ductwork, etc. may contain asbestos and shall not be disturbed.
- .6 **A survey of each building documenting the location and condition of asbestos-containing materials is available for your mandatory review prior to commencing any work on premises.**

1.51 DISCONNECTION AND REMOVAL

- .1 Disconnect and/or remove equipment 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.

1.52 OWNER SUPPLIED EQUIPMENT

- .1 Connect to equipment supplied by the owner and make operable.
- .2 Design drawings are diagrammatic and do not necessarily indicate all specific final connection requirements. For the purposes of bidding, electrical trade shall include but not be limited to provision of a junction box to connect equipment wiring tail, provision of suitable disconnecting means, and flexible connection directly to equipment.

1.53 ENCLOSURES

- .1 This contractor must ensure that all electrical equipment mounted in sprinklered areas is provided with an enclosure in conformance with the Electrical Safety Code.

1.54 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 walls 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.

END OF SECTION

Part 1 General

1.1 GENERAL PROVISIONS

- .1 Conform to the General Provisions of Division 1 and Electrical General Requirements Section.
- .2 This project is one of a retrofit nature in part, and which will require extensive 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 SCOPE OF WORK

- .1 The scope of work is essentially the selected disconnection and/or removal of services and/or equipment, devices etc. as indicated or required to complete the work.
- .2 The reference drawings indicate some of the services which shall remain and some may have to be retained through construction and a phased changeover to help construction i.e. electrical service, phone service, winter heat, and temporary construction services i.e. washroom facility. This co-ordination remains the responsibility of the contractors.

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 electrical systems which are not being reused are to be patched with the same material surrounding surfaces.

- .5 All new holes and openings to facilitate electrical 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, 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, devices, cabling, services, etc. as indicated.
- .11 Remove all redundant and obsolete systems, connections, and wiring.
- .12 Provide a list of equipment to be removed to the owner, for their acceptance of same. Remove all equipment from site that the owner does not retain.
- .13 Maintain equipment to be retained by owner on site where directed by consultant.
- .14 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.

END OF SECTION

Part 1 General

1.1 INTENT

- .1 Life safety and fire protection systems are to be installed to comply with the provisions of the current Ontario Building and Fire Codes. As a result, testing of these integrated systems must be performed as a whole to ensure the proper operation and inter-relationship between systems (functional testing).
- .2 The testing is to provide functional verification and documented confirmation that these building systems satisfy the intent of the Building Code.
- .3 These systems as applicable to any given project include but are not limited to fire alarm, sprinkler system and associated valves, ventilation, door hold open devices, elevator recalls, smoke and fire dampers.

1.2 GENERAL

- .1 This testing process is the responsibility of the Integrated Testing Firm as a sub-contractor to the electrical trade. Electrical trade to include all costs associated with the Integrated Testing Coordinator in contract.
- .2 This process must be co-ordinated with suppliers and sub-contractors associated with these systems (mechanical and/or electrical).
- .3 This process must be co-ordinated with the project construction schedule and be completed, including all associated documentation, prior to the consultant's certification of the project for occupancy.
- .4 All applicable contractors, sub-contractors, and suppliers are to include all required costs in their respective tender costs.
- .5 All work is to be performed in accordance with CAN/ULC S1001-2011. Special consideration is to be given to the Sample Integrated Testing Plan (ITP), the review of life safety system design documents, and the provision of test plans and reports.
- .6 The work to be performed by this contractor is also described in CAN/ULC S1001-2011.
- .7 Refer to CAN/ULC S1001-11 Rev1-2019 Informative Annex (C) for Sample Integrated Testing Plan (ITP).

1.3 QUALITY ASSURANCE

- .1 The following criteria must be met in order to be considered an acceptable Integrated Testing Coordinator for this project:
 - .1 Manufacturers: Firms regularly engaged in functional testing and implementation of life safety and fire protection systems for not less than five years.

- .2 Qualifications: Firms with at least five years of successful experience in facility construction, inspection, acceptance testing or commissioning as it relates to fire protection and life safety and equipment similar to that required for this project.
 - .3 The Contractor shall be an established commissioning contractor that has had and currently maintains a locally run and operated business for at least five years.
 - .4 The Contractor shall show satisfactory evidence, upon request, that he maintains a fully equipped service organization capable of furnishing adequate inspection and service to the systems.
- .2 For bidder information only, experienced Life Safety Systems Testing Firms include these listed below or local branches of the companies noted in the vicinity of this project:
- .1 Vintage Fire and Life Safety Ltd.
25 Coverdale Cres.
Kitchener, Ontario N2M 4X1
 - .2 Troy Life and Fire Safety
805 Boxwood Dr., Unit #201
Cambridge, Ontario N3E 1A4
 - .3 Control Tech Systems
31 Regal Road
Guelph, Ontario N1K 1B6
 - .4 Lonergan Engineering
4 Industrial Parkway South
Aurora, Ontario L4G 3W1
 - .5 Guardian Fire Consulting Group
55-346 Northfield Dr.
Waterloo, Ontario N2K 3T6
- NOTE: This agent must be a third party firm NOT associated with this project in any way and be under contract with the electrical sub-contractor not the fire alarm supplier.**
- .3 Other firms to these listed above, who feel they are capable, must submit in writing, to the Consultant's office confirmation of the items listed in the criteria above, a minimum of one week prior to tender close in order to be considered as a bidder.

1.4 GENERAL REQUIREMENTS

- .1 The Commissioning Process shall generally encompass and co-ordinate the following key areas:
 - .1 Integrated systems testing planning.
 - .2 Integrated systems testing implementation (functional testing).
 - .3 Integrated systems testing documentation

1.5 RESPONSIBILITIES

.1 General Contractor:

- .1 The general contractor shall verify completeness of the building envelope, perimeter and interior items which affect proper operation of the noted systems.
- .2 The general contractor will assure participation and co-operation of Sub-Contractors and Specialty Contractors (mechanical, electrical, building management, etc.) under the General Contractor's jurisdiction as required for the commissioning process.

.2 Mechanical Contractor:

- .1 Verify Functional performance of associated mechanical systems for compliance with design intent as specified in the appropriate Specification sections.
- .2 Provide the documentation with standard Functional performance reports on completion of the testing.
- .3 Verify submissions for system operation and maintenance manuals, as-built documents, spare parts listing, special tools listing, and other items as may be specified.

.3 Electrical Contractor:

- .1 The Integrated Life Safety Systems Testing Coordinator (ITC) is being retained by the electrical contractor, however; this contractor's work to satisfy the ITC requirements shall be included in the tender price.
- .2 Verify Functional performance of electrical systems for compliance with design intent as specified in the appropriate Specification sections.
- .3 Provide the documentation with standard Functional performance reports on completion of the testing.
- .4 Verify submissions for electrical system operation and maintenance manuals, as-built documents, spare parts listing, special tools listing, and other items as may be specified.
- .5 As a minimum this contractor must include for:
 - .1 Providing the ITC with documentation of design and shop drawings.
 - .2 Provide documents for sequence of operation and maintenance of system.
 - .3 Testing of all components and accessories to confirm Alarm/Supervisory/Trouble at the fire panel.
 - .4 Testing and operation of any generator (s) as applicable to the project.
 - .5 Other items that may be requested by the ITC.
 - .6 Re-commissioning of any items that may have failed.
 - .7 Re-setting of the system to proper operation after tests are completed.
 - .8 Provide written confirmation that life safety systems are installed in accordance with applicable codes and standards, as well as the scope of the project engineering documents.

- .4 Equipment Manufacturers:
 - .1 The equipment manufacturers shall be responsible for providing labour, material, equipment, etc., required within the scope of the respective equipment to facilitate the commissioning process.
 - .2 The equipment manufacturers will perform Pre-Functional and Functional Performance Tests required by the commissioning process.
- .5 Design Engineer:
 - .1 The design engineer shall review and provide written confirmation of acceptance of the Integrated Testing Plan (ITP).
 - .2 The design engineer shall observe Functional Performance Testing, at his discretion.
 - .3 The design engineer shall provide technical capabilities for resolution of deficiencies, where required.
 - .4 The design engineer shall provide necessary information to assist Integrated Test Coordinator including written confirmation of life safety systems installation in accordance with project engineering documents and are ready for integrated testing.

Part 2 Commissioning Process

2.1 OPERATIONS AND MAINTENANCE MANUALS

- .1 Furnish Final, reviewed Operation and Maintenance Manuals to the Consultant fourteen (14) days prior to scheduled Functional Performance Tests.

2.2 FUNCTIONAL PERFORMANCE TEST

- .1 The contractor shall be responsible for the Functional Performance Tests. These tests ensure that all equipment and systems are installed in accordance with the Specifications, Drawings and manufacturers' requirements.
- .2 The contractor shall be responsible for co-ordinating schedule for Functional tests of various equipment and systems.
- .3 In the Functional Test, all noted systems and sub-systems shall be checked for the following:
 - .1 Verify that each element has been properly installed, properly identified, and that all connections have been made correctly.
 - .2 Verify that tests, meter readings, and specific mechanical/electrical performance characteristics agree with those required by equipment or system manufacturer.

- .3 Re-commission any item(s) that may have failed.
- .4 Notify the consultant in writing, at least fourteen (14) days prior to the date of Functional Performance Testing. Schedule the Functional performance tests over a period of consecutive business days.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 CSA C22.2 No.0.3-92, Test Methods for Electrical Wires and Cables.
- .2 CAN/CSA-C22.2 No.131-M89(R1994), Type TECK 90 Cable.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with Electrical General Requirements Section.

Part 2 Products

2.1 BUILDING WIRES

- .1 Conductors: stranded for 10 AWG and larger.
- .2 Minimum size: 12 AWG.
- .3 Copper conductors: size as indicated, with 600 V insulation of chemically cross-linked thermosetting polyethylene material 90°C (194°F) rated T90 for indoor above grade installations and RW90 for below grade installations.

2.2 ARMoured CABLES

- .1 Conductors: insulated, copper minimum size as indicated above.
- .2 Type: AC90 (minimum size 12 AWG).
- .3 Armour: interlocking type fabricated from aluminum strip.
- .4 Connectors must be suitable for installed environment and approved for use with armoured cable.

Part 3 Execution

3.1 INSTALLATION OF BUILDING WIRES

- .1 Install wiring from source to load through raceways as specified.
- .2 Provide separate neutral conductors for all lighting circuits and circuits originating from surge protected panels. Size raceways accordingly.

3.2 INSTALLATION OF ARMoured CABLES

- .1 Group cables wherever possible.
- .2 Terminate cables in accordance with Wire and Box Connectors - 0 - 1000 V Section.

- .3 These cables are to be installed in concealed locations only. These concealed locations are considered to be stud walls and “drops” to stud walls, lighting fixtures, and ceiling mounted devices.
- .4 **These “drops” shall not be permitted to exceed 2.4 m (8'-0"). To limit these “drops” to lengths noted above provide additional branch wiring in conduit.**

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data for cabinets in accordance with Electrical General Requirements Section.

Part 2 Products

2.1 MATERIALS

- .1 Splitters must conform to CSA C22.2 No. 76 (latest edition).
- .2 Junction and pull boxes must conform to CSA C22.2 No. 40 (latest edition)

2.2 SPLITTERS

- .1 Sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.
- .2 Main and branch lugs to match required size and number of incoming and outgoing conductors as indicated.
- .3 At least three spare terminals on each set of lugs in splitters less than 400 A.
- .4 Splitter length must match arrangement of equipment unless indicated otherwise.

2.3 JUNCTION AND PULL BOXES

- .1 Welded steel construction with screw-on flat covers for surface mounting.
- .2 Covers with 25 mm (1") minimum extension all around, for flush-mounted pull and junction boxes.

Part 3 Execution

3.1 SPLITTER INSTALLATION

- .1 Install splitters and mount plumb, true and square to the building lines on 21 mm (3/4") painted plywood backboards.

3.2 JUNCTION AND PULL BOXES INSTALLATION

- .1 Install pull boxes in inconspicuous but accessible locations.
- .2 Install junction and pull boxes so as not to exceed 30 m (100') of conduit run between pull boxes and in conformance with the Electrical Safety Code.

3.3 IDENTIFICATION

- .1 Provide equipment identification in accordance with General Electrical Requirements Section.
- .2 Install size 2 identification labels indicating system name, voltage and phase.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Outlet boxes, conduit boxes, and fittings must conform to CSA C22.2 No. 18 (latest edition).

Part 2 Products

2.1 OUTLET AND CONDUIT BOXES GENERAL

- .1 Size boxes in accordance with CSA C22.1.
- .2 102 mm (4") square or larger outlet boxes as required for special devices.
- .3 Gang boxes where wiring devices are grouped.
- .4 Blank cover plates for boxes without wiring devices.
- .5 347 V outlet boxes for 347 V switching devices.
- .6 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 SHEET STEEL OUTLET BOXES

- .1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 76 mm x 50 mm x 64 mm (3" x 2" x 2½") or as indicated. 102 mm (4") square outlet boxes when more than one conduit enters one side with extension and plaster rings as required. Iberville 1104 Series.
- .2 Electro-galvanized steel utility boxes for outlets connected to surface-mounted EMT conduit **in utility rooms**, minimum size 102 mm x 57 mm x 38 mm (4" x 2¼" x 1½"). Iberville 1110 Series.
- .3 102 mm (4") square or octagonal outlet boxes for lighting fixture outlets.
- .4 102 mm (4") square outlet boxes with extension and plaster rings for flush mounting devices in finished tile walls.

2.3 MASONRY BOXES

- .1 Electro-galvanized steel masonry single and multi gang boxes for devices flush mounted in exposed block walls.

2.4 CONCRETE BOXES

- .1 Electro-galvanized sheet steel concrete type boxes for flush mount in concrete with matching extension and plaster rings as required.

2.5 CONDUIT BOXES

- .1 Cast FS or FD ferrous boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacle **in areas (other than utility rooms) where surface conduit is used.**

2.6 OUTLET BOXES FOR NON-METALLIC SHEATHED CABLE

- .1 Electro-galvanized, sectional, screw ganging steel boxes, minimum size 76 mm 50 mm x 63 mm (3" x 2" x 2-1/2") with two double clamps to take non-metallic sheathed cables.

2.7 FITTINGS- GENERAL

- .1 Bushing and connectors with nylon insulated throats.
- .2 Knock-out fillers to prevent entry of debris.
- .3 Conduit outlet bodies for conduit up to 32 mm (1- 1/4") and pull boxes for larger conduits.
- .4 Double locknuts and insulated bushings on sheet metal boxes.

Part 3 Execution

3.1 INSTALLATION

- .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.
- .3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm (1/4") of opening.
- .4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.
- .5 Outlets if unwired are to be provided with blank coverplates to suit related sections of this specification.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 CSA C22.2 No.65-1956(R1965) Wire Connectors.

Part 2 Products

2.1 MATERIALS

- .1 Pressure type wire connectors: with current carrying parts of copper sized to fit copper conductors as indicated.
- .2 Fixture type splicing connectors: with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
- .3 Clamps or connectors for armoured cable and flexible conduit, as required.

Part 3 Execution

3.1 INSTALLATION

- .1 Remove insulation carefully from ends of conductors and:
 - .1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No.65.
 - .2 Install fixture type connectors and tighten. Replace insulating cap.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA C22.2 No.18-92, Outlet Boxes, Conduit Boxes, and Fittings.
 - .2 CSA C22.2 No.56-1977(R1977), Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .3 CSA C22.2 No.83-M1985(R1992), Electrical Metallic Tubing.
 - .4 CSA C22.2 No.211.2-M1984(R1992), Rigid PVC (Unplasticized) Conduit.
 - .5 CAN/CSA C22.2 No.227.3-M91, Flexible Nonmetallic Tubing.

Part 2 Products

2.1 CONDUITS

- .1 Epoxy coated conduit: to CSA C22.2 No.45, with zinc coating and corrosion resistant epoxy finish inside and outside.
- .2 Electrical metallic tubing (EMT) with couplings: to CSA C22.2 No.83.
- .3 Rigid PVC conduit: to CSA C22.2 No.211.2.
- .4 Flexible metal conduit: to CSA C22.2 No.56, aluminum and liquid-tight flexible metal.
- .5 Flexible PVC conduit: to CAN/CSA C22.2 No.227.3, ENT.

2.2 CONDUIT FASTENINGS

- .1 One hole steel straps to secure surface conduits 53 mm (2") and smaller. Two hole steel straps for conduits larger than 53 mm (2").
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Channel type supports for two or more conduits at 1.5 m (5'0") oc.
- .4 Threaded rods, 6 mm (1/4") diameter, to support suspended channels.

2.3 CONDUIT FITTINGS

- .1 EMT fittings shall be set screw style (zinc alloy).
- .2 Flexible metal conduit fittings shall be screw-in type.
- .3 Liquid type flexible metal conduit fittings shall be sealtite type.
- .4 PVC fittings shall be PVC type complete with PVC adaptors at all boxes.
- .5 Coating: same as conduit.
- .6 Factory "ells" where 90° bends are required for 27 mm (1") and larger conduits.

- .7 Where bushings are noted to be provided they must be “screwed” type fastened to a conduit connector. Push-fit or glued in place bushings will NOT be accepted.

2.4 FISH CORD

- .1 Nylon twine.

Part 3 Execution

3.1 INSTALLATION

- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .2 Conceal conduits except in mechanical/ electrical service rooms and in unfinished areas.
- .3 **Use electrical metallic tubing (EMT) for all branch circuits unless specified otherwise.**
- .4 Use rigid aluminum threaded conduit where specified and up to 2.1 m (7'0") above finish floor where exposed to mechanical injury.
- .5 Use rigid PVC conduit underground and in kitchen areas.
- .6 Use flexible metal conduit for connection to motors in dry areas, connection to recessed fixtures without a prewired outlet box, connection to surface or recessed fixtures, work in movable metal partitions.
- .7 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations and for connections to kitchen equipment.
- .8 Conduits terminating at electrical equipment in sprinklered areas are to be provided with insulated compression style connectors equal to Thomas & Betts Cat. #TC8XXSC or approved equal.
- .9 **Minimum conduit size for branch circuits shall be 21 mm (3/4").** Single drops from ceiling mounted junction boxes down to a light switch or duplex receptacle may be reduced to 16 mm (1/2").
- .10 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .11 Mechanically bend steel conduit over 27 mm (1") diameter.
- .12 Install fish cord in empty conduits.
- .13 Run 2- 27 mm (1") spare conduits up to accessible ceiling space from each flush panel. Terminate these conduits in 152 mm x 152 mm x 102 mm (6" x 6" x 4") junction boxes in ceiling space.
- .14 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
- .15 Dry conduits out before installing wire.

3.2 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Locate conduits behind infrared or gas fired heaters with 1.5 m (5') clearance.
- .3 Run conduits in flanged portion of structural steel.
- .4 Group conduits wherever possible on suspended or surface channels.
- .5 Do not pass conduits through structural members except as indicated.
- .6 Do not locate conduits less than 75 mm (3") parallel to steam or hot water lines with minimum of 25 mm (1") at crossovers.
- .7 Do not fasten surface conduit to roof deck. Provide standoffs or supports as manufactured by Caddy or use unistrut trapeze fastened to structure.**

3.3 CONCEALED CONDUITS

- .1 Do not install horizontal runs in masonry walls.
- .2 Do not install conduits in terrazzo or concrete toppings.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

- .1 This analysis is to be performed by an independent, third party firm.**
- .2 The studies must be submitted to the Consultant prior to receiving final approval of the distribution equipment shop drawings and/or prior to release of equipment for manufacturing. If formal completion of the studies may cause delay in equipment manufacturing, approval from the Consultant may be obtained for a preliminary submittal of sufficient study data to ensure that the selection of device ratings and characteristics will be satisfactory.
- .3 The studies shall include all portions of the electrical distribution system from the normal power source or sources down to and including the smallest adjustable trip circuit breaker in the distribution system. Normal system connections and those, which result in maximum fault conditions, shall be adequately covered in the study.
- .4 The firm should be currently involved in high- and low-voltage power system evaluation. The study must be performed, stamped and signed by a registered professional engineer in the Province of Ontario. Credentials of the individual(s) performing the study and background of the firm shall be submitted to the Consultant for approval prior to start of the work. A minimum of five (5) years experience in power system analysis is required for the individual in charge of the project.
- .5 The firm performing the study should demonstrate capability and experience to provide assistance during start up as required.

1.2 DATA COLLECTION FOR THE STUDY

- .1 The Contractor shall provide the required data for preparation of the studies. The Consultant performing the system studies shall furnish the Contractor with a listing of the required data immediately after award of the contract.
- .2 The Contractor shall expedite collection of the data to assure completion of the studies as required for final approval of the distribution equipment shop drawings and/or prior to release of the equipment for manufacturing.
- .3 Data collected for the study, including correspondence with local utility, shall be included with study report.

Part 2 Products

2.1 SHORT CIRCUIT AND PROTECTIVE DEVICE EVALUATION AND COORDINATION STUDY

- .1 The short-circuit study shall be performed with the aid of a digital computer program and shall be in accordance with the latest applicable IEEE and ANSI standards.

- .2 In the short-circuit study, provide calculation methods and assumptions, the base per unit quantities selected, one-line diagrams, source impedance data including power company system characteristics, typical calculations, tabulations of calculation quantities and results, conclusions, and recommendations. Calculate short-circuit interrupting and momentary (when applicable) duties for an assumed 3-phase bolted fault at each supply switchgear lineup, unit substation primary and secondary terminals, low-voltage switchgear lineup, switchboard, motor control center, distribution panelboard, pertinent branch circuit panelboard, and other significant overcurrent protective device locations throughout the system. Provide a ground fault current study for the same system areas, including the associated zero sequence impedance data. Include in tabulations fault impedance, X to R ratios, asymmetry factors, motor fault contribution, short circuit kVA, and symmetrical and asymmetrical fault currents.
- .3 In the protective device coordination study, provide time-current curves graphically indicating the coordination proposed for the system, centered on conventional, full-size, log-log forms. Include with each curve sheet a complete title and one-line diagram with legend identifying the specific portion of the system covered by that particular curve sheet. Include a detailed description of each protective device identifying its type, function, manufacturer, and time-current characteristics. Tabulate recommended device tap, time dial, pickup, instantaneous, and time delay settings.
- .4 Include on the curve sheets power company relay and fuse characteristics, medium-voltage equipment protective relay and fuse characteristics, low-voltage equipment circuit breaker trip device characteristics, pertinent transformer characteristics, pertinent motor and generator characteristics, and characteristics of other system load protective devices. In addition, include all devices down to the largest branch circuit and largest feeder circuit breaker in each motor control center, and main breaker in branch panelboards. Include all adjustable settings for ground fault protective devices. Include manufacturing tolerance and damage bands in plotted fuse characteristics. Show transformer full load currents, transformer magnetizing inrush, ANSI transformer withstand parameters, and significant symmetrical fault currents. Terminate device characteristic curves at a point reflecting the maximum symmetrical fault current to which the device is exposed.
- .5 Select each primary protective device required for a delta-wye connected transformer so that its characteristic or operating band is within the transformer characteristics, including a point equal to 58 percent of the ANSI withstand point to provide secondary line-to-ground fault protection. Separate transformer primary protective device characteristic curves from associated secondary device characteristics by a 16 percent current margin to provide proper coordination and protection in the event of secondary line-to-line faults. Separate medium-voltage relay characteristic curves from curves for other devices by at least a 0.4-second time margin.
- .6 Include complete fault calculations as specified herein based on contract documents.
- .7 Submit qualifications of individual(s) who will perform the work for approval prior to commencement of the studies. Provide studies in conjunction with equipment submittals to verify equipment ratings required. Submit the study to Consultant for review prior to delivery of the study to the Owner. Make all additions or changes as required by the reviewer.

- .8 Utilize equipment load data for the study obtained by the Contractor from contract documents, including contract addendum's issued prior to bid openings.
- .9 Include fault contribution of all motors in the study. Notify the Consultant in writing of circuit protective devices not properly rated for fault conditions.
- .10 When emergency generator is provided, include phase and ground coordination of the generator protective devices. Show the generator decrement curve and damage curve along with the operating characteristic of the protective devices. Contractor shall obtain the information from the generator manufacturer and include the generator actual impedance value, time constants and current boost data in the study. Do not use typical values for the generator.
- .11 Evaluate proper operation of the ground relays in 4-wire distributions with more than one main service circuit breaker, or when generators are provided, and discuss the neutral grounds and ground fault current flows during a neutral to ground fault.
- .12 For motor control circuits, show the MCC full-load current plus symmetrical and asymmetrical of the largest motor starting current and time to ensure protective devices will not trip during major or group start operation.

2.2 STUDY REPORT

- .1 The results of the power system study shall be summarized in a final report. Submit report in accordance with Electrical General Requirements Section as a shop drawing.
- .2 The report shall include the following sections:
 - .1 Descriptions, purpose, basis, and scope of the study.
 - .2 Tabulations of circuit breaker, fuse and other protective device ratings versus calculated short-circuit duties, and commentary regarding same.
 - .3 Protective device time versus current coordination curves, tabulations of relay and circuit breaker trip settings, fuse selection, and commentary regarding same.
 - .4 Fault current calculations including a definition of terms and guide for interpretation of computer printout.

Part 3 Execution

3.1 POWER COMPANY APPROVAL

- .1 Copies of the final report must be submitted to the power company for their review and approval. Approved copies of the report shall be submitted to the Consultant.

3.2 FIELD SETTINGS

- .1 The Contractor shall perform field adjustments of the protective devices as required to place the equipment in final operating condition. The settings shall be in accordance with the approved short-circuit study, protective device evaluation study, and protective device coordination study.

- .2 Necessary field settings of devices and adjustments and minor modifications to equipment to accomplish conformance with the approved short-circuit and protective device coordination study shall be carried out by the Contractor at no additional cost to the Owner.
- .3 At the completion of the project, configure settings and install equipment labels. On company letterhead, the contractor is to prepare a certification letter indicating at minimum:
 - .1 project
 - .2 date
 - .3 device designation
 - .4 certification of correct settings
 - .5 certification of correct device labels
 - .6 digital image of each breaker indicating final settings and placement of labels

3.3 SERIES RATING LABELS

- .1 Provide lamicaid labels where recommended by study. **Labels for series rating with panelboards shall be indicated on feeder breaker as "SERIES RATING BREAKER". Refer to section 26 24 16.**

3.4 ACCEPTABLE TESTING FIRMS

- .1 MVA Engineering (519) 668-4698
- .2 GT Wood Company Ltd. (905) 272-1696
- .3 Brosz & Associates (905) 472-6660
- .4 K-Tek Electro-services Ltd. (905) 640-2002

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS

- .1 Submit shop drawings for each system in Conformance with The Electrical General Requirements Section.

1.2 PRODUCT/MAINTENANCE DATA

- .1 Submit product/maintenance data for each system for inclusion in maintenance manual conforming to The General Electrical Requirements Section.

1.3 SCOPE

- .1 The scope of this Section will include the following systems.
 - .1 Hand dryers.
 - .2 Security and access control rough-in.
 - .3 Telecommunication network system rough-in.
 - .4 Classroom control panels.
 - .5 Public address system rough-in.
 - .6 Digital lighting control.
 - .7 Occupancy sensors.

Part 2 Products

2.1 HAND DRYERS

- .1 Hand dryers where noted on the drawings are to be supplied and installed by this Division with the following features:
 - .1 Surface mounting.
 - .2 Fixed nozzle.
 - .3 White finish with automatic activation.
 - .4 Rating of 1800 W at 120 V.
 - .5 NOVA 5-0212
 - .6 Approved alternate:
 - .1 World Dryer Cat. #XA5-2-974.

2.2 SECURITY AND ACCESS CONTROL ROUGH-IN

- .1 Provide conduit from device and outlet locations to cable management systems as noted on drawings.
- .2 Outlets if unwired are to be provided with blank coverplates to suit related sections of this specification.

- .3 Provide grounding of equipment as noted on drawings.
- .4 Security and access control systems installation shall be by Owner's approved vendor as part of separate tender.
- .5 Refer to Telecommunication Network Installations and Security System sections for additional requirements

2.3 TELECOMMUNICATION NETWORK SYSTEM ROUGH-IN

- .1 Outlets where noted shall be single gang flush mounted in wall or surface raceways.
- .2 Outlets if unwired are to be provided with blank coverplates to suit related sections of this specification.
- .3 Provide a #6 insulated green ground conductor from main service ground to voice equipment backboard located on drawings.
- .4 Security and access control systems installation shall be by Owner's approved vendor as part of separate tender.
- .5 Refer to Telecommunication Network Installations section for additional requirements.

2.4 CLASSROOM CONTROL PANELS

- .1 Provide surface mounted ClassMate Classroom Control Panels as detailed on the drawings. To be specified as manufactured by Interspec Systems Limited. – Rosemont, ON (705) 435-3780 x.21 Specified manufacturer's products establish minimum standards and shall be base bid.
- .2 Modular control panels shall be constructed of structurally sound 6063 T5 alloy satin anodized aluminum frame .080 mm thick with high pressure plastic laminate faced panels of lightweight particle core and 0.50 mm thick plastic laminate backing sheet. Plastic laminate colour as selected by the Architect from Arborite or Formica, furniture finish, from manufacturer's standard colour range. Complete assembly to meet flame spread ratings in areas used.
- .3 Units to be complete with backboxes fabricated from heavy guage satin coat steel with suitable barriers and continuous knockouts. Satin anodized faceplates shall be pre-punched to accept detailed components.
- .4 All panels shall be vandal resistant and removable with special tools for service access.
- .5 Fabricate units in accordance with reviewed shop drawings with extruded aluminum frames and solid plastic laminated face panels.
- .6 Panels to be removable from aluminum frames with rounded profile edging.
- .7 Front panels to have colour finish as selected by the Architect.

- .8 Panels to have all openings, mounting hardware, etc. for services as required for installation of mechanical and electrical services.
- .9 Units to be full height from 200 mm off floor to underside of ceiling panels.
- .10 Part numbers:
CCP-3016-04JV – ClassMate 406 mm (16”) Wide x 102 mm (4”) Deep

2.5 PUBLIC ADDRESS SYSTEM ROUGH-IN

- .1 Provide conduit from device and outlet locations to cable management systems as noted on drawings.
- .2 Outlets if unwired are to be provided with blank coverplates to suit related sections of this specification.
- .3 Provide grounding of equipment as noted on drawings.
- .4 Public address system installation shall be by Owner’s approved vendor as part of separate tender.

2.6 DIGITAL LIGHTING CONTROL

- .1 Supply and install a digital time switch with 40 Amp SPST contacts.
- .2 Unit shall be capable of 20 set points.
- .3 Unit shall repeat the same schedule each day.
- .4 Unit shall have automatic Daylight Savings Time and Leap Year compensation.
- .5 Unit shall program in AM/PM format.
- .6 Unit shall have LCD display.
- .7 Unit shall have permanent schedule retention.
- .8 Unit real time clock shall be retained by supercapacitor for 100 hours in a power failure.
- .9 Unit shall be capable of manual override ON and OFF either to the next scheduled event or permanently.
- .10 Unit shall have a NEMA 3R indoor/outdoor plastic enclosure.
- .11 Unit shall have Load Status indication.
- .12 Unit shall have Power Failure indication.
- .13 Acceptable Manufacturer:
Tork Cat. #EW/EWZ Series

2.7 OCCUPANCY SENSORS

- .1 Where noted on drawings the wall mounted (passive technology) occupancy sensor used in storage and service rooms shall be either:
 - .1 Hubbell Cat. # AP1277XIN (colour by Architect).
 - .2 Wattstopper Cat. #PW-100-VOLT-X (colour by Architect).
 - .3 Leviton Cat. #ODS-15-ID-VOLT-X (colour by Architect).
 - .4 Sensor switch Cat. #WSX-VOLT-X (colour by architect).
 - .5 Cooper Controls (Greengate) Cat.#ONW-P-1001-VOLT-X (colour by architect).

Note: Writer – confirm voltage.

- .2 Where noted on the drawings, the wall mounted switch style occupancy sensor used in Administrative Offices and Seminar/Meeting Rooms shall be a dual technology switch with either single or double relay (circuit) as noted on the drawings. Colour to suit architect.

Note: For dual relay switches, program the sensor for 15 minute off delay, enabled walk-thru, audible alert enabled, relay 1 on mode: auto on, relay 2 on mode: manual on.

- .1 Single relay (circuit): Wattstopper Cat. #DW-100
 - .2 Dual relay (circuit): Wattstopper Cat. #DW-200
 - .3 Approved equal:
 - .1 Hubbell.
 - .2 Leviton.
 - .3 Sensor switch.
 - .4 Cooper Controls (Greengate).
- .3 Provide other occupancy sensors to suit the detail on the drawings.
- .4 All sensors shall be set to 5 minutes “delay to off” unless otherwise directed.

Part 3 Execution

3.1 HAND DRYERS

- .1 Install and connect hand dryers in conformance with manufacturer’s recommendations.
- .2 Hand dryers are to be mounted at a height to suit age of expected users’. Unless otherwise noted confirm height with manufacturer, owner, Architect, and/or consultant prior to rough in.
- .3 Once installed this contractor is to caulk the joint between dryer and wall surface with a bead of white silicone.

3.2 SECURITY AND ACCESS CONTROL ROUGH-IN

- .1 Outlets are to be provided for devices with conduit as detailed on drawings.
- .2 Conduits terminated into ceiling spaces must be within 1m of cable management of tray.

3.3 TELECOMMUNICATION NETWORK SYSTEM ROUGH-IN

- .1 Install incoming service ducts and terminate as noted.
- .2 Provide backboard as noted complete with ground connection to main service ground.
- .3 Conduits terminated into ceiling spaces must be within 3m (10') of zone conduits (if applicable).
- .4 Ensure specified zone conduits are installed back to service backboard.
- .5 Outlets are to be installed complete with 25 mm (1") conduit to corridor ceiling space or nearest zone conduit (if applicable).
- .6 Provide insulated bushings on all conduits terminated in ceiling space.
- .7 A 25mm (1") conduit is to be installed from elevator machine room to voice service backboard.
- .8 Refer to Telecommunication Network Installations Section for additional requirements.

3.4 CLASSROOM CONTROL PANELS

- .1 Electrical trade to supply and install units in accordance with manufacturers' recommendations and reviewed shop drawings complete with all frames, cut outs, face panels, etc., to provide a complete installation.
- .2 It is the electrical trade's responsibility to coordinate complete installation of all mechanical, electrical and miscellaneous services in all control panels. Components within control panels will vary from room to room.

3.5 PUBLIC ADDRESS SYSTEM ROUGH-IN

- .1 Conduits terminated into ceiling spaces must be within 1m (10') of cable management tray.
- .2 Outlets are to be installed complete with 25 mm (1") conduit to corridor ceiling space or nearest cable management tray.
- .3 Provide insulated bushings on all conduits terminated in ceiling space.
- .4 Electrical contractor shall obtain speaker back boxes from School Board vender for installation into ceiling tiles, block walls, etc.

3.6 DIGITAL LIGHTING CONTROL

- .1 Install electromechanical lighting controls as indicated and in accordance with manufacturer's instructions.
- .2 Coordinate with owner's representative and install 'trippers' to suit.

3.7 OCCUPANCY SENSORS

- .1 Install power packs in accessible maintenance areas.
- .2 Provide access doors if power packs are installed above drywall ceilings.

- .3 It shall be the contractor's responsibility to locate and aim sensors in the correct location required for complete and proper coverage within the range of coverage as per the manufacturer's recommendations. The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only the rooms which are to be provided with sensors. The contractor shall provide additional sensors if required to properly and completely cover the respective rooms.
- .4 It is the contractor's responsibility to arrange a pre-installation meeting with the manufacturer's factory authorized representative, at the facility, to verify placement to sensors and installation criteria.
- .5 The contractor shall also provide the on-site training necessary to familiarize the owner's personnel with the operation, use, adjustment and problem solving diagnosis of the occupancy sensing devices systems.
- .6 Upon completion of the installation, the system shall be completely commissioned by the manufacturer's factory authorized technician who will verify all adjustments and sensor placement to ensure a trouble-free occupancy-based lighting control. Submit commissioning report with closeout documents.

END OF SECTION

Part 1 General

1.1 PRODUCT DATA

- .1 Submit product data in accordance with Electrical General Requirements Section.
- .2 Drawings to include electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension.

Part 2 Products

2.1 PANELBOARDS

- .1 Panel boards must conform to CSA C22.2 No. 29 (latest edition).
- .2 Panelboards: product of one manufacturer.
- .3 Install circuit breakers in panelboards before shipment.
- .4 In addition to CSA requirements manufacturer's nameplate must show fault current that panel including breakers has been built to withstand. **Series rating is acceptable – submit information with shop drawings. Provide lamicaid label on feeder breaker. Lamicaid label to state "Series Rating Breaker." Lamicaid label to be size 2.**
- .5 Bus and breakers must be rated for interrupting capacity as indicated.
- .6 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.
- .7 Panelboard mains, number of circuits, and number and size of branch circuit breakers as indicated.
- .8 Two keys for each panelboard and key panelboards alike.
- .9 Aluminum bus with neutral of same ampere rating as mains.
- .10 Mains must be suitable for bolt-on breakers. Provide main (if applicable) and branch breakers as bolt-on style.
- .11 Trim with concealed front bolts and hinges.
- .12 Trim and door finish must be baked grey enamel.
- .13 All panels regardless of voltage and amperage must be provided with a lockable door.
- .14 Branch circuit panelboards (250 AMP or smaller) must be one of the following:
 - .1 Eaton Cat # POW-R-LINE-C PRL-1 or PRL-2
 - .2 Schneider Electric Cat # NQ Series for up to 240V or NF Series for up to 600V
 - .3 Siemens Cat #Sentron P1 Series

2.2 BREAKERS

- .1 Breakers: to Moulded Case Circuit Breakers Section.
- .2 Breakers with thermal and magnetic tripping in panelboards except as indicated otherwise.
- .3 Main breaker (as specified) must be separately mounted on top or bottom of panel to suit cable entry. When mounted vertically, down position should open breaker.
- .4 Lock-on devices for fire alarm, stairway, exit and night light circuits.

2.3 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Electrical General Requirements Section.
- .2 Nameplate for each panelboard size 4 engraved description as indicated. In finished areas install label on inside of panel, and in service areas install label on exterior of panel.
- .3 Nameplate for each circuit in distribution panelboards size 2 engraved "name of load" as indicated.
- .4 Complete circuit directory with typewritten legend showing location of each circuit.
Include a copy of the directories in the maintenance manuals.

Part 3 Execution

3.1 INSTALLATION

- .1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.
- .2 Install surface mounted panelboards on plywood backboards. Where practical, group panelboards on common backboard. Plywood shall be 21mm (3/4") fire rated or painted with intumescent fire block paint having a minimum of 1h rating, unless noted otherwise.
- .3 Mount panelboards to height specified in Electrical General Requirements Section or as indicated.
- .4 Connect loads to circuits.
- .5 Connect neutral conductors to common neutral bus.
- .6 Install series rating lamicides adjacent to all breakers utilized to achieve series ratings.

END OF SECTION

Part 1 General

1.1 PRODUCT DATA

- .1 Submit product data in accordance with Electrical General Requirements Section.

Part 2 Products

2.1 BREAKERS GENERAL

- .1 Moulded case circuit breakers must conform to CSA C22.1 No.5.1-M91 (latest edition.)
- .2 Bolt-on moulded case circuit breaker quick-make, quick-break type, for manual and automatic operation.
- .3 Common-trip breakers: with single handle for multi-pole applications.
- .4 Unless otherwise indicated moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

Part 3 Execution

3.1 INSTALLATION

- .1 Install circuit breakers as indicated complete with all necessary mounting hardware and filler panels if necessary.
- .2 Provide lamicon labels for series rating breakers. Lamicon label to state "Series Rating Breaker." Lamicon to be size 2.

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Electrical General Requirements Section.

Part 2 Products

2.1 SWITCHES

- .1 General purpose AC switches must conform to CSA C22.2 No. 111 (latest edition).
- .2 15 or 20 A, 120 V, single pole, three-way, four-way, keyed, or motor rated switches complete with pilot light.
- .3 Manually-operated general purpose ac switches with following features:
 - .1 Terminal holes approved for No. 10 AWG wire.
 - .2 Silver alloy contacts.
 - .3 Urea or melamine molding for parts subject to carbon tracking.
 - .4 Suitable for back and side wiring.
 - .5 Toggle style (Rocker style) (architect to select colour).
- .4 Toggle operated fully rated for tungsten filament and fluorescent lamps, and up to 80% of rated capacity of motor loads.
- .5 Switches of one manufacturer throughout project.
- .6 Acceptable materials:

single pole: Hubbell Cat # HBL1201 [HBL2101 (decora)] Series

three way: Hubbell Cat # HBL1203 [HBL2103 (decora)] Series

four way: Hubbell Cat # HBL1204 [HBL2124 (decora)] Series

Keyed: Hubbell Cat. #HBL1221 Series complete with 2 keys per switch

(Keys): Hubbell Cat. #HBL1209

Motor rated: Hubbell Cat. #HBL1221PL [HBL2121 PL (decora)] c/w pilot light (20 A):
- .7 Acceptable alternate manufacturers include:
 - .1 Pass & Seymour
 - .2 Leviton.

2.2 RECEPTACLES

- .1 Receptacles, plugs, and other similar wiring devices must conform to CSA 22.2 No 42 (latest edition).
- .2 Duplex receptacles, CSA type 5-15 R, 125 V, 15 A, U ground, with following features (20A where noted):
 - .1 Urea molded housing (Colour by architect).
 - .2 Suitable for No. 10 AWG for back and side wiring.
 - .3 Break-off links for use as split receptacles.
 - .4 Eight back wired entrances, four side wiring screws.
 - .5 Triple wipe contacts and rivetted grounding contacts.
- .3 Other receptacles with ampacity and voltage as indicated.
- .4 Receptacles of one manufacturer throughout project.
- .5 Acceptable materials:

| | |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------|
| Dryer receptacle | Hubbell Cat # HBL9430A |
| Range receptacle | Hubbell Cat # HBL9450A |
| Tamper resistant receptacle | Hubbell Cat # BR15TR |
| Tamper resistant T-slot receptacle | Hubbell Cat. #BR20TR |
| Tamper resistant ground fault protected receptacle | Hubbell Cat. #GFTR15 |
| Tamper resistant ground fault protected T-slot receptacle | Hubbell Cat. #GFTR20 complete with Decora style coverplate to suit specification below |
| Tamper resistant duplex receptacle complete with dual USB ports | Hubbell Cat. #USB15XXX |

- .6 Acceptable alternate manufacturers include:
 - .1 Pass & Seymour
 - .2 Leviton

2.3 COVER PLATES

- .1 Cover plates from one manufacturer throughout project.
- .2 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.
- .3 Stainless steel, brushed, 1 mm (1/32") thick cover plates for wiring devices mounted in flush-mounted outlet box.
- .4 Sheet metal cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.
- .5 Weatherproof cover plates complete with gaskets and "heavy-duty in use" covers in conformance with the Electrical Safety Authority. Provide product equal to Intermatic Cat. #WP5100C.

- .6 Where noted on plans for exterior weatherproof GFCI receptacles at grade, provide extra-duty single gang horizontal die cast receptacle covers. NEMA 3R rated complete with lockable hasp and reinforced hinge. Suitable for use with 12-gauge cord sets. Intermatic Cat. # WP1010HMXD or equal.

2.4 DIMMER CONTROL

- .1 Dimmers are to be provided complete with the following features:
 - .1 Rating of 15 A 120 V.
 - .2 Wattage to suit load as indicated on drawings (minimum 1000W).
 - .3 Thin profile linear slide control only. (Rotary controls will not be accepted).
 - .4 Dimmer must provide full range of illumination from zero to full intensity.
 - .5 Integral on/off switch.
 - .6 Devices must mount in single gang box or multi-ganged where noted.
 - .7 Device and faceplate colour must match other wiring devices.
 - .8 Acceptable manufacturers:
 - .1 Leviton Renoir Series
 - .2 Lutron Lumea 2 Series
 - .3 Hubbell AS103 Series

Part 3 Execution

3.1 INSTALLATION

- .1 Switches:
 - .1 Install single throw switches with handle in "UP" position when switch closed.
 - .2 Install switches in gang type outlet box when more than one switch is required in one location.
 - .3 Mount toggle switches at height specified in Electrical General Requirements Section or as indicated.
- .2 Receptacles:
 - .1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.
 - .2 Mount receptacles at height specified in Electrical General Requirements Section or as indicated.
 - .3 Where split receptacle has one portion switched mount vertically and switch upper portion.
- .3 Cover plates:
 - .1 Protect stainless steel cover plate finish with paper or plastic film until painting and other work is finished.
 - .2 Install suitable common cover plates where wiring devices are grouped.

- .3 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.
- .4 Dimmer:
 - .1 Mount devices at height as specified in Electrical General Requirements Section.
 - .2 Dimmer switches must be installed with the “most downward” position of slider corresponding to zero light intensity and the “highest” position of slider corresponding to full light intensity.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No.248.12/94, Low Voltage Fuses Part 12: Class R (Bi-National Standard with, UL 248-12 (1st Edition).
 - .2 CSA C22.2 No. 106-M92 (latest edition).

1.2 MAINTENANCE MATERIAL

- .1 Three spare fuses of each type and size installed.

1.3 DELIVERY AND STORAGE

- .1 Ship fuses in original containers.
- .2 Store fuses in original containers in moisture free location.

Part 2 Products

2.1 FUSES GENERAL

- .1 Fuses: product of one manufacturer for entire project .
- .2 Fuses specified below must conform to CSA C22.2 No. 106 (latest edition). Fuses conforming to standard C22.2 No. 106-1953 will be rejected.
- .3 Fuses must provide a fully co-ordinated system for both overload and fault conditions.

2.2 FUSE TYPES

- .1 Class L fuses (formerly HRC-L) for ratings 601-6000 A..
 - .1 Time delay, capable of carrying 500% of its rated current for 10 s minimum.
 - .2 Fast acting as noted.
- .2 Class J fuses (formerly HRCI- J).
 - .1 Time delay, capable of carrying 500% of its rated current for 10 s minimum.
 - .2 Fast acting as noted.
- .3 Class R fuses (formerly HRCI- R). For UL Class RK1 fuses, peak let-through current and I^2t values not to exceed limits of UL 198E-1982, table 10.2.

2.3 ACCEPTABLE PRODUCTS

- .1 Motor Protection:
 - 1-600 A: Mersen Type AJT
 - 601-2000 A: Mersen Type A4BT

- .2 Other acceptable manufacturers:
 - .1 GEC
 - .2 Little Fuse

Part 3 Execution

3.1 INSTALLATION

- .1 Install fuses in mounting devices immediately before energizing circuit.
- .2 Ensure correct fuses fitted to physically matched mounting devices.
 - .1 Install Class R rejection clips for HRCI-R fuses.
- .3 Ensure correct fuses fitted to assigned electrical circuit.

END OF SECTION

Part 1 General

1.1 PRODUCT DATA

- .1 Submit product data in accordance with Electrical General Requirements Section.

Part 2 Products

2.1 DISCONNECT SWITCHES

- .1 Enclosed manual air break switches must conform to CSA C22.1 No.4 (latest edition).
- .2 Fuseholder assemblies must conform to CSA C22.2 No.39 (latest edition).
- .3 Fusible, and/or non-fusible, horsepower rated disconnect switches, size as indicated.
- .4 Provision for padlocking in off switch position by three locks.
- .5 Mechanically interlocked door to prevent opening when handle in ON position.
- .6 Fuses: size as indicated, to Fuses - Low Voltage Section.
- .7 Fuseholders: relocatable and suitable without adaptors, for type and size of fuse indicated.
- .8 Quick-make, quick-break action.
- .9 ON-OFF switch position indication on switch enclosure cover.
- .10 Disconnects feeding elevator controllers must be equipped with two auxiliary contacts approved by the elevator supplier.
- .11 Service entrance rated with fault bracing and fusing as required.

2.2 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Electrical General Requirements Section.
- .2 Indicate name of load controlled on size 4 nameplate.

2.3 ACCEPTABLE MANUFACTURERS

| <u>Manufacturer</u> | <u>General Purpose</u> | <u>Weather Proof</u> |
|---------------------|------------------------|----------------------|
| Eaton | IHD Series | 3HD Series |
| Schneider Electric | Type A Series | Type R Series |
| Siemens | ID Series | NFR/FR Series |

Part 3 Execution

3.1 INSTALLATION

- .1 Install disconnect switches complete with fuses if applicable.
- .2 Connect auxiliary contacts to elevator controller using conduit, wire and route approved by the elevator supplier.

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings in accordance with Electrical General Requirements Section.
- .2 Indicate:
 - .1 Mounting method and dimensions.
 - .2 Starter/contactor size and type.
 - .3 Layout of identified internal and front panel components.
 - .4 Enclosure types.
 - .5 Wiring diagram for each type of starter.
 - .6 Interconnection diagrams.

1.2 OPERATION AND MAINTENANCE DATA

- .1 Provide operation and maintenance data for incorporation into manual specified in Electrical General Requirements Section.
- .2 Include operation and maintenance data for each type and style of starter/contactor.

1.3 MAINTENANCE MATERIALS

- .1 Provide maintenance materials in accordance with Electrical General Requirements Section.
- .2 Provide listed spare parts for each different size and type of starter:
 - .1 1 operating coil.
 - .2 3 fuses.
 - .3 10% indicating lamp bulbs used.

Part 2 Products

2.1 MATERIALS

- .1 Starters: must conform to CSAC22.2 No. 14 (latest edition) and EEMAC E14-1.
- .2 Control transformers must conform to CSAC22.2 No. 66 (latest edition).
- .3 Auto-transformers must conform to CSAC22.2 No 47 (latest edition).
- .4 Contactors must conform to CSA C22.2 No. 14 (latest edition).
- .5 Half size starters will not be accepted. NEMA and IEC rated starters are acceptable.

2.2 MANUAL MOTOR STARTERS

- .1 Single and Three phase manual motor starters of size, type, rating, and enclosure type as indicated, with components as follows:
 - .1 Switching mechanism, quick make and break.
 - .2 One or Three overload heaters, manual reset, trip indicating handle.
 - .3 Toggle switch: standard duty labeled "on"/"off".
 - .4 Indicating light: standard duty type and red colour.
 - .5 Locking tab to permit padlocking in "ON" or "OFF" position.

2.3 FULL VOLTAGE MAGNETIC STARTERS

- .1 Magnetic and combination magnetic starters of size, type, rating and enclosure type as indicated with components as follows:
 - .1 Contactor solenoid operated, rapid action type.
 - .2 Motor overload protective device in each phase, manually reset from outside enclosure.
 - .3 Wiring and schematic diagram inside starter enclosure in visible location.
 - .4 Identify each wire and terminal for external connections, within starter, with permanent number marking identical to diagram.
- .2 Combination type starters to include fused disconnect switch with operating lever on outside of enclosure to control disconnect, and provision for:
 - .1 Locking in "OFF" position with up to 3 padlocks.
 - .2 Independent locking of enclosure door.
 - .3 Provision for preventing switching to "ON" position while enclosure door open.
- .3 Accessories:
 - .1 Pushbuttons Selector switches standard duty labeled as indicated.
 - .2 Indicating lights: standard duty type and color as indicated.
 - .3 1-N/O and 1-N/C spare auxiliary contacts unless otherwise indicated.
 - .4 1 red pilot light for "stop" or "off" and 1 green light for "start" or "on".

2.4 CONTROL TRANSFORMER

- .1 Single phase, dry type, control transformer with primary voltage as indicated and secondary voltage to suit remote control device, complete with secondary fuse, installed in with starter as indicated.
- .2 Size control transformer for control circuit load plus 20% spare capacity.

2.5 CONTACTORS

- .1 Electrically held and controlled by pilot devices as indicated and rated for type of load controlled.
- .2 Complete with 2 normally open and 2 normally closed auxiliary contacts unless indicated otherwise.
- .3 Mount in CSA Enclosure 1 unless otherwise indicated.
- .4 Include following options in cover:
 - .1 Red indicating lamp.
 - .2 Hand - Off - Auto selector switch.
- .5 Control transformer: mounted in contactor enclosure.
- .6 Contactors must be definite purpose.

2.6 FINISHES

- .1 Apply finishes to enclosure in accordance with Electrical General Requirements Section.

2.7 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Electrical General Requirements Section.
- .2 Manual starter designation label: black plate, white letters, size 1, engraved as indicated.
- .3 Magnetic starter designation label: black plate, white letters, size 2, engraved as indicated.
- .4 Contactor designation label:
black plate, white letters, size 4, indicating name of load controlled.

2.8 ACCEPTABLE MANUFACTURERS

- .1 The acceptable manufacturers are as follows:
 - .1 Allen Bradley
 - .2 Eaton
 - .3 Siemens
 - .4 Group Schneider
 - .5 Klockner Moeller

Part 3 Execution

3.1 INSTALLATION

- .1 Install starters, connect power and control as indicated.
- .2 Ensure correct fuses and overload devices elements installed.

3.2 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Electrical General Requirements Section.
- .2 Operate switches, contactors to verify correct functioning.
- .3 Perform starting and stopping sequences of contactors and relays.
- .4 Check that sequence controls, interlocking with other separate related starters, equipment, control devices, operate as indicated.
- .5 Install contactors and connect auxiliary control devices.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
 - .1 ANSI/IEEE C62.41- 1991, Recommended Practices for Surge Voltages in Low-Voltage AC Power Circuits.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM F1137- 88 (1993), Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
- .3 United States of America, Federal Communications Commission (FCC)
 - .1 FCC (CFR47) EM and RF Interference Suppression.
- .4 IESNA LM-79-08, IES Electrical Method for the Electrical and Photometric Measurements of Solid State Lighting Products.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings in accordance with Electrical General Requirements Section for all light fixtures supplied under this contract.
- .2 Submit complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Consultant.
- .3 Photometric data to include: VCP Table spacing criterion.

1.3 SCOPE

- .1 This contractor is responsible to supply and install all lighting fixtures as scheduled and/or indicated including lamp and those accessories required for a complete lighting system. This contractor must coordinate lighting installations with all other Divisions of this project.
- .2 All fixtures must be CSA approved or approved at this contractor's expense by the Special Inspection Division of the Electrical Safety Authority.

1.4 GUARANTEE

- .1 Guarantees for materials replacement shall be as follows from date of substantial completion.
 - .1 LED lamps: 3 months
 - .2 LED fixtures, and driver: 5 years.
- .2 The labour required to replace these ballasts, lamps or drivers must be included in the above guarantee, however only for the extent of the contract guarantee and warranty period as noted in Electrical General Requirements.

1.5 EXISTING FIXTURE BALLAST REMOVAL AND DESTRUCTION

.1 Scope

.1 This Contractor is responsible for contracting with an approved company for the dismantling, disposal and removal of all existing fluorescent ballasts and lamps from this project. This process must include but is not limited to the following:

- .1 Removal of existing ballasts from fixtures by this contractor.
- .2 This contractor is to compare the ballast number to the PCB ballast identification booklet provided by the disposal company.
- .3 If the ballast is not contaminated it is to be disposed of by normal means.
- .4 If the ballast is contaminated provide:
 - .1 Approved interm on site storage area.
 - .2 Approved interm on site storage containers.
 - .3 Any and all necessary on site inspections.
 - .4 All necessary approval certificates (include copies in maintenance manuals).
 - .5 Full dismantling, complete destruction and disposal of all ballasts components.

.2 Approved Disposal Companies

.1 PCB Containment Technology Inc.
75 Wanless Court
Ayr, Ontario
NOB 1E0
Phone: (519) 740-1333
Fax: (519) 740-2320

.3 Payment Procedures

.1 Cost of complete services of this sub-contractor shall be paid for by this Section. Refer to Allowances and Fees Section for allowance to be carried for this work.

Part 2 Products

2.1 FIXTURE CONSTRUCTION

- .1 Fixtures must be constructed of 20 gauge (minimum) cold rolled steel. All metal edges require smooth finish.
- .2 Light leaks must be prevented by providing gasketting, stops, and barriers.
- .3 Fixtures must be finished in high reflective baked white enamel. This surface must have a reflectance of not less than 85%.

2.2 FIXTURE LENS

- .1 Unless otherwise noted fixture lenses shall be as follows:
 - .1 Lens thickness: 3.2 mm (1/8")
 - .2 Material: injection moulded clear prismatic virgin acrylic
 - .3 Frame: hinged, latched, steel.

2.3 LED FIXTURES

- .1 Fixture LED's must be tested in conformance with IESNA LM80 standard.
- .2 LED's must be selected using a binning algorithm to ensure colour and lumen output of a given fixture are consistent, as well as meet or surpass ANSI C78.377 specification for the rated lifetime of the fixture. Colour accuracy between products must be within a 2-step MacAdam ellipse.
- .3 Luminaires must be tested to IESNA LM79 by an independent approved laboratory.
- .4 Luminaires must be tested prior to shipping.
- .5 Luminaires must be ULC certified and approved for use in Canada.
- .6 Fixtures must maintain a minimum of 90% of their initial light output for 60,000 hours. Submit test results upon request.
- .7 Lumen values indicated for fixtures in the project documents are to be considered as "absolute" or "delivered" values.
- .8 Other than for specialty fixtures, and unless otherwise indicated, the maximum driver current is to be 750 mA.

2.4 STANDARD EXIT LIGHTING UNITS

- .1 Exit lighting units must conform to CSA C860, CSA 22.2 No. 141 (latest edition).
- .2 Housing: extruded aluminum housing, white finish.
- .3 Face and back plates: extruded aluminum.
- .4 Lamps: 2W LED.
- .5 Operation: 25 year.
- .6 Units are to be provided with three (3) pictogram legends indicating "left from here", "straight from here", and "right from here".
- .7 Face plate to remain captive for relamping.

2.5 SELF-POWERED COMBINATION EXIT/EMERGENCY LIGHTING UNITS

- .1 Exit lighting units must conform to CSA C860, CSA 22.2 No. 141 (latest edition).
- .2 Housing: extruded aluminum housing. White Finish.
- .3 Face and back plates: extruded aluminum.
- .4 Lamps 2W LED (EXIT).

- .5 Operation: 25 year life.
- .6 Units are to be provided with three (3) pictogram legends indicating “left from here”, “straight from here”, and “right from here”.
- .7 Face plate to remain captive for relamping.
- .8 Supply voltage: as noted on drawings.
- .9 Output voltage: 12 V DC.
- .10 Battery: sealed maintenance free 10 year life.

Note: Battery must be capable of supplying the wattage indicated for a minimum of 30 minutes.
- .11 Charger: solid state, voltage/current regulated, inverse temperature compensated, short circuit protected, with regulated output of plus or minus 0.01 V for plus or minus 10% V input variation.
- .12 Solid state transfer circuit.
- .13 Signal lights: “AC Power On” condition and “charging” condition.
- .14 Lamp heads: integral on unit, 345° horizontal and 180° vertical adjustment. Lamp type: minimum 4 watt LED.
- .15 Mounting: suitable for universal mounting directly on junction box and complete with knockouts for conduit. Removable or hinged front panel for easy access to batteries.
- .16 Cabinet: finish: white.
- .17 Auxiliary equipment:
 - .1 Test switch.

2.6 EMERGENCY LIGHTING UNITS

- .1 Emergency lighting units must conform to CSA C22.2 No 141 (latest edition).
- .2 Supply voltage: as noted on drawings.
- .3 Output voltage: 12 V DC.
- .4 Battery: sealed, maintenance free, 10 year life.

Note: Battery units must be capable of supplying the wattage indicated for a minimum of 30 minutes.
- .5 Charger: solid state, multi rate, voltage/current regulated, inverse temperature compensated, short circuit protected with regulated output of plus or minus 0.01 V for plus or minus 10% input variations.
- .6 Solid state transfer circuit.
- .7 Low voltage disconnect: solid state, modular, operates at 80% battery output voltage.
- .8 Signal lights: “AC Power ON” condition and “charging” condition.
- .9 Lamp heads: integral on unit, 345° horizontal and 180° vertical adjustment. Lamp type: minimum 4 watt LED.

- .10 Cabinet suitable for direct or shelf mounting to wall and complete with knockouts for conduit. Removable or hinged front panel for easy access to batteries.
- .11 Auxiliary equipment:
 - .1 Test switch.
 - .2 Ac input and DC output terminal blocks inside cabinet.
 - .3 Shelf.
 - .4 Cord and plug connection for AC. (**Not applicable on 347 V units**).

2.7 ACCEPTABLE LIGHTING MANUFACTURERS

- .1 Refer to the light fixture schedule as indicated on drawings.

Part 3 Execution

3.1 INSTALLATION

- .1 Locate and install luminaires as indicated. Luminaires are not to be supported from the roof deck. Provide additional unistrut support channel and/or support from structure. Co-ordinate with consultant on site.
- .2 Ball align hangers must be provided for rod suspended fixtures.
- .3 Fixtures surface mounted to suspended ceilings must be secured through ceiling assembly to cross member supports. These supports are to be steel channels or angles independently secured **to structure** using # 12 “jack” chain. Each chain must be secured so no fixture weight is added to the ceiling assembly.
- .4 Plaster frames/flange kits must be provided by this Division for fixtures recessed in plaster and/or drywall ceilings.
- .5 Where specified, fixtures to be chain hung shall be hung using “jack” chain with a capacity to suit the fixture weight. Branch circuit wiring feeding these fixtures shall be AC90 cable “ty-wrapped” at 900mm (36”) intervals along length of drop. Final appearance must be neat and professional.
- .6 Install exit lighting units with illuminated faces and chevrons/arrows indicating path(s) of exit as indicated. Unless otherwise noted install exit fixtures at 2400 mm (8' 0”) above finished floor.
- .7 Install emergency lighting units and associated remote mounted fixtures as indicated.
- .8 Direct “heads” on units and remote mounted fixtures to illuminate path(s) of exit.
- .9 Install emergency lighting units and remote fixtures at 300mm (12”) below finished ceiling, unless indicated otherwise.
- .10 Provide a 15 A 120 V duplex receptacle (connected to circuit indicated) adjacent to unit.

- .11 **Special installation: Secure fixtures to structure to conform to the Electrical Safety Code using “jack chain” NOT ceiling suspension wire. Where coreslab is used, suspension point must be independent of the one used for suspension of the ceiling assembly. As an alternate to jack chain the contractor may use a pre-manufactured aircraft cable suspension and fastening system as manufactured by Gripple (Gripple Cat. #HF02-10F2). Provide minimum 2 per fixture.**
- .12 All battery units are to be provided with a visible lamicoid label indicating the unit number as per drawings.

3.2 WIRING

- .1 Connect luminaires to lighting circuits as indicated.
- .2 Connect exit fixtures to exit lighting circuits and unit equipment (if applicable).
- .3 Connect unit equipment to circuits as indicated.
- .4 All wiring of remote emergency fixtures shall be minimum #10 T90 for each circuit and run in conduit. Wiring must be sized in conformance with manufacturer’s recommendations for distances required.

3.3 LUMINAIRE ALIGNMENT

- .1 Align luminaires mounted in continuous rows to form straight uninterrupted line.
- .2 Align luminaires mounted individually parallel or perpendicular to building grid lines.

3.4 DELIVERIES

- .1 Fixtures are to be completely assembled at the manufacturer’s plant and delivered to the project site in original unitized containers. Ensure that a dry, protected and secure space is available for proper storage before scheduling delivery of fixtures.

3.5 TESTING/CERTIFICATION

- .1 At the completion of the project and in the presence of the consultant, test all exit and emergency fixtures. On company letterhead, the contractor is to prepare a chart indicating:
 - .1 project
 - .2 date
 - .3 equipment type
 - .4 certification of correct connection
 - .5 certification of correct operation
 - .6 duration of test in minutes (minimum 30)
 - .7 actual period of testing (time of day)
- .2 **Provide “Integrated Testing” of this life safety system in conformance with the noted specification section. Include all associated costs in tender.**

3.6 EQUIPMENT ALLOWANCES

- .1 The manufacturer and electrical contractor are to allow in their bid the cost to add two (2) additional standard exit lighting units to be installed and tested in locations as directed by the consultant. Note: This installation and test will be occurring after the initial testing/certification testing is complete.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE).
- .2 Underwriter Laboratories of Canada (ULC).
- .3 International Electrotechnical Commission.
- .4 International Organization for Standardization (ISO).
- .5 National Electrical Manufacturers Association (NEMA).

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings in accordance with Section 26 01 16.
- .2 Submit composite wiring diagrams and control schedule for each room control circuit type as proposed to be installed. Include load type, sequence of operation, sensor parameters, time delays, sensitivities and daylighting set points.
- .3 Catalog cut sheets with performance specifications demonstrating compliance with specified requirements.

1.3 SCOPE

- .1 This contractor is responsible to supply and install all equipment and control wiring as specified for the digital occupancy and daylight control systems. This contractor must coordinate these control systems with the lighting fixtures being supplied for the project to ensure intended function as specified.
- .2 Control Intent: Control Intent includes, but is not limited to:
 - .1 Defaults and initial calibration settings for such items as time delay, sensitivity, fade rates, etc.
 - .2 Initial sensor and switching zones.
- .3 All equipment must be CSA approved or approved at this contractor's expense by the Special Inspection Division of the Electrical Safety Authority.
- .4 Reference section 26 51 13 for Lighting information.
- .5 Reference section 26 05 75 for line voltage occupancy sensors and switches (hard wired analog).

1.4 SYSTEM DESCRIPTION AND OPERATION

- .1 The Digital Lighting Control (room level) as defined under this section covers the following equipment:
 - .1 Digital Room Controllers – Self-configuring, digitally addressable one, two or three relay controllers.
 - .2 Digital Occupancy Sensors – Self-configuring, digitally addressable and calibrated occupancy sensors with LCD display and two-way active infrared (IR) communications.
 - .3 Digital Switches – Self-configuring, digitally addressable pushbutton switches, dimmers, and scene switches with two-way active infrared (IR) communications.
 - .4 Digital Photosensors – Single-zone closed loop sensors with two-way active infrared (IR) communications can provide switching or dimming control for daylight harvesting.
 - .5 Configuration Tools – Handheld remote for room configuration provides two-way infrared (IR) communications to digital devices and allows complete configuration and reconfiguration of the device / room from an accessible location.

1.5 LIGHTING CONTROL APPLICATIONS

- .1 Provide a minimum application of intended lighting control functions as detailed on design drawings and specified herein. Control functions shall include the following:
 - .1 Space Control Requirements – Provide occupancy/vacancy sensors with Manual-ON functionality in all spaces except toilet rooms, storerooms, or other applications where hands-free operation is desirable and Automatic-ON occupancy sensors are more appropriate. For spaces with multiple occupants, or where line-of-sight may be obscured, provide ceiling- or corner-mounted sensors.
 - .2 Bi-Level Lighting – Provide single zone, multi-level controls in any enclosed office, conference room, meeting room, and training room in all enclosed spaces except where variable dimming or multi-zone switching is used.
 - .3 Daylit Areas – All luminaires closest to the daylight source, and zoned separately from other fixtures in the space, shall be controlled separately from luminaires outside of daylit zones. Multiple-leveled switched daylight harvesting controls may be utilized for areas marked on drawings.

1.6 WARRANTY

- .1 Provide a five-year complete manufacturer's warranty on all products to be free of manufacturers' defects.
- .2 The labour required to replace these products must be included in the above warranty, however only for the extent of the contract guarantee and warranty period as noted in Electrical General Requirements.

1.7 QUALITY ASSURANCE

- .1 Manufacturer: Minimum 10-years experience in manufacture of lighting controls.

Part 2 Products

2.1 MANUFACTURERS

- .1 Basis of design product: WattStopper Digital Lighting Management (DLM). Acceptable alternates are subject to compliance and prior approval with specified requirements of this section, as one of the following:

- .1 Cooper Controls (Greengate).
- .2 Acuity Controls (nlight).

- .2 Substitutions:

- .1 All proposed substitutions (clearly delineated as such) must be submitted in writing for approval by the design professional a minimum of 7 working days prior to the bid date and must be made available to all bidders.
- .2 By using pre-approved substitutions, the contractor accepts responsibility and associated costs for all required modifications to circuitry, devices, and wiring.

2.2 DIGITAL WALL OR CEILING MOUNTED OCCUPANCY SENSOR SYSTEM

- .1 Wall or ceiling mounted (to suit installation) passive infrared (PIR), ultrasonic or dual technology digital (passive infrared and ultrasonic) occupancy sensor. Furnish the Company's system which accommodates the square-foot coverage requirements for each area controlled, utilizing room controllers, digital occupancy sensors and accessories which suit the lighting and electrical system parameters.

- .2 Digital Occupancy Sensors shall provide calibration and electronic documentation for the following features:

- .1 Digital calibration and pushbutton programming for the following variables:
 - .1 Sensitivity – 0-100% in 10% increments
 - .2 Time delay – 1-30 minutes in 1 minute increments
 - .3 Test mode – Five second time delay
 - .4 Detection technology – PIR, Ultrasonic or Dual Technology activation and/or re-activation.
 - .5 Walk-through mode
 - .6 Load parameters including Auto/Manual-ON, blink warning, and daylight enable/disable when photosensors are included in the DLM local network.

- .2 Two-way infrared (IR) transceiver to allow remote programming through handheld commissioning tool and control by remote personal controls.

- .3 Device Status LEDs including:
 - .1 PIR Detection
 - .2 Ultrasonic detection
 - .3 Configuration mode
 - .4 Load binding
- .4 Manual override of controlled loads.
- .5 One or two RJ-45 port(s) for connection to DLM local network.
- .3 Multiple occupancy sensors may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required.
WattStopper product numbers: LMPX, LMDX, LMPC, LMUC, LMDC

2.3 DIGITAL WALL SWITCHES

- .1 Low voltage momentary pushbutton switches in 1, 2, 3, 4, 5, and 8 button configuration; colour per architect, compatible with wall plates with decorator opening. Wall switches shall include the following features:
 - .1 Two-way infrared (IR) transceiver for use with personal and configuration remote controls.
 - .2 Removable buttons for field replacement with engraved buttons and/or alternate color buttons. Button replacement may be completed without removing the switch from the wall.
- .2 Multiple digital wall switches may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required to achieve multi-way switching.
- .3 The following switch attributes may be changed or selected using a wireless configuration tool:
 - .1 Load and Scene button function may be reconfigured for individual buttons (from Load to Scene, and vice versa).
 - .2 Individual button function may be configured to Toggle, On only or Off only.
 - .3 Individual scenes may be locked to prevent unauthorized change.
 - .4 Switch buttons may be bound to any load on a room controller and are not load type dependent; each button may be bound to multiple loads.
- .4 Two RJ-45 ports for connection to DLM local network.
- .5 Multiple digital wall switches may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required to achieve multi-way switching.
- .6 WattStopper product numbers: LMSW-101, LMSW-102, LMSW-103, LMSW-104, LMSW-105, LMSW-108, LMDM-101.

2.4 DIGITAL POWER PACKS (ROOM CONTROLLERS)

- .1 Room Controllers automatically bind the room loads to the connected devices in the space without commissioning or the use of any tools. Room Controllers shall be provided to match the room lighting load and control requirements. The controllers will be simple to install and will not have, dip switches, potentiometers or require special configuration. The control units will include the following features:
 - .1 Automatic room configuration to the most energy-efficient sequence of operation based upon the devices in the room.
 - .2 Simple replacement – Using the default automatic configuration capabilities, a room controller may be replaced with an off-the-shelf unit without requiring any configuration or setup.
 - .3 Device Status LEDs to indicate:
 - .1 Data transmission
 - .2 Device has power
 - .3 Status for each load
 - .4 Configuration status
 - .4 Quick installation features including:
 - .1 Standard junction box mounting
 - .5 Plenum rated
 - .6 Manual override and LED indication for each load
 - .7 120 VAC, 60 Hz operation.
 - .8 Zero cross circuitry for each load.
- .2 On/Off Room Controllers shall include:
 - .1 One or multiple relay configuration to suit control details
 - .2 Efficient 150 mA switching power supply
 - .3 Sufficient sensor connection points to suit indicated function without the requirement for additional hardware
 - .4 Discrete model listed for connection to receptacles, for schedule-based control of plug loads within the space.
 - .1 One relay configuration only.
 - .2 Automatic-ON/OFF configuration.
 - .3 Optional Network Bridge for BACnet MS/TP communications
 - .5 Three RJ-45 DLM local network ports.
 - .6 WattStopper product numbers: LMRC-101, LMRC-102, LMPL-101, LMPL-201.
- .3 On/Off Room/Dimming enhanced Room Controllers shall include:
 - .1 One or multiple relay configuration to suit control details.
 - .2 Efficient 250 mA switching power supply.
 - .3 One 0-10 volt analog output per relay for control of compatible ballasts and LED drivers.

- .4 The following dimming attributes may be changed or selected using a wireless configuration tool:
 - .1 Establish preset level for each load from 0-100%.
 - .2 Set high and low trim for each load.
 - .3 Set lamp burn in time for each load up to 100 hours.
- .5 Four RJ-45 DLM local network ports.
- .6 Optional Network Bridge for BACnet MS/TP communications.
- .7 WattStopper product numbers: LMRC-211, LRMC-212, LRMC-213, LMPL-201, LMRC-311, LMRC-312, LMRC-313.

2.5 CONFIGURATIONS TOOLS

- .1 A configuration tool facilitates optional customization of digital lighting control system featuring infrared communications.
- .2 Features and functionality of the wireless configuration tool shall include:
 - .1 Two-way infrared (IR) communication with DLM IR-enabled devices within a range of approximately 30 feet.
 - .2 Read, modify and send parameters for occupancy sensors, daylighting sensors, room controllers and buttons on digital wall switches.
 - .3 Save up to nine occupancy sensor setting profiles, and apply profiles to selected sensors.
- .3 WattStopper Product Numbers: LMCT-100, LMCI-100/LMCS-100

2.6 PROGRAMMING, CONFIGURATION AND DOCUMENTATION SOFTWARE

- .1 PC-native application for optional programming of detailed technician-level parameter information for all DLM products, including all parameters not accessible via BACnet and the handled IR configuration tool. Software must be capable of accessing room-level parameter information locally within the room when connected via the optional LMCI-100 USB programming adapter, or globally for many segment networks simultaneously utilizing standard BACnet/IP communication.
- .2 Additional parameters exposed through this method include but are not limited to:
 - .1 Occupancy sensor detection LED disable for performance and other aesthetic spaces where blinking LEDs present a distraction.
 - .2 Six occupancy sensor action behaviors for each controlled load, separately configurable for normal hours and after hours modes. Modes include: No Action, Follow Off Only, Follow On Only, Follow On and Off, Follow On Only with Override Time Delay, Follow Off Only with Blink Warn Grace Time, Follow On and Off with Blink Warn Grace Time.
 - .3 Separate fade time adjustments per load for both normal and after hours from 0 - 4 hours.
 - .4 Configurable occupancy sensor re-trigger grace period from 0 - 4 minutes separate for both normal hours and after hours.

- .5 Separate normal hours and after hours per-load button mode with modes including: Do nothing, on only, off only, on and off.
- .6 Load control polarity reversal so that on events turn loads off and vice versa.
- .7 Per-load DR (demand response) shed level in units of percent.
- .8 Load output pulse mode in increments of 1second.
- .9 Fade trip point for each load for normal hours and after hours that establishes the dimmer command level at which a switched load closes its relay to allow for staggered On of switched loads in response to a dimmer.
- .3 Generation of reports at the whole file, partial file, or room level. Reports include but are not limited to:
 - .1 Device list report: All devices in a project listed by type.
 - .2 Load binding report: All load controller bindings showing interaction with sensors, switches, and daylighting.
 - .3 BACnet points report: Per room Device ID report of the valid BACnet points for a given site's BOM.
 - .4 Room summary report: Device manifest for each room, aggregated by common BOM, showing basic sequence of operations.
 - .5 Device parameter report: Per-room lists of all configured parameters accessible via hand held IR programmer for use with O&M documentation.
 - .6 Scene report: All project scene pattern values not left at defaults (i.e. 1 = all loads 100 percent, 2 = all loads 75 percent, 3 = all loads 50 percent, 4 = all loads 25 percent, 5-16 = same as scene 1).
 - .7 Occupancy sensor report: Basic settings including time delay and sensitivities for all occupancy sensors.
- .4 Network-wide programming of parameter data in a spreadsheet-like programming environment including but not limited to the following operations:
 - .1 Set, copy/paste an entire project site of sensor time delays.
 - .2 Set, copy/paste an entire project site of sensor sensitivity settings.
 - .3 Search based on room name and text labels.
 - .4 Filter by product type (i.e. LMRC-212) to allow parameter set by product.
 - .5 Filter by parameter value to search for product with specific configurations.
- .5 Network-wide firmware upgrading remotely via the BACnet/IP network.
 - .1 Mass firmware update of entire rooms.
 - .2 Mass firmware update of specifically selected rooms or areas.
 - .3 Mass firmware upgrade of specific products
- .6 Wattstopper Product Number: LMCS-100, LMCI-100

2.7 SYSTEM INPUT/OUTPUT

- .1 Provide a means to allow seamless integration with third party devices to provide additional functionality to the Digital Lighting Management system via low voltage input/output interface. Wattstopper Product Number: LMIN-104.
- .2 Provide a means to integrate analog occupancy sensors to the Digital Lighting Management system via low voltage analog sensor input module. Wattstopper Product Number: LMIO-201.

Part 3 Execution

3.1 INSTALLATION

- .1 Install the work of this Section in accordance with manufacturer's printed instructions unless otherwise indicated.
- .2 When using wire for connections other than the DLM local network (LMRJ Cat 5e with RJ-45 connectors), provide detailed point to point wiring diagrams for every termination. Provide wire specifications and wire colors to simplify contactor termination requirements.
- .3 Calibrate all sensor time delays and sensitivity to guarantee proper detection of occupants and energy savings.
 - .1 Adjust time delay so that controlled area remains lighted for 5 minutes after occupant leaves area.
- .4 Install power packs in accessible maintenance areas unless noted otherwise. Provide access doors if power packs are installed above drywall ceilings.
- .5 Install sensors in gym where noted on plan at mid-height of wall.
- .6 It shall be the contractor's responsibility to locate and aim sensors in the correct location required for complete and proper coverage within the range of coverage as per the manufacturer's recommendations. The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only the rooms which are to be provided with sensors. The contractor shall provide additional sensors if required to properly and completely cover the respective rooms.
- .7 Provide written or computer-generated documentation on the commissioning of the system including room by room description including:
 - .1 Sensor parameters, time delays, sensitivities, and daylighting setpoints.
 - .2 Sequence of operation, (e.g. manual ON, Auto OFF. etc.)
 - .3 Load Parameters (e.g. blink warning, etc.)
- .8 Re-commissioning – After 30 days from occupancy re-calibrate all sensor time delays and sensitivities to meet the Owner's Project Requirements. Provide a detailed report to the Architect / Owner of re-commissioning activity.

3.2 FACTORY COMMISSIONING

- .1 Upon completion of the installation, the system shall be commissioned by the manufacturer's factory authorized representative who will verify a complete fully functional system.
- .2 The electrical contractor shall provide both the manufacturer and the electrical engineer with ten working days written notice of the system startup and adjustment date.
- .3 Upon completion of the system commissioning the factory-authorized technician shall provide the proper training to the owner's personnel on the adjustment and maintenance of the system.
- .4 Factory commissioning shall include functional testing and documentation of the control system conforming to the "Functional Testing" requirements included in the current ASHRAE standard. This cost shall be included in the Tender Price.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 CAN/ULC-S524 (latest edition), Installation of Fire Alarm Systems.
- .2 ULC-S525 (latest edition), Audible Signal Appliances for Fire Alarm Systems.
- .3 CAN/ULC-S526 (latest edition), Visual Signal Appliances, Fire Alarm.
- .4 CAN/ULC-S527 (latest edition), Control Units, Fire Alarm.
- .5 CAN/ULC-S528 (latest edition), Manual Pull Stations.
- .6 CAN/ULC-S529 (latest edition), Smoke Detectors.
- .7 CAN/ULC-S530 (latest edition), Heat Actuated Fire Detectors, Fire Alarm.
- .8 CAN/ULC-S531 (latest edition), Smoke Alarms.
- .9 CAN/ULC-S536 (latest edition), Inspection and Testing of Fire Alarm Systems.
- .10 CAN/ULC-S537 (latest edition), Verification of Fire Alarm Systems.
- .11 CAN/ULC-S552 (latest edition), Inspection, Testing and Maintenance of Smoke Alarms.
- .12 CAN/ULC-S553 (latest edition), Installation of Smoke Alarms.
- .13 OBC-2012, Ontario Building Code.

1.2 DESCRIPTION OF SYSTEM

- .1 System includes:
 - .1 Control panel to carry out fire alarm and protection functions including receiving alarm signals, initiating general alarm, supervising system continuously, actuating zone annunciators, and initiating trouble signals.
 - .2 Trouble signal devices.
 - .3 Power supply facilities.
 - .4 Addressable manual alarm stations.
 - .5 Addressable and conventional automatic alarm initiating devices.
 - .6 Audible and visual signal devices.
 - .7 End-of-line devices.
 - .8 Annunciators.
 - .9 Ancillary devices.
 - .10 Interface and zone modules.
 - .11 Remote trouble indicator.

1.3 REQUIREMENTS OF REGULATORY AGENCIES

- .1 This system is subject to review by local building department officials, local fire department officials. **Therefore, submission of verification certificate and field technician device verification sheets is required prior to inspection by these officials. Schedule accordingly.**

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Electrical General Requirements Section.
- .2 Include:
 - .1 Layout of equipment.
 - .2 Zoning.
 - .3 Complete wiring diagram.

1.5 OPERATION AND MAINTENANCE DATA

- .1 Provide operation and maintenance data for Fire Alarm System for incorporation into manual specified in Electrical General Requirements Section.
- .2 Include:
 - .1 Operation and maintenance instructions for complete fire alarm system to permit effective operation and maintenance.
 - .2 Technical data - illustrated parts lists with parts catalogue numbers.
 - .3 Copy of approved shop drawings.
 - .4 List of recommended spare parts for system.

1.6 MAINTENANCE MATERIALS

- .1 Include:
 - .1 10% spare glass rods for total number of manual pull box stations if applicable.

1.7 TRAINING

- .1 Arrange and pay for on-site demonstrations by fire alarm equipment manufacturer to train operational personnel in use and maintenance of fire alarm system. **Obtain written receipt of training session and include in maintenance manual.**

1.8 SYSTEM OPERATION

- .1 Operation of any alarm initiating device to:
 - .1 Cause audible and visual signal devices to sound throughout building.
 - .2 Transmit signal to fire department via monitoring station.
 - .3 Cause zone of alarm device to be indicated on control panel and remote annunciator(s).
 - .4 Cause air conditioning and ventilating fans to shut down and to function so as to provide required control of smoke movement.

- .5 Cause fire doors and smoke control doors if normally held open, to close automatically.
- .6 Log the alarm in the historical alarm log file.
- .2 System Reset
 - .1 It shall not be possible to reset the fire alarm system until all the alarm zones have been properly reset or cleared.
- .3 System Trouble Operation
 - .1 A trouble initiated by the actuation of a sprinkler system supervisory trouble switch shall cause the following to occur:
 - .1 An audible and visual trouble signal shall sound at the main control panel Only until acknowledged by an operator.
 - .2 Annunciate the Supervisory Trouble Alarm at the main control panel LCD Display and all remote annunciator(s).
 - .3 Log the Supervisory Trouble Alarm in the Historical Trouble Log File.
 - .4 Cause the remote trouble indicator to activate
 - .2 Any system trouble shall cause the following to occur:
 - .1 An audible and visual trouble signal shall sound at the main control panel LCD Display Only until acknowledged by an operator.
 - .2 Log the trouble condition in the separate Historical Trouble Log File.

1.9 PERFORMANCE CRITERIA

- .1 These specifications describe the minimum functional requirements for an electronically supervised, microprocessor based, fully integrated system. The initial installation shall include all the necessary electronic hardware, software and memory for a completely operable system in accordance with these specifications.

1.10 QUALITY ASSURANCE

- .1 Each and all items of the fire alarm system shall be listed as the products of a single manufacturer under the appropriate category by the Underwriter's Laboratories of Canada and shall bear the "U.L.C." label.
- .2 Each and all items of the fire alarm system shall be covered by a one year parts and labour warranty covering defects resulting from faulty workmanship and materials. The warranty shall be deemed to begin on the date the system is accepted by the Project Manager on issuance of the substantial performance certificate for the project.
- .3 All control equipment must have Transient Protection Devices to comply with U.L.C. requirements.

Part 2 Products

2.1 GENERAL

- .1 The fire alarm is an existing Edwards EST panel.

2.2 ADDRESSABLE MANUAL ALARM STATIONS

- .1 Manual alarm stations shall be addressable, single action, non-coded, semi-flush mounted type. Pull stations shall be break-glass style. Contacts are to activate when the handle is pulled down.
- .2 Addressable pull station electronics shall be mounted to the back plate of the station. The station's address will be set at the time of installation. Device addressing shall be accomplished by either an electrical or mechanical means.
- .3 Where noted on drawings, stations are to be equipped with tamperproof guard equal to Stopper II Cat. # STI-1100. **(WRITER TO SELECT)**

2.3 INTELLIGENT DETECTORS-GENERAL OPERATION

- .1 Addressable devices shall use simple to install and maintain decade, numbered 0 to 9, address switches. Detectors that have expanded addressing will have decade switch numbered from 0 to 15 for the most significant digit to allow detector addressing from 1 to 250.
- .2 Device addressing shall be accomplished by either an electrical or mechanical means.
- .3 Detectors shall be intelligent (analog) and addressable, and shall connect with two wires to the fire alarm control panel signalling line circuits.
- .4 Addressable smoke detectors shall provide dual alarm and power/polling LEDs. Both LEDs shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. If required, the LED flash shall have the ability to be removed from the system program. An output connection shall also be provided in the base to connect an external remote alarm LED.
- .5 The fire alarm control panel shall permit detector sensitivity adjustment through field programming of the system. Sensitivity shall be automatically adjusted by the panel on a time-of-day basis.
- .6 Using software in the FACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance.
- .7 The detectors shall be ceiling-mount and shall include a separate twist-lock base with tamper proof feature.
- .8 The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.
- .9 Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device (PHOTO, THERMAL).

- .10 Detectors will operate in an analog fashion, where the detector simply measures its designed environment variable and transmits an analog value to the FACP based on real-time measured values. The FACP software, not the detector, shall make the alarm/normal decision, thereby allowing the sensitivity of each detector to be set in the FACP program and allowing the system operator to view the current analog value of each detector.
- .11 Detectors shall provide address-setting means using decimal switches and shall also store an internal identifying code that the control panel shall use to identify the type of device. LEDs shall be provided that shall flash under normal conditions, indicating that the device is operational and is in regular communication with the control panel.
- .12 Addressable devices shall provide address-setting means using decimal switches and shall also store an internal identifying code that the control panel shall use to identify the type of device. LED(s) shall be provided that shall flash under normal conditions, indicating that the device is operational and is in regular communication with the control panel.
- .13 The sensors shall be of a low profile design and ULC listed for both ceiling and wall mount applications.
- .14 Automatic smoke sensors shall be equipped with a dust cover, which shall be removed at the time of verification to prevent dust and dirt entering the smoke chamber during construction.
- .15 A magnetic test switch shall be provided to test detectors and modules. Detectors shall report an indication of an analog value reaching 100% of the alarm threshold.

2.4 INTELLIGENT MULTI-DETECTOR

- .1 The intelligent multi-detector shall be an addressable device, which is designed to monitor photoelectric, ionization, and thermal technologies in a single sensing device. This detector shall utilize advanced electronics which react to smaller products of combustion found in fast flaming fires (ionization), slow smouldering fires (photoelectric), and heat (thermal) all within a single sensing device.
- .2 The multi-detector shall include two bicolor LEDs, which flash green in normal operation and turn on steady red in alarm.
- .3 Detectors are to be provided with relay base where noted on the drawings.
- .4 Separately mounted photoelectric ionization and heat detectors in the same location are not acceptable alternatives.

2.5 FIXED TEMPERATURE HEAT DETECTOR

- .1 These heat detectors shall have a low mass thermistor heat sensor and operate at a fixed temperature. It shall continually monitor the temperature of the air in its surroundings to minimize thermal lag to the/ time required to process an alarm. The integral microprocessor shall determine if an alarm condition exists and initiate an alarm based on the analysis of the data. The heat detector shall have a nominal alarm point rating of 57°C (135°F). The heat detector shall be rated for ceiling installation at a minimum of 21.3m (70') centres and be suitable for wall mount applications.

2.6 FIXED TEMPERATURE / RATE OF RISE HEAT DETECTOR

- .1 These heat detectors shall have a low mass thermistor heat sensor and operate at a fixed temperature and at a temperature rate-of-rise. It shall continually monitor the temperature of the air in its surroundings to minimize thermal lag to the time required to process an alarm, The integral microprocessor shall determine if an alarm condition exists and initiate an alarm based on the analysis of the data. Systems using central intelligence for alarm decisions shall not be acceptable. The intelligent heat detector shall have a nominal fixed temperature alarm point rating of 57°C (135°F) and a rate-of-rise alarm point of 9°C (15°F) per minute. The heat detector shall be rated for ceiling installation at a minimum of 21.3m (70') centres and be suitable for wall mount applications.

2.7 PHOTOELECTRIC SMOKE DETECTOR

- .1 The intelligent photoelectric detector shall utilize a light scattering type photoelectric smoke sensor to sense changes in air samples from its surroundings. The integral microprocessor shall dynamically examine values from the sensor and initiate an alarm based on the analysis of data. The detector shall continually monitor any changes in sensitivity due to the environmental affects of dirt, smoke, temperature, aging, and humidity. The photo detector shall be rated for ceiling installation at a minimum of Soft (Olin) centres and be suitable for wall mount applications.
- .2 The percent smoke obscuration per foot alarm set point shall be field selectable to any of five sensitivity settings ranging from 1.0% to 3.5%. The photo detector shall be suitable for operation in the following environment:
 - .1 Temperature: 0°C to 49°C (32°F to 120°F)
 - .2 Humidity: 0-93% RH, non-condensing
 - .3 Elevation: no limit
- .3 Detectors are to be provided with relay base where noted on the drawings.

2.8 STANDARD DETECTOR MOUNTING BASES

- .1 Provide standard detector mounting bases suitable for mounting on North American 1-gang, 85mm (3 ½ ") or 100 mm (4") octagon box and 100 mm (4") square box. The base shall, contain no electronics, support all detector types and have the following minimum requirements:
 - .1 Removal of the respective detector shall not affect communications with other detectors.
 - .2 Terminal connections shall be made on the room side of the base. Bases which must be removed to gain access to the terminals shall not be acceptable.

2.9 INTELLIGENT DUCT SMOKE DETECTOR

- .1 The smoke detector housing shall accommodate an intelligent photoelectric detector (as noted above) that provides continuous analog monitoring and alarm verification from the panel.
- .2 When sufficient smoke is sensed, an alarm signal is initiated at the FACP, and appropriate action taken to change over air handling systems to help prevent the rapid distribution of toxic smoke and fire gases throughout the areas served by the duct system.
- .3 Duct smoke detector sensor assemblies shall be complete with duct housing, photoelectric smoke detector, and sampling tubes as required. The duct-housing base shall come complete with an auxiliary set of form C dry contacts rated at 120 VAC, 3 Amps.
- .4 The system shall automatically indicate when an individual duct sensor needs cleaning.

2.10 CONVENTIONAL AUTOMATIC ALARM INITIATING DEVICES

- .1 Thermal fire detectors: fixed temperature, non-restorable, rated 57°C (135°F) or 88°C (194°F) as indicated.
- .2 Thermal fire detectors, combination fixed temperature and rate of rise, non-restorable fixed temperature element, self-restoring rate of rise, fixed temperature 57°C (135°F) or 88°C (194°F), rate of rise 8.3°C (15°F) per minute.
- .3 Smoke detector: ceiling mounted, photo electric type, visual alarm indicator, complete with relay base where noted.
- .4 Smoke detector: photo electric type air duct type with sampling tubes with protective housing.
 - .1 Plug-in type with fixed base.
 - .2 Wire-in base assembly with integral red alarm LED, and terminals for remote alarm LED.

2.11 AUDIBLE/VISUAL SIGNAL DEVICES

- .1 150 mm (6") Bells: surface mounted bell, vibration type 24Vdc, 150 mm (6"), 92dBA rating at 3 m (10'), red finish, FM and ULC listed.
- .2 Strobe: semi-recessed, 24Vdc operation, complete with selectable 15/30/75/110 candela output (unless otherwise noted set at 75 cd), synchronized strobe, red finish, FM and ULC listed. Suitable for mounting on a single gang box.

NOTES:

- .1 **Signal devices with integral strobe lights in high abuse areas (i.e. gymnasium, change rooms, etc.) must be provided with protective wireguards.**
- .2 **Any surface mounted signal devices must be provided with suitable backboxes supplied by the manufacturer.**
- .3 **Provide synchronization modules to suit signal devices (if required by manufacturer).**
- .4 **Set signal devices in classrooms to LOW setting.**

2.12 END OF LINE RESISTORS

- .1 End-of-line resistors for signalling circuits shall be sized to ensure the correct supervisory current flows in each circuit.
- .2 End-of-line resistors shall be mounted on a stainless steel plate for mounting on a standard single gang box and bear the ULC label.

2.13 GRAPHIC DISPLAY (PASSIVE)

- .1 Black and white layout of facility showing all zones as specified/indicated.
- .2 Display is to be found behind Plexiglas, approximate size: 500 mm x 500 mm (20" x 20").
- .3 Finish frame to architects direction.

2.14 ANCILLARY DEVICES

- .1 Relay unit to facilitate elevator recall functions as indicated.

2.15 INTELLIGENT MODULES – GENERAL OPERATION

- .1 The modules shall have a minimum of 2 diagnostic LED's mounted behind a finished coverplate. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status. The module shall be capable of storing up to 24 diagnostic codes, which can be retrieved for troubleshooting assistance. Input and output circuit wiring shall be supervised for open and ground faults. The module shall be suitable for operation in the following environment:

- .1 Temperature: 0°C to 49°C (32°F to 120°F).
- .2 Humidity: 0-93% RH, non-condensing.

2.16 MONITOR MODULE

- .1 The monitor modules shall have the following operating characteristics:
A flashing LED indicates that the module is in communication with the control panel.
The LED latches steady on alarm (subject to current limitations on the loop).
- .2 The monitor modules shall have the following features:
Nominal operating voltage: 15 to 32 VDC.
Maximum current draw: 5.1 mA (LED on)
Average operating current: 400 uA (LED flashing)
EOL resistance: 47K ohms.
Temperature range: 0°C to 49°C (32°F to 120°F)
Humidity range: 10% to 93% noncondensing
Dimensions: 114.3mm (4.5") high x 101.6 mm (4") wide x 31.75 mm (1.25") deep. Mounts to a 101.6 mm (4") square x 53.975 mm (2.1/8") deep box.

2.17 ISOLATOR MODULE

- .1 Fault isolator modules shall be provide to automatically isolate wire-to-wire short circuits on an SLC loop. The fault isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC loop. If a wire-to wire short occurs, the fault isolator module shall automatically open-circuit (disconnect) the SLC loop. When the short circuit condition is corrected, the fault isolator module shall automatically reconnect the isolated section of the SLC loop. The fault isolator module shall not require any address-setting, and its' operations shall be totally automatic. It shall not be necessary to replace or reset a fault isolator module after its normal operation. The fault isolator module shall mount in a standard 10.16 cm (4") deep electrical box, in a surface-mounted backbox, or in the fire alarm control panel. It shall provide a single LED which shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

2.18 CONTROL MODULE

- .1 Addressable control modules shall be provided to supervise and control the operation of one conventional NACs of compatible, 24 VDC powered, polarized audio/visual notification appliances. For fan shutdown and other auxiliary control functions, the control module may be set to operate as a dry contract relay.
- .2 The control module NACs may be wired for Style Z or Style Y (Class A/B) with up to 1 Amp of inductive A/V signal, or 2 Amps of resistive A/V signal operation, or as a dry contact (Form-C) relay. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to ensure that 100% or all auxiliary relay or NACs may be energized at the same time on the same pair of wires.
- .3 The control module shall be suitable for pilot duty applications and rated for a minimum of 0.6 Amps at 30 VDC.

2.19 DOOR HOLD OPEN DEVICES

- .1 Units to be complete with the following features:
 - .1 Wall mounted style.
 - .2 Long life electromagnet.
 - .3 Low current operation.
 - .4 Completely silent operation.
 - .5 25 lbf (111N) minimum holding force.
 - .6 Adjustable swivel contact plate.
 - .7 Brushed zinc finish.
 - .8 Maintenance free operation.
 - .9 Water resistant design.
 - .10 ULC, CSA, and FM approved.

2.20 SPRINKLER AND SUPERVISED VALVE CONNECTIONS

- .1 Sprinkler and standpipe system contacts shall be provided by the mechanical/sprinkler contractor but connected into the fire alarm system by this Division.

2.21 REMOTE TROUBLE INDICATOR

- .1 A system remote trouble indicator where noted on the drawings shall be provided complete with the following features:
 - .1 Flush mounted in a double gang box.
 - .2 Trouble LED.
 - .3 Trouble buzzer.

2.22 SYSTEM WIRING

- .1 The system wiring must be FSA rated in conformance with the Electrical Safety Code to suit the type of installation.
- .2 Wiring shall be minimum #18 AWG twisted shielded pair in conduit. "Securex 2" armoured cable will be permitted to be used for "drops" to devices on accessible ceilings.
- .3 As indicated on system riser diagram initiating device wiring shall be run in a loop with a home run from the last device to the control panel (Class 'A' configuration). Wiring from the "loop" module to conventional devices must be supervised, run in conduit, and conform to the standards of the Electrical Safety Code.
- .4 Signal wiring is to be cross connected in a class 'B' configuration.
- .5 Install isolator modules and end of line resistors in service rooms no higher than 2.4 M AFF. Provide location of these devices at the time of shop drawing submission.
- .6 **These are the basic wiring requirements for system operation. Prior to tender close manufacturer and contractor are to confirm all necessary wiring specifications and requirements.**

2.23 APPROVED EQUIPMENT

| <u>DEVICE</u> | <u>EDWARDS</u> |
|-----------------------------------|---------------------------|
| <u>Control Panel</u> | |
| | EST |
| <u>Intelligent Devices</u> | |
| Manual Alarm Stations 1-Stage | SIGA-270 |
| Addressable Multi-Sensor | SIGA2-PS |
| Addressable Base | SIGA-SB |
| Addressable Base c/w Relay | SIGA-RB |
| Heat Sensor | SIGA2-HRS or SIGA2-HFS |
| Smoke Detectors | SIGA-PS |
| Monitor Module | SIGA-CT Series |
| Control Module | SIGA-CR |
| Isolator Module | SIGA-IM |

| | |
|-------------------------------------------|--------------------------|
| <u>Conventional and Auxiliary Devices</u> | |
| 150 mm (6") Bells | 439D Series or MB Series |
| Strobe | G1R-VM |

Part 3 Execution

3.1 INSTALLATION

- .1 The entire system shall be installed in accordance with CAN/ULC-S524 (latest edition) and approved manufacturers manuals and wiring diagrams. The contractor shall furnish all conduit, wiring, outlet boxes, junction boxes, cabinets and similar devices necessary for the complete installation, All wiring shall be of the type recommended by the Electrical Safety Code, approved by local authorities having jurisdiction for the purpose, and shall be installed in dedicated conduit throughout.
- .2 Locate and install manual alarm stations and connect to alarm circuit wiring.
- .3 Locate and install detectors and connect to alarm circuit wiring. **Do not mount detectors within 1 m (39") of air outlets.** Maintain at least 600 mm (24") radius clear space on ceiling, below and around detectors. Locate duct type detectors in straight portions of ducts.
- .4 Connect alarm circuits to main control panel.
- .5 Locate and install signal devices and connect to signalling circuits.
- .6 Connect signalling circuits to main control panel.
- .7 Install end-of-line devices at end of applicable alarm and signalling circuits.
- .8 Install remote annunciator panels and connect to annunciator circuit wiring.
- .9 Locate and install door releasing devices.
Note: Door holders must release by way of local smoke detector and signal from main control panel. Provide additional relays to suit.
- .10 Locate and install remote relay units to control fan shut down.
- .11 Connect fire suppression systems to control panel.
- .12 Elevator controllers are to be connected with 4 #14 conductors in conduit from fire alarm control panel to signal elevator recall in the event of a general alarm.
- .13 **Connect smoke damper integral detector outputs to monitor modules for alarm condition and for monitoring of AC power to smoke damper as trouble condition at fire alarm panel based on module address.**

3.2 FIELD QUALITY CONTROL

- .1 The system shall be installed and fully tested under the supervision of trained manufacturer's representative. The system shall be demonstrated to perform all the functions as specified.

3.3 ACCEPTABLE INSTALLER

- .1 The fire alarm / life safety system specified herein shall be installed by an Authorized Electrical Contractor who is CFAA certified.

3.4 EXAMINATION

- .1 Prior to the commencement of any of the work detailed herein, an examination and analysis of the area(s) where the Fire Alarm / Life Safety System and all associated components are to be installed shall be made.
- .2 Any of these area(s) which are found to be outside the manufacturers' recommended environments for the particular specified products shall be noted on a Site Examination Report which shall be given to the Building Owners Representative, and the Consultant.
- .3 Any shorts, opens, or grounds found on existing wiring shall be corrected prior to the connection of these wires to any panel component or field device.

3.5 DEMONSTRATION

- .1 Each of the intended operations of the installed Fire Alarm / Life Safety System shall be demonstrated to the Building Owners' Representative and the Consultant.

3.6 SYSTEM TEST

- .1 Perform tests in accordance with General Electrical Requirements Section and CAN/ULC-S537-(latest edition) Standard for the Verification of Fire Alarm Systems.
- .2 Fire alarm system:
 - .1 Test each device and alarm circuit to ensure noted devices transmit alarm to control panel and actuate general alarm and ancillary devices.
 - .2 Check annunciator panels to ensure zones are shown correctly.
 - .3 Simulate grounds and breaks on alarm and signalling circuits to ensure proper operation of system.
 - .4 Class A circuits.
 - .1 Test each conductor on all circuits for capability of providing alarm signal on each side of single open-circuit fault condition imposed near middlemost point of circuit. Reset control unit after each alarm function and correct imposed fault after completion of each test.
 - .2 Test each conductor on all circuits for capability of providing alarm signals during ground-fault condition imposed near middlemost point of circuit. Reset control unit after each alarm function and correct imposed fault after completion of each test.

- .5 Class B circuits
 - .1 Test each conductor on all circuits for capability of providing alarm signal on line side of single open-circuit fault condition imposed at electrically most remote device on circuit. Reset control unit after each alarm function and correct imposed fault after completion of each test.
- .3 The control panel shall continuously perform as automatic self-test routine on each sensor, which will functionally check the sensor electronics and ensure the accuracy of the valves being transmitted to the control panel.
- .4 Automatic testing will occur at a rate of one sensor every four minutes.
- .5 The sensor's average analogue value is the average of the last 2000 recorded analogue entries of its chamber.
- .6 Any sensor that fails this test shall indicate a '**SELF-TEST ABNORMAL**' trouble condition with the sensor's address at the control panel.
- .7 The system shall automatically indicate when an individual sensor needs cleaning. When the sensor's average value reaches a predetermined value, a '**DIRTY SENSOR**' trouble condition shall be audibly and visually indicated at the local control panel for that sensor. IF a '**DIRTY SENSOR**' indication is left unattended and its average value increases to a second predetermined value, an '**EXCESSIVELY DIRTY SENSOR**' trouble condition shall be indicated at the local control panel for that sensor. To prevent false alarms, these '**DIRTY**' conditions shall in no way decrease the amount of smoke obscuration necessary to generate an alarm condition.
- .8 An operator having a proper access level, shall have the capability to manually access the following information from the control panel:
 - .1 Primary Status
 - .2 Device Type
 - .3 Present Average Value
 - .4 Present Sensitivity Selected*
 - .5 Highest Peak Detection Values (HVP)*
 - .6 Sensor Range (Normal, Dirty, Excessively Dirty)

* Values shall be in 'percent of smoke obscuration' format so that no interpretation is required by the operator.
- .9 **Provide "Integrated Testing" of this life safety system in conformance with the noted specification section. Include all associated costs in tender.**

3.7 AUDIBILITY TESTING

- .1 Audibility Testing:
 - .1 The contractor is to coordinate an audibility test prior to occupancy of the facility. The test is to be performed by the representatives of the fire alarm manufacturer in the presence of the consultant. The test report is to be in chart form indicating:
 - .1 Project
 - .2 Date of test
 - .3 Room name and number
 - .4 Ambient dB level
 - .5 Alarm dB level
 - .6 Name of testing technician
 - .2 The test results are to be submitted to the consultant for review prior to issuing to owner's representatives and/or authorities having jurisdiction.

3.8 EQUIPMENT ALLOWANCES

- .1 The manufacturer and electrical contractor are to include in their bid the cost to add five (5) additional signaling devices to be installed and verified in locations as directed by the consultant. Note: This installation and verification and subsequent audibility test will be occurring after the initial audibility testing is complete.
- .2 The manufacturer and electrical contractor are to include in their bid the cost to add three (3) additional fire detection devices (heat or smoke detectors) to be installed and verified in locations as directed by the consultant.
- .3 The manufacturer and electrical contractor are to include in their bid the cost to add three (3) additional fire alarm zones with associated zone modules and including six (6) additional isolation modules to be installed and verified as directed by the consultant.

END OF SECTION

Division 20 Common Requirements for Mechanical

| | |
|----------|---------------------------------------------------------------|
| 20 00 01 | Mechanical Specification Index |
| | Common Contract Requirements for Mechanical |
| 20 02 51 | Mechanical Contract General 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 (Indoor) |
| 20 05 35 | Bases, Hangers, and Supports (Outdoor) |
| 20 05 49 | Vibration Control Measures |
| 20 05 53 | Identification of Mechanical Services |
| | Testing, Adjusting, and Balancing |
| 20 06 11 | Testing, Adjusting, and Balancing (TAB) of Mechanical Systems |

Division 22 Plumbing

| | |
|----------|---------------------------------------------------------|
| | 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 |
| | Fire Extinguishers |
| 22 37 13 | Portable Fire Extinguishers |
| | Plumbing Fixtures Combined With Drawing Schedule |
| 22 44 13 | Plumbing Fixtures Combined With Drawing Schedule |

Division 23 Heating, Ventilating, and Air Conditioning (HVAC)

| | |
|----------|---------------------------------------|
| | Common Work Results for HVAC |
| 23 05 81 | Pipe Welding |
| | HVAC Insulation |
| 23 07 13 | Duct Insulation |
| 23 07 19 | HVAC Piping Insulation |
| | Facility Fuel Piping |
| 23 11 23 | Facility Natural-Gas & Propane Piping |

| | |
|-------------|--------------------------------------------------|
| | Hydronic Piping and Pumps |
| 23 21 11 | Hydronic Accessories |
| 23 21 13 | Hydronic Piping - Screwed/Welded |
| | Refrigerant Piping |
| 23 23 13 | Refrigerant Piping and Specialties |
| | 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 16 | Fire Dampers |
| 23 33 17 | Smoke Control Dampers |
| 23 33 18 | Operating 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 |
| | Air-To-Air Energy Recovery Equipment |
| 23 72 19 | Fixed-Plate Air-to-Air Heat Recovery Ventilators |
| | Packaged Outdoor HVAC Equipment |
| 23 74 45 | Packaged Rooftop Dual Fuel Heat Pump HVAC Units |
| | Convection Heating and Cooling Units |
| 23 82 23 | Hydronic Unit Ventilators |
| 23 82 29 | Radiators, Convectors, and Cabinet Heaters |

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 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.

1.4 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.

1.5 INTERFERENCE AND COORDINATION 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 coordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment apparatus, and connections are coordinated.
- .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 file version AutoCAD 2013) in addition to hard copies.

1.6 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.

1.7 ALTERNATES AND SUBSTITUTIONS

- .1 Throughout Division 15 are lists of "Alternate and equal Equipment" manufacturers acceptable to Consultant if their product meets characteristics of specified described equipment.
- .2 Each bidder may elect to use "Alternate or equal Equipment" manufacturers 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" in which case contractor will complete the Supplementary Tender Form.

- .3 It is 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 pipe or item, of size or weight indicated, is unobtainable, supply next larger size or heavier weight without additional charge.

1.8 EXAMINATION

- .1 Site Reviews
 - .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.

1.9 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.

1.10 REQUEST FOR INFORMATION (RFI) PROCEDURES

- .1 RFIs shall be submitted to the consultant minimum two (2) weeks prior to answer being required. Failure to submit an RFI in a timely manner will forfeit delay claims and schedule extension requests by the contractor.
- .2 All RFIs will be submitted with the following information:
 - .1 RFI number
 - .2 Name of project
 - .3 Date of initiation
 - .4 Date response required by (minimum two (2) weeks)
 - .5 Subject
 - .6 Submitter's name
 - .7 Drawing/specification reference
 - .8 Photograph of the issue (if applicable)
 - .9 Description of the issue
 - .10 Contractor's proposed resolution

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
 - Gas Piping
 - Heating piping
 - Piping Insulation
 - Ductwork
 - Duct Insulation
 - Grilles & Diffusers
 - Fire Stopping
 - Fans
 - Building Automation Systems
 - Testing Adjusting and Balancing
 - HVAC system commissioning
 - Refrigeration Piping
 - Unit Ventilator and Condensing unit
 - Mechanical contractor closeout requirements (min. of 3% for the first \$500,000.00, 1% from \$500,000.00 to \$5,000,000.00, and 0.5% beyond. Shall not be 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.
- .6 **Mobilization amount may only be drawn when all required shop drawings have been reviewed by the consultant.**

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 14 days after award of Contract.
- .2 Upon receipt of reviewed shop drawing, product is to be ordered immediately.
- .3 Provide a complete list of shop drawings to be submitted prior to first submission.
- .4 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.
- .5 If material or equipment is not as specified or submittal is not complete, it will be rejected by Consultant.

- .6 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.
- .7 Submit all shop drawings for the project as a package. Partial submittals will not be accepted.**
- .8 Catalog data or shop drawings for equipment, which are noted as being reviewed by Consultant or their Engineer shall not supersede Contract Documents.
- .9 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.
- .10 Check work described by catalog data with Contract Documents for deviations and errors.
- .11 Shop drawings and product data shall show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances. e.g., access door swing spaces.
- .12 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.
- .13 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.
- .14 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.
 - .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.
 - .1 Manual(s) shall be in a three ring binder (minimum 50 mm (2") ring) labelled:
 - .1 Operation and Maintenance Manual.
 - .2 Project Name.
 - .3 Location.
 - .2 Make changes as required and re-submit as directed by Consultant.

- .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.
 - .5 Copy of all substantial performance final certificates.
- .6 Miscellaneous data to include:
 - .1 Letter of contractor's 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 Final Submittals:
 - .1 Upon acceptance of Operation and Maintenance Manual by the Consultant provide the following:
 - .1 Provide two (2) 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.

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 Warranty period shall start from date of ready for takeover. Warranty shall be for one (1) years.

1.16 READY FOR TAKEOVER

- .1 Complete the following to the satisfaction of the consultant prior to request for ready for takeover.
 - .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 Potable Water Test (Refer to domestic water piping – Copper section – Part 3)
 - .2 Mandatory TSSA Gas Pressure Test (CSA B149.1)
 - .3 Backflow Test Certificate (for all testable devices)
 - .4 NFPA-96 Kitchen Hood Fire Suppression System Test

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 Potable Water Test (Refer to domestic water piping – Copper section – Part 3).
 - .2 Mandatory TSSA Gas Pressure Test (CSA B149.1).
 - .3 Backflow Test Certificate (for all testable devices).
 - .4 NFPA-96 Kitchen Hood Fire Suppression System Test.

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/supplier's invoice if requested.

1.19 DELIVERY STORAGE, AND HANDLING

- .1 Follow Manufacturer's directions in delivery, storage, and protection, of equipment and materials. Contractor to include all costs associated with delivery storage and handling in tender price.
- .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 DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS

- .1 If designated substances and/or hazardous materials are suspected or identified cease all work in the immediate area in accordance with OHSA and notify consultant.**
- .2 Each contractor and on site employee of the contractor shall have “asbestos awareness training”.**
- .3 The Contractor shall ensure that employees who may come into contact with designated substances and/or hazardous materials due to the nature of the work that they perform, have received training that enables them to recognize designated substances and/or hazardous materials and that enables them to react in accordance with the Occupational Health and Safety Act and regulations thereto should contact with designated substances and/or hazardous materials occur during the course of their work.
- .4 It is the responsibility of the contractor to review the designated substances and/or hazardous materials book in the building prior to starting any work.**
- .5 Existing occupied buildings (depending upon their age) may contain designated substances and/or hazardous materials in thermal insulating materials and some manufactured products, such as vinyl asbestos floor tile. Any insulating materials, on pipes, fittings, boilers, tanks, ductwork, etc. may contain designated substances and/or hazardous materials and shall not be disturbed.**
- .6 A survey of each building documenting the location and condition of designated substances and/or hazardous materials -containing materials is available for your mandatory review prior to commencing any work on premises.**

1.21 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.

1.22 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.

1.23 CONFINED SPACES

- .1 Certain areas of the building may be defined as a “Confined Space”. Any personnel working in these areas must have confined space training, appropriate equipment and undertake all work in conformance with appropriate codes and standards.
- .2 Refer to building documentation for any spaces deemed “Confined Space”.

1.24 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 | System Checklist |
| Rooftop Heating/Cooling Unit(s) | Air Handling Units |
| Exhaust Fans | Heat Recovery Unit(s) |
| Heat Recovery Unit(s) | |
| 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 Barrier-free water closets 450 (18") to top of seat lid
 - .4 Wall hung lavatory 787 (31") to rim
 - .5 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
 - .6 Fire extinguisher 1350 (4'- 0") to hanger
 - .7 **Hydronic heating elements 200 mm (8") to bottom of cabinet**
 - .8 **Backflow preventors 900 – 1200 (3'- 4') to centerline of unit**
 - .9 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 MOTORS

- .1 Provide high efficiency motors for mechanical equipment as specified.
- .2 If delivery of specified motor will delay delivery or installation of any equipment, install motor approved by Consultant for temporary use. Final acceptance of equipment will not occur until specified motor is installed.
- .3 Motors under 373 W, (1/2 hp): speed as indicated, continuous duty, built-in overload protection, resilient mount, single phase, voltage as indicated.
- .4 Motors 373 W, (1/2 hp) and larger: EEMAC Class B, squirrel cage induction, speed as indicated, continuous duty, drip proof, ball bearing, maximum temperature rise 40°C (72°F), 3 phase, voltage as indicated.

1.14 BELT DRIVES

- .1 Fit reinforced belts in sheave matched to drive. Multiple belts to be matched sets.
- .2 Use cast iron or steel sheaves secured to shafts with removable keys unless otherwise specified.
- .3 For motors under 7.5 kW 10 hp: standard adjustable pitch drive sheaves, having plus or minus 10% range. Use mid-position of range for specified r/min.
- .4 For motors 7.5 kW 10 hp and over: sheave with split tapered bushing and keyway having fixed pitch unless specifically required for item concerned. Provide sheave of correct size to suit balancing.

- .5 Minimum drive rating: 1.5 times nameplate rating on motor. Keep overhung loads within manufacturer's design requirements on prime mover shafts.
- .6 Motor slide rail adjustment plates to allow for centre line adjustment.
- .7 Provide sheave changes as required for final air balancing.

1.15 GUARDS

- .1 Provide guards for unprotected devices.
- .2 Guards for belt drives:
 - .1 Expanded metal screen welded to steel frame.
 - .2 Minimum 1.2 mm (18 gauge) thick sheet metal tops and bottoms.
 - .3 40 mm (1 1/2") diameter holes on both shaft centres for insertion of tachometer.
 - .4 Removable for servicing.
- .3 Provide means to permit lubrication and use of test instruments with guards in place.
- .4 Install belt guards to allow movement of motors for adjusting belt tension.
- .5 Guard for flexible coupling:
 - .1 "U" shaped, minimum 1.6 mm (16 gauge) thick galvanized mild steel.
 - .2 Securely fasten in place.
 - .3 Removable for servicing.
- .6 Unprotected fan inlets or outlets:
 - .1 Wire or expanded metal screen, galvanized, 20 mm (3/4") mesh.
 - .2 Net free area of guard: not less than 80% of fan openings.
 - .3 Securely fasten in place.
 - .4 Removable for servicing.
- .7 Duct Openings in Floor
 - .1 Provide reinforced expanded mesh grating, style 3 (3 lbs/sq.ft.) cover on accessible unprotected duct openings over 300 mm (12") wide and as indicated. This includes all ductwork terminating in air handling units and plenums.
 - .2 Securely Fasten in place.
 - .3 Removable for servicing.

1.16 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.

1.17 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.

1.18 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 cementitious 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 Alternate Manufacturers to approval of local authority:
Minnesota Mining and Manufacturing
- .16 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.

1.19 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.

1.20 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.

1.21 SPARE PARTS

- .1 Furnish spare parts in accordance with general requirements and as follows:
 - .1 One set of packing/mechanical seals 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.

1.22 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.

1.23 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.

1.24 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.

1.25 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.

1.26 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.

1.27 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.

1.28 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.

1.29 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.

1.30 OWNER SUPPLIED EQUIPMENT

- .1 Connect to equipment supplied by the owner and make operable.

1.31 VIDEO RECORDING OF NEW & EXISTING UNDERGROUND SERVICES

- .1 **Prior to final acceptance of the new underground plumbing system and prior to pouring the floor this contractor shall retain a qualified contractor to video tape the new, existing and revised sanitary and storm drainage piping and branch piping. Transfer all videotape information to USB.**
- .2 **This contractor shall flush the new and existing storm and sanitary system to remove all debris prior to final video taping of systems.**

- .3 Provide 1 copy of USB.
- .4 Identify video routing on As-built drawings.

1.32 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.

1.33 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.

1.34 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.

1.1 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.

1.2 INTEGRATED LIFE SAFETY SYSTEMS TESTING

- .1 Mechanical systems in this building, including but not limited to smoke control dampers, smoke control fans, high speed low velocity ceiling fans, makeup air units, heat tracing for fire protection systems and fire protection system components may be subject to Integrated Life Safety Systems testing.
- .2 The Mechanical Contractor shall co-ordinate with the Integrated Life Safety Systems Testing Agent as follows:
 - .1 Confirm which mechanical systems are to be included as part of the testing process.
 - .2 Verify in writing to the Integrated Life Safety Systems Testing Agent that mechanical commissioning of the affected systems/devices is complete prior to the scheduled testing date(s).
 - .3 Participate in the Integrated Life Safety Systems Testing to confirm proper operation of all associated systems.
 - .4 This contractor shall work with the Integrated Life Safety Systems Testing Agent to reset all systems back to normal operating mode after the testing is complete.
- .3 Include all costs associated with Integrated Life Safety System Testing in the tender value.
- .4 Refer to Division 1/Division 26 Integrated Life Safety Systems Testing specifications for additional information/requirements.

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 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') | |

- .6 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 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 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.
- .5 CSA B272-93 – Prefabricated Self-Sealing Roof Vent Flashings
- .6 CRCA (Canadian Roofing Contractor’s Association)
- .7 SPRI (Single Ply Roofing Institute)
- .8 CUFCA (Canadian Urethane Foam Contractor’s Association) and CGSB-51-GP-46MP, Manual for “Installers of Spray Polyurethane Foam Thermal Insulation”
- .9 CSA G40.21-M1987, M350W, and M300W (Structural Quality Steels)
- .10 CSA W47.1-1983 (Certificate of Companies for Fusion Welding of Structural Steel)
- .11 CSA W59-M1989 (Welded Steel Construction – Metal Arc Welding)
- .12 CSA G164-M1981 (Hot Dip Galvanizing of Irregularly Shaped Articles)

1.2 RELATED SECTIONS

- .1 Section 03300 – Cast-in-place Concrete
- .2 Section 05210 – Steel Joists
- .3 Section 05300 – Metal Deck
- .4 Section 06100 – Rough Carpentry
- .5 Section 07200 – Thermal Protection
- .6 Section 07500 – Membrane Roofing
- .7 Section 07900 – Joint Sealers

1.3 DESIGN REQUIREMENTS

- .1 Construct support systems 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 Design 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.
- .4 Provide for vertical adjustments after erection and during commissioning. Amount of adjustment to be in accordance with MSS SP-58.

1.4 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.
- .3 Manufacturer's installation instruction.

1.5 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

1.6 QUALITY ASSURANCE

- .1 Roof accessories manufactures to have minimum five (5) years documented experience in the design and fabrication of roofing specialties and accessories.

1.7 SPECIAL WARRANTY

- .1 Warrant products installed under this section of work to be free of leaks, condensation, and defects in materials and/or manufacture for a period of twenty (20) years when installed in accordance with the manufacturer's written instructions.

Part 2 Products

2.1 PIPE/SUPPORT

- .1 Pipe/Support:
 - .1 Adjustable height 6061-T6, hollow aluminum with mill finish, urethane insulated supports, 2" (51mm) diameter.
- .2 Stack Jack Flashing:
 - .1 Height to suit application.
 - .2 Fully urethane insulated.
 - .3 Aluminum construction.
 - .4 Complete with EPDM triple pressure grommet seal and EPDM base seal and other accessories as required to suit roof type.
- .3 Provide appropriate stainless steel mounting hardware to suit supported pipe/equipment.
- .4 Provide appropriate system support as specified in this section to suit application.
 - .1 Single Plain Pipe: Type 304 stainless steel pipe roller assembly to suite actual O.D pipe.
 - .2 Double Plain Pipe: Type 304 stainless steel pipe roller assemblies sized to suit actual O.D pipe.
 - .3 Single Insulated Pipe: Type 304 stainless steel pipe cradle assembly sized to suit actual O.D of insulated pipe.
 - .4 Double insulated Pipe: Type 304 stainless steel pipe cradle assemblies sized to suit actual O.D of insulated pipe.
- .5 Basis of design/Acceptable Manufacturer
 - .1 Thaler MERS 600 series.
 - .2 Acceptable equals if submitted during tender period.

2.2 DUCT SUPPORT

- .1 Duct support:
 - .1 Adjustable height 6061-T6, hollow aluminum with mill finish, urethane insulated supports, 2" (51mm) diameter.
- .2 Stack Jack Flashing:
 - .1 Height to suit application.
 - .2 Fully urethane insulated.
 - .3 Aluminum construction.
 - .4 Complete with EPDM triple pressure grommet seal and EPDM base seal and other accessories as required to suit roof type.

- .3 Provide appropriate stainless steel mounting hardware to suit application.
- .4 Cross-bar carrier assembly of length to suit application with EPDM end caps.
- .5 Basis of design/Acceptable Manufacturer
 - .1 Thaler MERS-800 series.
 - .2 Acceptable equals if submitted during tender period.

2.3 NON-PENETRATING MECHANICAL UNIT SUPPORT (SMALL UNITS)

- .1 Provide zero penetration support on roof where indicated.
- .2 Support system shall be fully engineered by manufacturer to withstand:
 - .1 Unit weight
 - .2 Wind loads based on prevailing wind conditions on roof of building.
- .3 Engineered shop drawings, stamped by a Professional Engineer shall be provided indicating loading and calculations that demonstrate that the stand is suitable for the proposed application.
- .4 Base shall be made of high density polypropylene with UV protection.
- .5 Frames shall be galvanized. All fastenings, rods, nuts, washers, etc. shall be stainless steel.
- .6 Provide shop drawings as specified. Install to manufacturers recommendations.
- .7 Acceptable materials:
 - Portable pipe hanger
 - Bigfoot systems
 - Miro rooftop support
 - Trikon Systems
 - Walravin BIS Yeti
 - Ecofoot

2.4 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

- .1 Provide templates to ensure accurate location of anchor bolts.

2.5 ROOF CURB MOUNTED EQUIPMENT

- .1 Install as per manufacturer's instructions on roof curbs provided by manufacturer as indicated.
- .2 Provide all necessary continuous pressure treated wood blocking and 24 gauge metal liner on all exposed wood as required to install roof curb level.

2.6 MANUFACTURED ROOF SUPPORTS

- .1 Single piece injection moulded polypropylene support.
- .2 Type 3-20 psi extruded polystyrene UV protected base glued to the support.
- .3 Minimum base dimension of 300 x 225 (12" x 9") and be 140 mm (5.5") high.
- .4 Pull test of 1.4 KN (315 lbs) using two #14-10 screws on pipe strap.
- .5 Acceptable materials:
Quick Block
Erico

2.7 PIPING THROUGH ROOF

- .1 Provide Thaler MEF-9 or equal gas piping flashing where pipe and/or relief vent penetrates roof.

2.8 ROOF MOUNTED DUCT SUPPORT

- .1 Provide zero penetration duct support on roof where indicated.
- .2 Base shall be made of high density polypropylene with UV protection.
- .3 Frames shall be galvanized. All fastenings, rods, nuts, washers, etc. shall be stainless steel.
- .4 Provide shop drawings as specified. Install to manufacturers recommendations.
- .5 Acceptable materials:
Portable pipe hanger
Bigfoot systems
Miro rooftop support
Trikon Systems
Walravin BIS Yeti
Ecofoot

2.9 ROOF MOUNTED PIPE SUPPORT

- .1 Provide zero penetration pipe support on roof where indicated.
- .2 Base shall be made of high density polypropylene with UV protection. Maximum loading shall be 50 lb/sq.ft.
- .3 Frames shall be galvanized. All fastenings, rods, nuts, washers, hangers, etc. shall be stainless steel.
- .4 Provide shop drawings as specified. Install to manufacturers recommendations.
- .5 Acceptable material:
Portable pipe hanger
Bigfoot systems
Miro rooftop supports
Walravin BIS Yeti
Ecofoot

Part 3 Execution

3.1 INSTALLATION

- .1 Roof support install in accordance with:
 - .1 Manufacturer's instructions and recommendations.
 - .2 Provide protection against deterioration due to contact of dissimilar metals.
- .2 Flashing Installation:
 - .1 Install roof support flashing in accordance with manufacturer's printed instructions.
- .3 Vibration Control Devices:
 - .1 Install as indicated and at all roof mounted mechanical equipment that is not internally isolated.
- .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 PIPE SUPPORT SPACING

- .1 Plumbing piping: most stringent requirements of Canadian Plumbing Code, Provincial Code, or authority having jurisdiction.
- .2 Gas and fuel oil piping: every 1.8 m (6').
- .3 Copper piping: up to NPS 15 mm (1/2"): every 1.5 m (5').
- .4 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') | |

- .5 Pipework greater than NPS 300 mm (12"): to MSS SP-69.

3.3 EXAMINATION

- .1 Report to the contractor in writing, defects of work prepared by other trades and other unsatisfactory site conditions. Verify site dimensions. Commencement of work will imply acceptance of prepared work.

3.4 ADJUSTING

- .1 Verify that all manufactured units have been installed in accordance with specifications and details and will function as intended. Adjust any items where necessary to ensure proper operation.

3.5 CLEANING

- .1 Clean manufactured units using materials and methods approved by manufacturer. Do not use cleaning techniques which could impair performance of the roofing system.

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with general requirements.
- .2 Provide separate shop drawings for each isolated system complete with performance and product data.

Part 2 Products

2.1 GENERAL

- .1 Size and shape of bases type and performance of vibration isolation to be as indicated.
- .2 To be of the same manufacturer for all isolation.
- .3 Acceptable materials:
 Korfund
 Vibro-Acoustics
 Vibron

2.2 ELASTOMERIC PADS

- .1 Type EP1 - neoprene waffle or ribbed; 10 mm (3/8") minimum thick; 50 durometer; maximum loading 350 kPa (50.8 psi).
- .2 Type EP2 - rubber waffle or ribbed; 10 mm (3/8") minimum thick; 30 durometer natural rubber; maximum loading 415 kPa (60.2 psi).
- .3 Type EP3 - neoprene-steel-neoprene; 10 mm (3/8") minimum thick neoprene bonded to 1.5 mm (16 gauge) steel plate; 50 durometer neoprene, waffle or ribbed; holes sleeved with isolation washers; maximum loading 350 kPa (50.8 psi).
- .4 Type EP4 - rubber-steel-rubber; 10 mm (3/8") minimum thick rubber bonded to 1.5 mm (16 gauge) steel plate; 30 durometer natural rubber, waffle or ribbed; holes sleeved with isolation washers; maximum loading 415 kPa (60.2 psi).
- .5 Acceptable materials:
 Korfund
 IAC Acoustics
 Vibro-Acoustics
 Vibron

2.3 ELASTOMERIC MOUNTS

- .1 Type M1 - colour coded; neoprene in shear; maximum durometer of [60]; threaded insert and two bolt-down holes; ribbed top and bottom surfaces.

Acceptable materials:
Vibro-Acoustics
Korfund
IAC Acoustics
Vibron

2.4 SPRINGS

- .1 Design stable springs so that ratio of lateral to axial stiffness is equal to or greater than 1.2 times the ratio of static deflection to working height. Select for 50% travel beyond rated load. Units to be complete with levelling devices.
- .2 Ratio of height when loaded to diameter of spring to be between 0.8 to 1.0.
- .3 Cadmium plate for all installations.
- .4 Colour code springs.

2.5 SPRING MOUNT

- .1 Zinc or cadmium plated hardware; housings coated with rust resistant paint.
- .2 Type M2 - stable open spring: support on bonded 6 mm (1/4") minimum thick ribbed neoprene or rubber friction and acoustic pad.
- .3 Type M3 - stable open spring: 6 mm (1/4") minimum thick ribbed neoprene or rubber friction and acoustic pad, bonded under isolator and on isolator top plate; leveling bolt for rigidly mounting to equipment.
- .4 Type M4 - restrained stable open spring: supported on bonded 6 mm (1/4") minimum thick ribbed neoprene or rubber friction and acoustic pad; built-in resilient limit stops, removable spacer plates.
- .5 Type M5 - enclosed spring mounts with snubbers for isolation up to 950 kg (2100 lbs) maximum.
- .6 Performance: as indicated.
- .7 Acceptable materials:
Korfund
IAC Acoustics
Vibron
Vibro-Acoustics

2.6 HANGERS

- .1 Colour coded springs, rust resistant, painted box type hangers. Arrange to permit hanger box or rod to move through a 30° arc without metal to metal contact.
- .2 Type H1 - neoprene - in-shear, molded with rod isolation bushing, which passes through hanger box.
- .3 Type H2 - stable spring, elastomeric washer, cup with molded isolation bushing which passes through hanger box.
- .4 Type H3 - stable spring, elastomeric element with pre-compression washer and nut [with deflection indicator].
- .5 Performance as indicated.
- .6 Acceptable materials:
Vibron
IAC Acoustics
Korfund
Vibro-Acoustics

2.7 ROOF CURB ISOLATION RAIL

- .1 General: complete factory assembled without need for sub-base.
- .2 Lower member: continuous extruded aluminum channel.
- .3 Upper member: continuous extruded aluminum channel to provide continuous support for equipment, complete with all-directional neoprene rubber bushings 6 mm (1/4") thick to resist wind [and seismic] forces.
- .4 Springs: steel, adjustable, removable, selected for 25 mm (1") maximum static deflection plus 50% additional travel to solid, cadmium plated, sized and positioned to ensure uniform deflection.
- .5 High frequency isolation: 6 mm (1/4") minimum thick [continuous gasket on top and bottom of complete assembly] [or] [pads on top and bottom of each spring]. Material: closed cell neoprene.
- .6 Weatherproofing: continuous flexible counterflashing to curb and providing access to springs. Material: [aluminum] [neoprene].
- .7 Hardware: cadmium plated or galvanized.

Part 3 Execution

3.1 INSTALLATION

- .1 Install vibration isolation equipment in accordance with manufacturers instructions and adjust mountings to level equipment.
- .2 Ensure piping, ducting and electrical connections to isolated equipment do not reduce system flexibility and that piping, conduit and ducting passage through walls and floors do not transmit vibrations.
- .3 Unless indicated otherwise, support piping connected to isolated equipment with spring mounts or spring hangers with 25 mm (1") minimum static deflection as follows:
 - .1 Up to NPS 100 mm (4"): first 3 points of support. NPS 125 mm (5") to NPS 200 mm (8"): first 4 points of support. NPS 250 mm (10") and Over: first 6 points of support.
 - .2 First point of support shall have a static deflection of twice deflection of isolated equipment, but not more than 50 mm (2").
- .4 Where isolation is bolted to floor use vibration isolation rubber washers.
- .5 Block and shim level bases so that ductwork and piping connections can be made to a rigid system at the operating level, before isolator adjustment is made. Ensure that there is no physical contact between isolated equipment and building structure.

3.2 SITE VISIT

- .1 Manufacturer to visit site and provide written certification that installation is in accordance with manufacturer's instructions and submit report to Consultant.
- .2 Provide Consultant with notice 24 h in advance of visit.
- .3 Make adjustments and corrections in accordance with written report.

3.3 TESTING

- .1 Experienced and competent sound and vibration testing professional engineer to take vibration measurement for HVAC systems after start up and TAB of systems to Testing Adjusting and Balancing Section.
- .2 Vibration measurements shall be taken for equipment-listed below:
- .3 Provide Consultant with notice 48 h in advance of commencement of tests.
- .4 Establish adequacy of equipment isolation and acceptability of noise levels in occupied areas and where appropriate, remedial recommendations including sound curves.
- .5 Submit complete report of test results including sound curves.

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 lamicoid 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/FIRE SMOKE DAMPER

- .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:

| | BACKGROUND COLOUR MARKING | LEGEND |
|----------------------------|------------------------------------------|------------------------|
| CONTENTS | | |
| Hot water heating supply | Yellow | HEATING SUPPLY |
| Hot water heating return | Yellow | HEATING RETURN |
| Domestic hot water supply | Green | DOM. HW SUPPLY |
| Dom. HW recirculation | Green | DOM. HW CIRC |
| Domestic cold water supply | Green | DOM. CWS |
| Domestic tempered supply | Green | DOM. TEMPERED |
| Trap Primer | Green | TRAP PRIMER |
| | | |
| Sanitary | Green | SAN |
| Plumbing vent | Green | SAN. VENT |
| | | |
| Condensate | Green | CONDENSATE |
| | | |
| Refrigeration suction | Yellow | REF. SUCTION |
| Refrigeration liquid | Yellow | REF. LIQUID |
| Refrigeration hot gas | Yellow | REF. HOT GAS |
| | | |
| Natural gas | Yellow | NATURAL GAS |
| | | |
| Gas regulator vents | | to Codes |
| | | |
| 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 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.

1.2 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) or AABC (Associated Air Balance Council) 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 Clark Balancing Ltd.
8094 Esquesing Line
Milton, Ontario
L9T 2X9
(905) 693-1518

- .5 Airwaso Canada Inc.
London, Ontario
N6E 3P3
(519) 652-4040
- .6 Dynamic Flow Balancing Ltd.
Oakville, Ontario
L6L 2X4
(905) 338-0808

1.3 PURPOSE OF TAB

- .1 Test to verify proper and safe operation, determine actual point of performance, evaluate qualitative and quantitative performance of equipment, systems and controls at design, average (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.

1.4 EXCEPTIONS

- .1 TAB of systems and equipment regulated by codes, standards to be to satisfaction of authority having jurisdiction.

1.5 CO-ORDINATION

- .1 Schedule time required for TAB (including repairs, re-testing) into project construction and completion schedule so as to ensure completion before acceptance of project.
- .2 Do TAB of each system independently and subsequently, where interlocked with other systems, in unison with those systems. Co-ordinate with other trades to ensure all systems are interlocked as indicated elsewhere prior to TAB.

1.6 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.

1.7 START-UP

- .1 Follow start-up procedures as recommended by equipment manufacturer unless specified otherwise.
- .2 Follow special start-up procedures specified elsewhere in the Mechanical Division.

1.8 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.

1.9 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.

1.10 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%.

1.11 ACCURACY TOLERANCES

- .1 Measured values to be accurate to within plus or minus 2% of actual values.

1.12 INSTRUMENTS

- .1 Prior to TAB, submit to 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.

1.13 SUBMITTALS

- .1 Submit, prior to commencement of TAB:
 - .1 Proposed methodology and procedures for performing TAB if different from referenced standard.

1.14 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.

1.15 TAB REPORT

- .1 Format to be in accordance with NEBB, AABC, or SMACNA.
- .2 The following additional information shall be provided for all air systems:
 - .1 Minimum damper position (MAD/Economizer) and the corresponding BAS signal and the voltage to the actuator to meet the full ASHRAE occupied ventilation requirements.
 - .2 Minimum damper position (MAD/Economizer) and the corresponding BAS signal and the voltage to the actuator to meet the full ASHRAE unoccupied ventilation requirements.
 - .3 Static pressure reading for each HVAC/AHU unit with VAV/VVT boxes open to 80% of design airflow and bypass damper closed to 0%. Provide reading at normal MAD/economizer damper position, dampers fully closed and dampers fully open.

- .3 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.

1.16 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.

1.17 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.

1.18 COMPLETION OF TAB

- .1 TAB to be considered complete only when final TAB Report received and approved by Consultant.

1.19 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.

1.20 HYDRONIC SYSTEMS

- .1 Definitions: for purposes of this section, to include low pressure hot water heating, chilled water, condenser water, glycol systems.
- .2 Standard: TAB to be the most stringent of TAB standards of NEBB, AABC, SMACNA, ASHRAE.
- .3 Do TAB of all systems, equipment, components, controls specified in Mechanical Division including but not limited to hydronic equipment testing.
- .4 Qualifications: personnel performing TAB to be current member in good standing of NEBB.
- .5 Quality assurance: perform TAB under direction of qualified supervisor.
- .6 Measurements: to include, but not limited to, following as appropriate for systems, equipment, components, controls: Flow rate, static pressure, pressure drop (or loss), temperature, specific gravity, density, RPM, electrical power voltage, noise, vibration.
- .7 Locations of equipment measurement: To include, but not be limited to, following as appropriate:
 - .1 Inlet and outlet of each heat exchanger (primary and secondary sides), boiler, chiller, coil, humidifier, cooling tower, condenser, pump, PRV, control valve, other equipment causing changes in conditions.
 - .2 At each controller, controlled device.
- .8 Locations of systems measurements to include, but not be limited to, following as appropriate: Supply and return of each primary and secondary loop (main, main branch, branch, sub-branch of all hydronic systems, inlet connection of make-up water.

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 OTHER TAB REQUIREMENTS

- .1 General requirements applicable to all work specified this paragraph:
 - .1 Qualifications of TAB personnel: as for air systems specified this section.
- .2 Quality assurance: as for air systems specified this section.
- .3 Building pressure conditions:
 - .1 Adjust HVAC systems, equipment, controls to ensure specified pressure conditions at all times.
 - .2 TAB procedures:

| | |
|-----------------|-------------------------------------------------------|
| <u>Positive</u> | <u>Negative</u> |
| Corridors | Washrooms |
| Cafeteria | Cafeteria Kitchen (Kitchen maximum -0.02 inches w.c.) |
- .4 Zone pressure differences:
 - .1 Adjust HVAC systems, equipment, controls to establish air pressure differentials, with all systems in all possible combinations of normal operating modes.
- .5 Smoke management systems:
 - .1 Test for proper operation of all smoke and fire dampers installed as component parts of air systems specified.
- .6 Provide duct testing as specified.

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 C547, Type I and IV, Standard Specifications for Mineral Fibre Pipe Insulation.
 - .2 ASTM C 335, Test Method for Steady State Heat Transfer Properties of Pipe Insulation.
 - .3 ASTM C177, Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot-Plate Apparatus.
 - .4 ASTM C518, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - .5 ASTM C 921, Practice for Determining the Properties Jacketing Materials for Thermal Insulation.
 - .6 ASTM C1695, Standard Specification for Fabrication of Flexible, Removable, and Reusable Blanket Insulation for Hot Service.
 - .7 ASTM C1729 Standard Specification for Aluminium Jacketing for Insulation.
- .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), North American Commercial and Industrial 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.
- .3 Submit properly completed detail plates from the North American Commercial and Industrial Insulation Standards manual, applicable to installation types required by this specific section.

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 have successfully completed apprenticeship program.
- .2 Installer to be specialist in performing work of this section and have at least three (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 MATERIAL LIMITATIONS

- .1 Products shall not contain formaldehyde, asbestos, lead, mercury or mercury compounds or PBDE fire retardants.

2.2 FIRE AND SMOKE RATING

- .1 In accordance with CAN/ULC-S102:
 - .1 Maximum flame spread rating: 25.
 - .2 Maximum smoke developed rating: 50.

2.3 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 C335, ASTM C177 or ASTM C518.
- .3 Type A-1: Rigid moulded or wound mineral fibre with factory applied vapour retarder jacket.
 - .1 Mineral fibre: to ASTM C547 Type I and IV.
 - .2 Jacket: to ASTM C1136, Type I, II, III, IV, X.
 - .3 Maximum "k" factor: to ASTM C547.
- .4 Type A-5: Fiberglass pipe and tank insulation:
 - .1 Segmented, flexible fiberglass board bonded to laminated vapor retarder, ASJ or FSK.
 - .2 Complying with ASTM C1393, Type II or Type III Category 2.
 - .3 Maximum "k" value: 0.037W/M (or less) x C°@100°F (38°C) is 0.26BTU x IN/H FT² x °F
 - .4 Jacket: specified in 'Factory-Applied Jackets' Article
- .5 Materials:
 - .1 All materials must be supplied by the same manufacturer.
 - .2 Acceptable Materials:
 - .1 Johns Manville
 - .2 Knauf
 - .3 Manson
 - .4 Owens Corning

2.4 INSULATION SECUREMENT

- .1 Tape: Self-adhesive, aluminum, reinforced, 50 mm (2") wide minimum.
- .2 Contact adhesive: Quick setting.
- .3 Canvas adhesive: Washable.

2.5 CEMENT

- .1 Thermal insulating and finishing cement:
 - .1 Hydraulic setting or Air drying on mineral wool, to ASTM C 449M.

2.6 VAPOUR RETARDER LAP ADHESIVE

- .1 Water based, fire retardant type, compatible with insulation.

2.7 INDOOR VAPOUR RETARDER FINISH

- .1 Compatible with insulation.

2.8 JACKETS

- .1 Polyvinyl Chloride (PVC):
 - .1 Minimum thickness: 20 mm (0.020")
 - .2 One-piece moulded type [and sheet] to CAN/CGSB-51.53 with pre-formed shapes as required.
 - .3 Colours: white.
 - .4 Minimum service temperatures: -29°C (-20°F).
 - .5 Maximum service temperature: 65°C (150°F).
 - .6 Moisture vapour transmission: 0.05 perm.
 - .7 Fastenings:
 - .1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
 - .2 Tacks are not to be used below ambient temperature (cold) operating systems.
 - .3 Pressure sensitive vinyl tape of matching colour.

2.9 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, North American Commercial and Industrial Insulation 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.
- .5 Below ambient/chilled water installation:
 - .1 All pipes, valves, strainers, flanges, unions, and other pipe system components and spec must be properly insulated with correctly completed vapor retarder applied.
 - .2 All insulation material must have properly installed and sealed vapor retarding jacket, including circumferential and longitudinal seams.
 - .3 All penetrations, tears, and punctures must be repaired and sealed with a vapor retarding material with a 0.02 or lower perm rating.
 - .4 Vapor stops must be installed at 18' intervals at all pipe insulation termination points including fittings, flanges, and other changes in direction or other types of piping specialties.
 - .5 All fitting insulation must be of the same type, thickness, and density of the pipe insulation, be premoulded insulation covers or fabricate from the same material as the pipe insulation. Full thickness must be maintained over all fitting surfaces. Blanket insulation with a factory applied vapor retarder facing is unacceptable.
 - .6 A complete vapor retarder must be installed on insulation over fittings before applying final finish. Vapor retarder must extend onto and be sealed to the vapor retarder of the pipe insulation.
 - .7 Additional fitting covers, PVC, or metal must have a vapor retarder seal applied to all longitudinal and circumferential seams in addition to the vapor retarder applied to the fitting insulation.
 - .8 Additional field applied to jackets must not use staples, screws, tacks, or rivets for attachment to avoid puncturing vapor retarder underneath.
 - .9 Insulating support inserts are to be high compressive strength insulation with a rigid shield. No calcium silicate is to be used for insulation on below-ambient operation piping.

3.3 REMOVABLE, PRE-FABRICATED, INSULATION AND ENCLOSURES

- .1 Application: At expansion joints, valves, primary flow measuring elements, flanges, and unions at equipment.
- .2 Flexible removable blanket insulation covers are not acceptable for below-ambient (cold) operation piping systems. Rigid removable insulation jackets that are vapor retarder exterior material, that can be vapor sealed at the seams, are acceptable on below-ambient (cold) operation piping systems.
- .3 Design: To permit movement of expansion joint and to permit periodic removal and replacement without damage to adjacent insulation.
- .4 Insulation:
 - .1 Insulation, fastenings and finishes: same as system.
 - .2 Jacket: As per adjacent insulation.

3.4 INSTALLATION OF ELASTOMERIC INSULATION

- .1 Insulation to remain dry at all times. Overlaps to manufacturers instructions. Ensure tight joints.
- .2 Provide vapour retarder as recommended by manufacturer.

3.5 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") |
| Cooling Coil cond. Drain | A-1 | 25 (1") | 25(1") | 25 (1") | 25 (1") | 25 (1") |
| Horizontal Cast Iron Sanitary Piping | A-1/A-5 N/A | | N/A | 25 (1") | 25 (1") | 25 (1") |
| 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 BACK FLOW PREVENTORS

- .1 The backflow preventor shall prevent backflow by either backpressure or backsiphonage from a cross-connection between potable water lines and substances that are objectionable.
- .2 To CAN/CSA-B64.
- .3 Application: as indicated.
- .4 Reduced pressure principle type up to 50 mm (2") (RP):
Rated to 180°F and supplied with full port ball valves. The main body and access covers shall be bronze (ASTM B584), the seat ring and all internal polymers shall be NSF® Listed Noryl™ and the seat disc elastomers shall be SILICONE. The first and second check shall be orientated at a 45° angle up-wards and accessible for maintenance without removing the relief valve. Supplied with an air gap adapter.
 - .1 Acceptable materials:
Watts 009 ½" - 2"
Wilkins 975 XL ½" - 2"
Conbraco 40-200 Series

2.2 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

2.3 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

2.4 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

2.5 OWNER SUPPLIED EQUIPMENT

- .1 The mechanical contractor shall supply and install all water, gas, condensate and sanitary piping to the owner supplied equipment. Connection to equipment shall be by this contractor.
- .2 Provide flexible riser stops to all sinks and ball valves to all other equipment.
- .3 Provide backflow preventors on equipment required by the local plumbing inspector.
- .4 Provide flexible gas piping to all gas equipment.
- .5 All equipment in store equipment schedule will be supplied and set in place by Mechanical Contractor unless otherwise noted.
- .6 Coordinate all rough-ins and connection with the supplier on site.
- .7 Owner supplied equipment includes existing relocated equipment.

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 BACK FLOW PREVENTORS

- .1 Install in accordance with CAN/CSA-B64 Series, where indicated and elsewhere as required by code.
- .2 Pipe discharge to terminate over nearest drain and or service sink.
- .3 Provide test results in manual and leave tag with test results on device.

3.3 STRAINERS

- .1 Install with sufficient room to remove basket.
- .2 Strainer size to match pipe size.

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 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 selection.

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 ZZN-1612
Mifab C1100-XR-6
Watts CO-200-RX-1-6
Jay R. Smith SQ-4-1753-XNBCO-SP-U
 - .2 Cover for terrazzo finish: round polished nickel bronze with recessed cover for filling with terrazzo, vandal-proof locking screws.
 - .1 Acceptable materials:
Zurn ZN-1400-Z
Mifab C1100-UR-6
Watts CO-200-U-1-6
Jay R. Smith SQ-4-1753-NBRT-SP-U
 - .3 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

- .4 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 ZZN-1612
 - Mifab C1100-S-6
 - Watts CO-200-S-1-6
 - Jay R. Smith SQ-4-1753-NBCO-SP-U-Y
- .5 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 PRIMER STATIONS

- .1 Provide trap primer stations where indicated complete with solenoid valve, backflow preventor, vacuum breaker, NPS 15 mm (1/2") solder ends, NPS 15 mm (1/2") drip line connections.
- .2 Solenoid valve electric characteristics shall be suitable for controlling function.
- .3 Coordinate location and number of trap primer stations with Building Automation System (BAS) contractor.

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 TRAP SEAL PRIMER STATIONS

- .1 Provide primer stations where indicated.
- .2 Install for all floor drains and elsewhere, as indicated.
- .3 Install copper piping to floor drains above grade. Install polypropylene piping to floor drains on grade.

3.5 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.

2.4 FORCED MAINS

- .1 Above and below ground sewage pump discharge, size as indicated, type 'L' copper to ASTM B88M.
- .2 Cast copper, solder fitting to ANSI B16.18.
- .3 Cast bronze threaded fittings, class 125 to ANSI/ASME B16.15.

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 Venting shall be 7.5 m (25'-0") from any outdoor air intakes.
 - .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.**
 - .3 Venting shall be 7.5 m (25'-0") from any outdoor air intakes.**
- .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 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 Storage Rooms 10 lb ABC rating
 - .3 Acceptable materials:
 - .1 Wilson & Cousins
 - .2 National

2.2 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.

2.3 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 NFPA 96 HOOD

- .1 10 BC rated fire extinguisher next to each NFPA 96 hood.

3.4 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 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ANSI/ASME B31.1, Power Piping.
- .3 ANSI/ASME Boiler and Pressure Vessel Code:
 - .1 Section 1: Power Boilers.
 - .2 Section V: Nondestructive Examination.
 - .3 Section IX: Welding and Brazing Qualifications.
- .4 CSA W47.2, Certification of Companies for Fusion Welding of Aluminum.
- .5 CSA W48, Filler Metals and Allied Metals for Arc Welding.
- .6 CSA B51, Boiler, Pressure Vessel and Pressure Piping Code.
- .7 CAN/CSA-W117.2, Safety in Welding, Cutting and Allied Processes.
- .8 CSA W178.1, Certification of Welding Inspection Organizations.
- .9 CSA W178.2, Certification of Welding Inspectors.
- .10 AWS B2.1, Specification for Welding Procedure and Performance Qualification.
- .11 AWS C1.1, Recommended Practices for Resistance Welding.
- .12 AWS W1, Welding Inspection.
- .13 ANSI/AWWA C206, Field Welding of Steel Water Pipe.

1.2 WELDERS QUALIFICATIONS

- .1 Welding qualifications to be in accordance with CSA B51.
- .2 Use qualified and licensed welders possessing certificate for each procedure to be performed from authority having jurisdiction.
- .3 Furnish welder's qualifications to Consultant.
- .4 Each welder to possess identification stamp issued by authority having jurisdiction.
- .5 Certification of companies for fusion welding of aluminum to be in accordance with CSA W47.2.

1.3 INSPECTORS QUALIFICATIONS

- .1 Inspectors to be qualified to CSA W178.2.

1.4 WELDING PROCEDURES

- .1 Registration of welding procedures in accordance with CSA B51.
- .2 Copy of welding procedures to be available for inspection at all times.
- .3 Safety in welding, cutting and allied processes to be in accordance with CAN/CSA-W117.2.

Part 2 Products

2.1 ELECTRODES

- .1 Electrodes: in accordance with CSA W48 Series.

Part 3 Execution

3.1 WORKMANSHIP

- .1 Welding to be in accordance with ANSI/ASME B31.1, ANSI/ASME Boiler and Pressure Vessel Code, Sections I and IX and ANSI/AWWA C206, using procedures conforming to AWS B3.0, AWS C1.1, and applicable requirements of provincial authority having jurisdiction.
- .2 Protect all adjacent areas.

3.2 INSTALLATION REQUIREMENTS

- .1 Identify each weld with welder's identification stamp.
- .2 Backing rings:
 - .1 Where used, fit to minimize gaps between ring and pipe bore.
 - .2 Do not install at orifice flanges.
- .3 Fittings:
 - .1 NPS 50 mm (2") and smaller: install welding type sockets.
 - .2 Branch connections: install welding tees or forged branch outlet fittings.

3.3 INSPECTION AND TESTS - GENERAL REQUIREMENTS

- .1 Review all weld quality requirements and defect limits of applicable codes and standards with Consultant before any work is started.
- .2 Formulate "Inspection and Test Plan" in co-operation with Consultant.
- .3 Do not conceal welds until they have been inspected, tested, and approved by inspector.
- .4 Provide for inspector to visually inspect all welds during early stages of welding procedures in accordance with AWS W1. Repair or replace all defects as required by codes and as specified herein.

3.4 SPECIALIST EXAMINATIONS AND TESTS

- .1 General.
 - .1 Perform examinations and tests by specialist qualified in accordance with CSA W178.1 and CSA W178.2 and approved by Consultant.
 - .2 To ANSI/ASME Boiler and Pressure Vessels Code, Section V, CSA B51 and requirements of authority having jurisdiction.
 - .3 Inspect and test 25% of welds in accordance with "Inspection and Test Plan" by non-destructive visual examination and magnetic particle (hereinafter referred to as "particle") tests and/or full gamma ray radiographic (hereinafter referred to as "radiography") tests as specified.
- .2 Hydrostatically test all welds to requirements of ANSI/ASME B31.1.
- .3 Visual examinations: include entire circumference of weld externally and (wherever possible) internally.
- .4 Failure of visual examinations:
 - .1 Upon failure of any weld by visual examination, perform additional testing as directed by Consultant of a total of up to 10% of all welds, selected at random by Consultant by radiographic tests.

3.5 DEFECTS CAUSING REJECTION

- .1 As described in ANSI/ASME B31.1 and ANSI/ASME Boiler and Pressure Vessels Code.
- .2 In addition, hydronic water systems:
 - .1 Undercutting greater than 0.8 mm (1/32") adjacent to cover bead on outside of pipe.
 - .2 . Undercutting greater than 0.8 mm (1/32") adjacent to root bead on inside of pipe.
 - .3 Undercutting greater than 0.8 mm (1/32") at combination of internal surface and external surface.

- .4 Incomplete penetration and incomplete fusion greater than total length of 40 mm (1 1/2") in any 1500 mm (60") length of weld depth of such defects being greater than 0.8 mm (1/32").
- .5 Repair all cracks and defects in excess of 0.8 mm (1/32") in depth.
- .6 Repair defects whose depth cannot be determined accurately on the basis of visual examination or particle tests.

3.6 REPAIR OF WELDS WHICH FAILED TESTS

- .1 Re-inspect and re-test repaired or re-worked welds at Contractor's expense.

3.7 CLAIMS AGAINST OWNER FOR DELAYS

- .1 Claims against Owner for delays in completion of project will not be entertained for reasons of failures of welds to pass examinations.

3.8 OCCUPIED AREAS

- .1 Do not do any "Hot Work" in occupied areas.
- .2 Obtain "Hot Work" permits for working in existing building.

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 C177 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Mean of the Guarded Hot-Plate Apparatus.
 - .2 ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - .3 ASTM C1729 Standard Specification for Aluminum Jacketing for Insulation.
 - .4 **ASTM C 411, Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.**
 - .5 **ASTM C 795, Specification for Thermal Insulation for Use with Austenitic Stainless Steel.**
 - .6 **ASTM C 921, Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.**
- .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)
 - .2 North American Commercial and Industrial 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 have successfully completed apprenticeship program.
- .2 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.

1.7 QUALITY ASSURANCE

- .1 Products shall not contain formaldehyde, asbestos, lead, mercury or mercury compounds or PBDE fire retardants.

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 C177 or ASTM C518.
- .3 Type C-1: Rigid mineral fibre board to ASTM C612, with factory applied vapour retarder jacket meeting the requirement of ASTM C1136 Type II and IV (FSK):
 - .1 Jacket: to ASTM C1136 Type II and IV (FSK)
 - .2 Maximum "k" value: .033 W/M•°C (.23 BTU•IN/HR•FT²•°F)
- .4 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 (6 oz/yd²) cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C 921.
 - .2 Lagging adhesive: Compatible with insulation.
- .2 Aluminum:
 - .1 To ASTM C1729 with moisture barrier as scheduled in PART 3 of this section.
 - .2 Thickness: 0.5 mm (0.020") sheet.
 - .3 Finish: Smooth.
 - .4 Jacket banding and mechanical seals: 15 mm (1/2") wide, 0.5 mm (0.020") thick stainless steel.
 - .5 Provide exterior silicone sealant on all joints.

2.4 ACCESSORIES

- .1 Vapour retarder lap adhesive:
 - .1 Water based, fire retardant type, compatible with insulation.
- .2 Indoor Vapour Retarder Finish:
 - .1 Compatible with insulation.
- .3 Insulating Cement: hydraulic setting on mineral wool, to ASTM C 449.
- .4 ULC Listed Canvas Jacket:
 - .1 220 g/m² (6oz/yd²) 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 Childers CP-82 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 North American Commercial and Industrial Insulation 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 thicknesses conform to following table:

| <u>Application</u> | <u>Type</u> | <u>Thickness</u> |
|------------------------------------------------------------------------------|-------------|------------------|
| Rectangular supply air ducts | C-1 | 25 mm (1") |
| Supply, return and fan exhaust ducts exposed (visible) in space being served | none | |
| Energy/Heat Recovery Ventilator Exhaust Ducts | C-1 | 25 mm (1") |
| Interior acoustically lined ducts | none | |
| Last 1.5m of Exhaust duct | C-1 | 25 mm (1") |
| Exterior ductwork | C-1 | 80 mm (3") |

.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 or type C-6.

.3 Finishes: Conform to following table:

| <u>Application</u> | <u>Rectangular</u> | <u>Round</u> |
|-----------------------------------|--------------------|--------------|
| Indoor, concealed | none | none |
| Indoor, exposed | Canvas | Canvas |
| Outdoor, exposed to Precipitation | Aluminum | Aluminum |

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-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 C547, Type I and IV Standard Specification for Mineral Fiber Pipe Insulation.
 - .2 ASTM C177, Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
 - .3 ASTM C518, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus to recognize the correct thermal insulation performance testing for blanket.
 - .4 ASTM C1393, Standard Specification for Perpendicularly Oriented Mineral Fiber Roll and Sheet Thermal Insulation for Pipes and Tanks
 - .5 ASTM C1695, Standard Specification for Fabrication of Flexible Removable and Reusable Blanket Insulation for Hot Service.
 - .6 ASTM C 335, Test Method for Steady State Heat Transfer Properties of Pipe Insulation.
 - .7 ASTM C 921, Practice for Determining the Properties Jacketing Materials for Thermal Insulation.
 - .8 ASTM C1729 Standard Specification for Aluminium Jacketing for Insulation.
 - .9 ASTM C553, Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
 - .10 CGSB 51-GP-52Ma, Vapour Barrier Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
- .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)
 - .2 North American Commercial and Industrial Insulation Standards

1.2 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with general requirements.
- .2 Submit properly completed detail plates from the North American Commercial and Industrial Insulation Standards manual, applicable to installation types required by this specific section.
- .3 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 have successfully completed apprenticeship program.
- .2 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.
 - .3 "PVC" – Poly Vinyl Chloride – polymer used to manufacture a non-metallic final protective finish jacket over insulation systems.

1.7 QUALITY ASSURANCE

- .1 Products shall not contain formaldehyde, asbestos, lead, mercury or mercury compounds or PBDE fire retardants.

Part 2 Products

2.1 MATERIAL LIMITATIONS

- .1 Products shall not contain formaldehyde, asbestos, lead, mercury or mercury compounds or PBDE fire retardants.

2.2 FIRE AND SMOKE RATING

- .1 In accordance with CAN/ULC-S102:
 - .1 Maximum flame spread rating: 25.
 - .2 Maximum smoke developed rating: 50.

2.3 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 C335, ASTM C177 or ASTM C518.
- .3 Type A-1: Rigid moulded or wound mineral fibre with factory applied vapour retarder jacket.
 - .1 Mineral fibre: to ASTM C547 Type I and IV.
 - .2 Jacket: to ASTM C1136, Type I, II, III, IV, X.
 - .3 Maximum "k" factor: to ASTM C547.
- .4 Type A-3: Tubular flexible elastomeric closed cell foam:
 - .1 Insulation to ASTM C534 Type I.
 - .2 Maximum "k" factor: to ASTM C534.
 - .3 To be certified by manufacturer to be free of potential stress corrosion cracking corrodents.
- .5 Materials:
 - .1 All materials must be supplied by the same manufacturer.
 - .2 Acceptable Materials:
 - Knauf
 - Manson
 - Owens Corning

2.4 INSULATION SECUREMENT

- .1 Tape: Self-adhesive, aluminum, reinforced, 50 mm (2") wide minimum.
- .2 Contact adhesive: Quick setting.
- .3 Canvas adhesive: Washable.

2.5 CEMENT

- .1 Thermal insulating and finishing cement:
 - .1 Air drying on mineral wool, to ASTM C 449M.
 - .2 Hydraulic setting on mineral wool, to ASTM C165

2.6 VAPOUR RETARDER LAP ADHESIVE

- .1 Water based, fire retardant type, compatible with insulation.

2.7 INDOOR VAPOUR RETARDER FINISH

- .1 Compatible with insulation.

2.8 OUTDOOR VAPOUR RETARDER FINISH

- .1 Compatible with insulation.
- .2 Reinforcing fabric: Open weave fibreglass fabric, with maximum weave of 10 x 10 squares per inch.

2.9 JACKETS

- .1 Polyvinyl Chloride (PVC):
 - .1 Minimum thickness: 20mil (0.020")
 - .2 One-piece moulded type [and sheet] to CAN/CGSB-51.53 with pre-formed shapes as required.
 - .3 Colours: white.
 - .4 Minimum service temperatures: -29°C (-20°F).
 - .5 Maximum service temperature: 65°C (150°F).
 - .6 Moisture vapour transmission: 0.05 perm.
 - .7 Fastenings:
 - .1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
 - .2 Tacks (not to be used on below-ambient temperature systems)
 - .3 Pressure sensitive vinyl tape of matching colour.
- .2 Aluminum:
 - .1 To ASTM C1729.
 - .2 Thickness: 0.50 mm (0.020") sheet.
 - .3 Finish: Smooth.
 - .4 Joining: Longitudinal and circumferential slip joints with 50 mm (2") laps.
 - .5 Fittings: 0.50 mm (0.020") thick die-shaped fitting covers with factory-attached protective liner.
 - .6 Metal jacket banding and mechanical seals: stainless steel, 20 mm (3/4") wide, 0.50 mm (0.020") thick at 300 mm (12") spacing.

2.10 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 North American Commercial and Industrial Insulation Standards.
- .2 Provide continuous insulation for complete systems including all valves, air separators, fittings, and other equipment.
- .3 Apply materials in accordance with manufacturers' instructions and this specification.
- .4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
 - .1 Hangers, supports to be outside vapour retarder jacket.
- .5 Supports, Hangers:
 - .1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

3.3 REMOVABLE, PREFABRICATED, INSULATION AND ENCLOSURES

- .1 Application: At expansion joints, valves, primary flow measuring elements, flanges, and unions at equipment.
- .2 Flexible removable insulation covers are not acceptable for below-ambient (cold) operation piping systems. Rigid removable insulation jackets that are vapor retarder exterior material that can be vapor sealed at the seams, are acceptable on below-ambient (cold) operation piping systems.
- .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, air separators, 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.

| 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 |
| Hot Water Heating | A-1 | 40 (1½") | 50 (2") | 50 (2") | 50 (2") | 50 (2") |
| Refrigerant piping | A-3 | 25 (1") | 25 (1") | 25 (1") | 25 (1") | 25 (1") |

- .5 Finishes: Conform to the following table:

| Application | Piping | Valves & Fittings |
|-----------------------------|----------|-------------------|
| Exposed indoors | PVC | PVC |
| Concealed indoors | N/A | PVC |
| Exterior refrigerant piping | Aluminum | Aluminum |

- .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 B16.5, Pipe Flanges and Flanged Fittings: NPS ½ through NPS 24 Metric/Inch.
- .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 B18.2.1, Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series).
- .6 ASTM A47/A47M, Specification for Ferritic Malleable Iron Castings.
- .7 ASTM A53/A53M, and A106, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded ERW and Seamless.
- .8 ASTM B32, Specification for Solder Metal.
- .9 ASTM B75M, Specification for Seamless Copper Tube [Metric].
- .10 CSA B149.1, Natural Gas and Propane Installation Code.
- .11 CSA W47.1, Certification of Companies for Fusion Welding of Steel.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings product data in accordance with general requirements.
- .2 Indicate on manufacturers catalogue literature.

1.3 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

Part 2 Products

2.1 PIPE

- .1 Steel pipe: to ASTM A106, Schedule 40, seamless as follows:
 - .1 NPS 15 mm to 50 mm (1/2" to 2"), screwed.
 - .2 NPS 65 mm (2 1/2") and over, plain end.
- .2 Buried pipe: CGA approved polypropylene complete with tracer wire and marker.
- .3 Copper tube: to ASTM B75M.

2.2 JOINTING MATERIAL

- .1 Screwed fittings: pulverized lead paste.
- .2 Welded fittings: to CSA W47.1.
- .3 Flange gaskets: nonmetallic flat.
- .4 Soldered: to ASTM B32, tin antimony 95/5.
- .5 Screwed brass fittings: Teflon Tape.

2.3 FITTINGS

- .1 Steel pipe fittings, screwed, flanged or welded:
 - .1 Malleable iron: screwed, banded, Class 150.
 - .2 Steel pipe flanges and flanged fittings: to ANSI/ASME B16.5.
 - .3 Welding: butt-welding fittings.
 - .4 Unions: malleable iron, brass to iron, ground seat, to ASTM A47/A47M.
 - .5 Bolts and nuts: to ANSI B18.2.1.
 - .6 Nipples: schedule 40, to ASTM A53/A53M/A106.
- .2 Copper pipe fittings, screwed, flanged or soldered:
 - .1 Cast copper fittings: to ANSI B16.18.
- .3 Brass fittings: To ASTM B16.

2.4 BALL VALVES

- .1 NPS 50 mm (2") and under:
 - .1 Body and cap: cast high tensile bronze to ASTM B62.
 - .2 Pressure rating: Class 125, 860 kPa (125 psi) steam, WP = 1.4 MPa (203 psi) WOG.
 - .3 Connections: Screwed ends to ANSI B1.20.1 and with hex. shoulders.
 - .4 Stem: tamperproof ball drive.
 - .5 Stem packing nut: external to body.
 - .6 Ball and seat: replaceable stainless steel solid ball and teflon seats.
 - .7 Stem seal: TFE with external packing nut.
 - .8 Operator: removable lever handle.

2.5 LUBRICATED PLUG VALVES

- .1 All sizes
 - .1 Provincial Code approved, lubricated plug type.
 - .2 Body: cast iron to ASTM A 126 Class B semi-steel.
 - .1 Rating: Class 125 psig.
 - .3 Plug: tapered, with regular pattern port – 90 from full open to fully closed.

- .4 Ends: 50 mm (2") and smaller with hexagon shoulders, ends screwed to ANSI B1.20.1. Flanged to ANSI B16.1.
- .5 Lubrication system, nickel-plated.
- .6 Lubricant: to suit type, temperature and pressure of contained fluid.
- .7 Feeding system: lubricant forced into lubrication grooves between seating surfaces of plug and body to form positive seal, leakproof operation, and corrosion preventing film.
- .8 Lubricant screw for lubrication.
- .9 O-rings between body and plug.
- .10 Operator: removable manual lever handle.
- .11 Acceptable materials:
 - Newman Hattersley
 - Crane
 - Jenkins
 - Milwaukee
 - Toya

2.6 GAS REGULATOR

- .1 Reduce pressure from 34.5 kPa (5 psi) to 1.74 kPa (7" WC) capacity as indicated.
- .2 Acceptable products:
 - Singer
 - Schlumberger
- .3 Vent interior relief valve to outdoors with gooseneck and stainless steel insect screen. Vent piping shall be sized as per manufacturers' requirements and recommendations.
- .4 Isolate with lubricated plug valve and union connection.
- .5 Asco.

2.7 MANUFACTURED ROOF SUPPORTS

- .1 Single piece injection moulded polypropylene support.
- .2 Type 3-20 psi extruded polystyrene UV protected base glued to the support.
- .3 Minimum base dimension of 300 x 225 (12" x 9") and be 140 mm (5.5") high.
- .4 Pull test of 1.4 KN (315 lbs) using two #14-10 screws on pipe strap.
- .5 Acceptable materials:
 - Quick Block
 - Erico

Part 3 Execution

3.1 PIPING

- .1 Install in accordance with applicable Provincial/Territorial Codes.
- .2 Install in accordance with CAN/CSA B149.
- .3 Assemble piping using fittings manufactured to ANSI standards.
- .4 Connect to equipment in accordance with manufacturer's instruction unless otherwise indicated.
- .5 Slope piping down in direction of flow to low points.
- .6 Install drip points:
 - .1 At low points in piping system.
 - .2 At each connection to equipment.
- .7 Use eccentric reducers at pipe size change installed to provide positive drainage.
- .8 Provide clearance for access and for maintenance.
- .9 Ream pipes, clean scale and dirt, inside and out.
- .10 Install piping to minimize pipe dismantling for equipment removal.
- .11 Install regulator vents to code. Terminate in open air with Gooseneck fitting complete with stainless steel screen.
- .12 Paint gas piping with two (2) coats yellow paint. Banding of gas will not be accepted.

3.2 PIPING ON ROOF

- .1 Support piping as follows or as per seismic requirements (1.8 M (6' - 0") O.C.) whichever is more stringent:
≤ 40 mm (1½") 2.4 M (8' - 0") O.C.
≥ 50 mm (2") 3.0 M (10' - 0") O.C.
- .2 Provide support at each elbow and fitting.
- .3 Provide support at each regular and/or isolating valve.
- .4 Provide support within 600 mm (24") of each piece of equipment.

3.3 VALVES

- .1 Install valves with stems upright or horizontal unless otherwise approved by Consultant.
- .2 Install valves at branch take-offs to isolate each piece of equipment, and as indicated.
- .3 Provide lubricated plug type when gas line is exterior of building or 65 mm (2½") and larger.
- .4 Provide ball valve when gas line is interior of building and 50 mm (2") or smaller.

3.4 FIELD QUALITY CONTROL

- .1 Test system in accordance with CAN/CSA B149. Requirements of authorities having jurisdiction.
- .2 Provide copy of TSSA tag to the consultant.

3.5 PURGING

- .1 Purge after pressure test in accordance with CAN/CSA B149.

3.6 GAS FIRED EQUIPMENT START-UP

- .1 Start-up of all new and existing gas fired equipment shall be by this contractor to the requirements of the equipment manufacturer.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 Canadian Standards Association (CSA).
 - .1 CSA B51, Boiler, Pressure Vessel, and Pressure Piping Code.
- .3 American Society for Testing and Materials (ASTM).
 - .1 ASTM A47/A47M, Specification for Ferritic Malleable Iron Castings.
 - .2 ASTM A278/A278M, Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures up to 650°F (350°C).
 - .3 ASTM A516/A516M, Specification for Pressure Vessel Plates, Carbon Steel, for Moderate - and Lower - Temperature Service.
 - .4 ASTM A536, Specification for Ductile Iron Castings.
 - .5 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
- .4 American Society of Mechanical Engineers (ASME).
 - .1 ANSI/ASME, Boiler and Pressure Vessels Code (BPVC).

1.2 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with general requirements.
- .2 Indicate on manufacturers' catalogue literature the following:
 - .1 Sizes, orientation, capacities, performance, etc.
 - .2 Accessories

1.3 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

Part 2 Products

2.1 PIPE LINE STRAINER

- .1 NPS 15 mm to 50 mm (1/2" to 2"): bronze body to ASTM B62, screwed connections.
- .2 NPS 65 mm to 300 mm (2 1/2" to 12"): cast steel body to ASTM A278M, Class 30, flanged connections.
- .3 NPS 50 mm to 300 mm (2" to 12"): T type with malleable iron body to ASTM A47M, grooved ends.
- .4 Blowdown connection: NPS 25 mm (1").
- .5 Screen: stainless steel with 1.19 mm (50 mil) perforations.
- .6 Working pressure: 860 kPa (125 psi).

Part 3 Execution

3.1 GENERAL

- .1 Install as indicated and to manufacturer's recommendations.
- .2 Run drain lines (and blow off connections) to terminate above nearest drain.
- .3 Maintain proper clearance to permit service and maintenance.
- .4 Should deviations beyond allowable clearances arise, request and follow Consultant's directive.
- .5 Check shop drawings for conformance of all tapings for ancillaries and for equipment operating weights.

3.2 STRAINERS

- .1 Install in horizontal or down flow lines.
- .2 Ensure clearance for removal of basket.
- .3 Install ahead of each pump.
- .4 Install ahead of each automatic control valve and as indicated.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 Canadian Standards Association (CSA).
 - .1 CSA W47.1, Certification of Companies for Fusion Welding of Steel.
- .3 American National Standards Institute (ANSI).
 - .1 ANSI/ASME B16.1, Gray Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250 and 800.
 - .2 ANSI/ASME B16.3, Malleable-Iron Threaded Fittings, Classes 150 and 300.
 - .3 ANSI/ASME B16.5, Pipe Flanges and Flanged Fittings: NPS½ through NPS24 Metric/Inch.
 - .4 ANSI/ASME B16.9, Factory-Made Wrought Steel Buttwelding Fittings.
 - .5 ANSI B18.2.1, Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series).
 - .6 ANSI/ASME B18.2.2, Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange, and Coupling Nuts (Inch Series).
 - .7 ANSI/AWWA C111/A21.11, Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- .4 American Society for Testing and Materials (ASTM).
 - .1 ASTM A47/A47M, Specification for Ferritic Malleable Iron Castings.
 - .2 ASTM A53/A53M, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.
 - .3 ASTM A536, Specification for Ductile Iron Castings.
 - .4 ASTM B61, Specification for Steam or Valve Bronze Castings.
 - .5 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
- .5 Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS).
 - .1 MSS-SP-67, Butterfly Valves.
 - .2 MSS-SP-70, Cast Iron Gate Valves, Flanged and Threaded Ends.
 - .3 MSS-SP-71, Cast Iron Swing Check Valves, Flanged and Threaded Ends.
 - .4 MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.
 - .5 MSS-SP-85, Cast Iron Globe and Angle Valves, Flanged and Threaded Ends.

1.2 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with general requirements.
- .2 Indicate on manufacturers' catalogue literature the following:
 - .1 Piping
 - .2 Valves
 - .3 Accessories

1.3 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

Part 2 Products

2.1 STEEL PIPE

- .1 Steel pipe: to ASTM A53/A53M, Grade B, as follows:
 - .1 NPS 32 mm (1 1/4") and smaller: Schedule 40.
- .2 Final connection to copper heating elements.
 - .1 Type "L" copper with 95/5 solder joints and dielectric couplings. Maximum length 600 mm (24").
- .3 Pipe Joints
 - .1 NPS 32 mm (1 1/4") and under: screwed fittings with pulverized lead paste.
 - .2 NPS 65 mm (2 1/2") and over: welding fittings and flanges to CSA W47.1.
 - .3 Flanges: plain or raised face, slip-on.
 - .4 Flange gaskets: suitable for hydronic heating up to 110°C (220°F).
 - .5 Pipe thread: taper.
 - .6 Bolts and nuts: to ANSI B18.2.1 and ANSI/ASME B18.2.2.
- .4 Fittings
 - .1 Screwed fittings: malleable iron, to ANSI/ASME B16.3, Class 150.
 - .2 Pipe flanges and flanged fittings:
 - .1 Cast iron: to ANSI/ASME B16.1, Class 125.
 - .2 Steel: to ANSI/ASME B16.5.
 - .3 Butt-welding fittings: steel, to ANSI/ASME B16.9.
 - .4 Unions: malleable iron, to ASTM A47/A47M and ANSI/ASME B16.3.

2.2 VALVES

- .1 Connections:
 - .1 NPS 32 mm (1 1/4") and smaller: screwed ends.
 - .2 NPS 50 mm (2") and smaller: screwed ends.
 - .3 NPS 65 mm (2 1/2") and larger: flanged ends.
- .2 Drain valves: Gate, Class 125, non-rising stem, solid wedge disc, with chain and cap.
- .3 Swing check valves:
 - .1 NPS 32 mm (1 1/4") and under:
 - .1 Class 150, swing, with PTFE disc, as specified. Bronze. Jenkins 4475TJ.
 - .2 NPS 65 mm (2 1/2") and over:
 - .1 Flanged or Grooved ends, Bronze trim, Cast Iron: Gate, Globe, Check.
- .4 Ball valves:
 - .1 NPS 80 mm (3") and under:
 - .1 Body and cap: cast high tensile bronze to ASTM B62.
 - .2 Pressure rating: Class 125, 860 kPa (125 psi) steam, WP = 1.4 MPa (203 psi) WOG.
 - .3 Connections:
 - .1 NPS 32 mm (1 1/4") and under screwed ends to ANSI B1.20.1 and with hex. shoulders.
 - .2 NPS 65 mm (2 1/2") and over flanged or grooved ends.
 - .4 Stem: stainless steel tamperproof ball drive.
 - .5 Ball and seat: replaceable stainless steel solid ball and teflon seats.
 - .6 Operator: removable lever handle.
 - .7 Extended handles on chilled water valves.
 - .8 Full port.
- .5 All valves shall be of commercial grade and of same manufacturer.
- .6 Acceptable Manufacturers:
 - .1 Newman Hattersley Canada Ltd.
 - .2 Jenkins/Crane
 - .3 Milwaukee
 - .4 Toyo
 - .5 Kitz

2.3 BALANCING VALVES

- .1 Size 32 mm (1 1/4") and below Bronze body, brass ball, NPT connections and variable orifice.
- .2 Size 65 mm (2 1/2") to larger: Cast iron body, raised flange connections, glove style with brass plug.
- .3 Differential pressure readout ports with internal EPT inserts and check valves, 6 mm (1/4")NPT tapped drain/purge ports, memory stop and calibrated nameplate.
- .4 Acceptable materials:
 - .1 Bell & Gossett Circuit Setters
 - .2 Armstrong
 - .3 Taco
 - .4 Tour & Anderson
 - .5 Oventrop

2.4 AUTOMATIC AIR VENT

- .1 Industrial float vent: cast iron body and NPS 15 mm (1/2") connection and rated at 860 kpa (125 psi) working pressure.
- .2 Float: solid material suitable for 115°C (240°F) working temperature.
- .3 Plastic vents are not acceptable.
- .4 Acceptable materials:
 - .1 Maid-O-Mist No. 67
 - .2 Spirax Sarco

Part 3 Execution

3.1 PIPING INSTALLATION

- .1 Installation shall be by a licensed pipe fitter.
- .2 Connect to equipment in accordance with manufacturer's instruction unless otherwise indicated.
- .3 Install concealed pipes close to building structure to keep furring space to minimum. Install to conserve headroom and space. Run exposed piping parallel to walls. Group piping wherever practical.
- .4 Slope piping in direction of drainage and for positive venting.
- .5 Use eccentric reducers at pipe size change installed to provide positive drainage or positive venting.

- .6 Provide clearance for installation of insulation and access for maintenance of equipment, valves and fittings.
- .7 Ream pipes, clean scale and dirt, inside and outside, before and after assembly.
- .8 Assemble piping using fittings manufactured to ANSI standards.
- .9 Saddle type branch fittings may be used on mains if branch line is no larger than half the size of main. Hole saw or drill and ream main to maintain full inside diameter of branch line prior to welding saddle.

3.2 VALVE INSTALLATION

- .1 Install rising stem valves in upright position with stem above horizontal.
- .2 Install butterfly valves on chilled water and condenser water lines only.
- .3 Install gate or ball valves at branch take-offs and to isolate each piece of equipment, and as indicated.
- .4 Install globe valves for balancing and in by-pass around control valves as indicated.
- .5 Provide silent check valves on discharge of pumps and in vertical pipes with downward flow and as indicated.
- .6 Provide swing check valves in horizontal lines as indicated.
- .7 Install chain operators on valves NPS 65 mm (2½") and over where installed more than 2400 mm (96") above floor in Boiler Rooms and Mechanical Equipment Rooms.
- .8 Provide ball valves for glycol service.

3.3 AIR VENTS

- .1 Install at high points of systems.
- .2 Install ball valve on automatic air vent inlet.
- .3 Extend vent lines in Mechanical Room with screwdriver stop at 1.8 m AFF.

3.4 CIRCUIT BALANCING VALVES

- .1 Install flow measuring stations and flow balancing valves as indicated.
 - .1 On return side of all heating devices (convectors, panels, force flows, radiation, coils, etc.).
 - .2 On return side of all water or glycol cooling coils.
 - .3 On return side of all reverse return piping loops and/or branch circuits.
- .2 Install to manufacturers requirements.
- .3 Minimum valve size shall be one pipe size smaller than piping or 20 mm (¾"), whichever is larger.
- .4 Refer to Testing Adjusting and Balancing Section for applicable procedures.

3.5 FILLING OF SYSTEM

- .1 Refill system with clean water adding water treatment as specified.
- .2 Co-ordinate filling of system with HVAC water treatment contractor.

3.6 TESTING

- .1 Test system in accordance with Mechanical General Requirements Section.
- .2 For glycol systems, retest with propylene glycol to ASTM E202, inhibited, for use in building system after cleaning. Repair any leaking joints, fittings or valves.

3.7 FLUSHING AND CLEANING

- .1 Scope:
 - .1 Flush new piping only.
- .2 Refer to Water Treatment Section

3.8 EXISTING SYSTEM DISPOSAL

- .1 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 ANSI/ASME B16.22, Wrought Copper Alloy and Copper Alloy Solder - Joint Pressure Fittings: Classes 150, 300, 600, 900, 1500, and 2500.
- .3 ANSI/ASME B16.24, Cast Copper Pipe Flanges and Flanged Fittings.
- .4 ANSI/ASME B16.26, Cast Copper Alloy Fittings for Flared Copper Tubes.
- .5 ANSI/ASME B31.5, Refrigeration Piping and Heating Transfer Components.
- .6 ASTM A307, Specification for Carbon Steel Bolts and Studs, 413.5 mPa (60,000 psi) Tensile Strength.
- .7 ASTM B280, Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
- .8 CSA B52, Mechanical Refrigeration Code.
- .9 EPS 1/RA/2, Environmental Code of Practice for Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems.

Part 2 Products

2.1 TUBING

- .1 Processed for refrigeration installations, deoxidized, dehydrated and sealed.
 - .1 Hard copper: to ASTM B280, type ACR-B.

2.2 FITTINGS

- .1 Service: design pressure 2070 kPa (300 psi) and temperature 121°C (250°F).
- .2 Brazed:
 - .1 Fittings: wrought copper to ANSI/ASME B16.22.
 - .2 Joints: silver solder, 45% Ag-15% Cu or copper-phosphorous, 95% Cu-5%P and non-corrosive flux.
- .3 Flanged:
 - .1 Bronze or brass, to ANSI/ASME B16.24, Class 150 and Class 300.
 - .2 Gaskets: suitable for service.
 - .3 Bolts, nuts and washers: to ASTM A307, heavy series.
- .4 Flared:
 - .1 Bronze or brass, for refrigeration, to ANSI/ASME 16.26.

2.3 PIPE SLEEVES

- .1 Hard copper or steel, sized to provide 6 mm (1/4") clearance all around between sleeve and uninsulated pipe or between sleeve and insulation.

2.4 VALVES

- .1 22 mm (7/8") and under: Class 500, 3.5 MPa (500 psi), globe or angle non-directional type, diaphragm, packless type, with forged brass body and bonnet, moisture proof seal for below freezing applications, brazed connections.
- .2 Over 22 mm (7/8"): Class 375, 2.5 MPa (375 psi), globe or angle type, diaphragm, packless type, back-seating, cap seal, with cast bronze body and bonnet, moisture proof seal for below freezing applications, brazed connections.

2.5 FILTER-DRIER

- .1 On lines 20 mm (3/4") outside diameter and larger, filter-drier shall be replaceable core type with Schraeder type valve.
- .2 On lines smaller than 20 mm (3/4") outside diameter, filter-drier shall be sealed type using flared copper fittings.
- .3 Size shall be full line size.
- .4 Approved manufacturers:
 - .1 Mueller
 - .2 Parker
 - .3 Sporlan
 - .4 Virginia

2.6 SIGHT GLASS

- .1 Combination moisture and liquid indicator with protection cap.
- .2 Sight glass shall be full line size.
- .3 Sight glass connections shall be solid copper or brass, no copper-coated steel sight glasses allowed.
- .4 Approved manufacturers:
 - .1 Mueller
 - .2 Henry
 - .3 Parker
 - .4 Superior

2.7 SUCTION LINE TRAP

- .1 Manufactured standard one-piece traps.

2.8 EXPANSION VALVES

- .1 For pressure type distributors, externally equalized with stainless steel diaphragm, and same refrigerant in thermostatic elements as in system.
- .2 Size valves to provide full rated capacity of cooling coil served. Co-ordinate selection with evaporator coil and condensing unit.
- .3 Approved manufacturers:
 - .1 Henry
 - .2 Mueller
 - .3 Parker
 - .4 Sporlan

2.9 FLEXIBLE CONNECTORS

- .1 Designed for refrigerant service with bronze seamless corrugated hose and bronze braiding.
- .2 Approved manufacturers:
 - .1 Anaconda "Vibration Eliminators" by Anamet
 - .2 Vibration Absorber Model VAF by Packless Industries
 - .3 Vibration Absorbers by Superior Valve Co
 - .4 Style "BF" Spring-flex freon connectors by Vibration Mountings.

2.10 ROOF FLASHING

- .1 Thaler or equal spun aluminum complete with insulation, cap, and rubber gasket.

2.11 PREFABRICATED PIPE ENTRY DOGHOUSE

- .1 Dog House and cover shall be fabricated from 2mm thick aluminum with UV protected powder coated finish is also acceptable.
- .2 Cover shall be gasketed to ensure air and water tightness.
- .3 Mount in curb shall be full insulated and supplied with Doghouse.
- .4 Curb shall be 610 mm (24") high with 89 mm (3.5") wide flange pre-punched for securement to roof deck.
- .5 Curb shall be insulated with 50 mm (2") thick glass fibre insulation.
- .6 Pipe entry openings shall be provided by the pipe entry chase manufacturer and be specifically made for the application. Minimum acceptable standard:
 - .1 Sigrist Exit Seal
 - .2 Vault Exit Seal

- .7 Cover shall be removable and be fastened to the curb/body with vandal resistant fasteners. Hardware shall be zinc plated or stainless steel.
- .8 Size: To suite required penetrations.
- .9 Acceptable Manufacturers
 - .1 Sigrist Alta Pipe Chase Housing
 - .2 Vault Roof Penetration Housing
 - .3 Other Acceptable Manufacturers if approved by Consultant prior to tender close.

2.12 PIPING SUPPORT ASSEMBLY

- .1 All channel members shall be fabricated from structural grade steel conforming to one of the following ASTM specifications: A1011/A1011M, A653/A653M.
- .2 All fittings shall be fabricated from steel conforming to one of the following ASTM specifications: A575, A36/A36M or A635/A635M.
- .3 Electro galvanized cush clamps with shoulder bolt and molded thermoplastic cushion, size to suit pipe.
- .4 Acceptable materials:
 - .1 Unistrut
 - .2 Or equal

Part 3 Execution

3.1 GENERAL

- .1 Hard copper to be used. Throughout the project, the use of annealed copper shall not be used without approval of the consultant.
- .2 Install in accordance with CSA B52, EPS 1/RA/2 and ANSI/ASME B31.5.
- .3 Connect to equipment with isolating valves and unions.
- .4 Provide space for servicing, disassemble, and removal of equipment and components all as recommended by manufacturer.
- .5 Protect all openings in piping against entry of foreign material.
- .6 Provide all necessary equipment including thermal expansion valve, sight glass, solenoid valve, filter dryer, etc., for a complete installed system. Pipe system as per manufacturer's recommendation and requirements.
- .7 Provide number of refrigerant circuits and appropriate corresponding piping as per manufacturer's recommendations and requirements.

3.2 BRAZING PROCEDURES

- .1 Bleed inert gas into pipe during brazing.
- .2 Remove valve internal parts, solenoid valve coils, sight glass.
- .3 Do not apply heat near expansion valve and bulb.

3.3 PIPING INSTALLATION

- .1 General:
 - .1 Hard drawn copper tubing: do not bend. Minimize use of fittings.
 - .2 Pitch at least 1:240 down in direction of flow to prevent oil return to compressor during operation.
 - .3 Provide trap at base of risers greater than 2.4m (8') high and at each 7.6m (25'-0") thereafter.
 - .4 Provide inverted deep trap at top of each riser.
 - .5 Provide double risers for compressors having capacity modulation.
 - .1 Large riser: install traps as specified above.
 - .2 Small riser: size for 5.1 m/s (1000 ft/min) at minimum load. Connect upstream of traps on large riser.

3.4 PRESSURE AND LEAK TESTING

- .1 Close valves on factory charged equipment and other equipment not designed for test pressures.
- .2 Leak test to CSA B52 before evacuation to 2 MPa (290 psi) and 1 MPa (145 psi) on high and low sides respectively.
- .3 Test Procedure: Build pressure up to 35 kPa (5 psi) with refrigerant gas on high and low sides. Supplement with nitrogen to required test pressure. Test for leaks with electronic or halide detector. Repair leaks and repeat tests.

3.5 DEHYDRATION AND CHARGING

- .1 Close service valves on factory charged equipment.
- .2 Ambient temperatures to be at least 13°C (55°F) for at least 12 h before and during dehydration.
- .3 Use copper lines of largest practical size to reduce evacuation time.
- .4 Use 2-stage vacuum pump with gas ballast on 2nd stage capable of pulling 5 Pa (0.02" WC) absolute and filled with dehydrated oil.
- .5 Measure system pressure with vacuum gauge. Take readings with valve between vacuum pump and system closed.

- .6 Triple evacuate all system components containing gases other than correct refrigerant or having lost holding charge as follows:
 - .1 Twice to 14 Pa (0.056" WC) absolute and hold for 4 h.
 - .2 Break vacuum with refrigerant to 14 kPa (0.056" WC).
 - .3 Final to 5 Pa (0.02" WC) absolute and hold for at least 12 h.
 - .4 Isolate pump from system, record vacuum and time readings until stabilization of vacuum.
 - .5 Submit all test results to Consultant.

- .7 Charging:
 - .1 Charge system through filter-drier and charging valve on high side. Low side charging not permitted.
 - .2 With compressors off, charge only amount necessary for proper operation of system. If system pressures equalize before system is fully charged, close charging valve and start up. With unit operating, add remainder of charge to system.
 - .3 Re-purge charging line if refrigerant container is changed during charging process.

- .8 Checks:
 - .1 Make all checks and measurements as per manufacturer's operation and maintenance instructions.
 - .2 Record and report all measurements to Consultant.

3.6 INSTRUCTIONS

- .1 Post instructions in frame with glass cover in accordance with Operation and Maintenance Manual Section and CSA B52.

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.
- .8 ANSI/NFPA 96, Ventilation Control and Fire Protection of Commercial Cooking Operations.

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 Nexas 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 WDCI.

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 | Acceptable Leakage Classification (Rectangular) | Acceptable Leakage Classification (Round) |
|---------------------------------|----------------------|----------------------------------------------------------|----------------------------------------------------|
| 2500 (10") | A | 4 | 2 |
| 1500 (6") | A | 4 | 2 |
| 1000 (4") | A | 4 | 2 |
| 750 (3") | A | 8 | 4 |
| 500 (2") | B | 16 | 8 |
| 250 (1") | B | 16 | 8 |
| 125 (0.5") | C | 16 | 8 |

- .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 WATERTIGHT DUCT

- .1 Provide watertight duct for:
 - .1 Fresh air intake.
 - .2 As indicated.
- .2 Form bottom of horizontal duct without longitudinal seams. Solder or weld joints of bottom and side sheets. Seal all other joints with duct sealer.

2.10 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 |
| Ventilation Plenum | 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 WATERTIGHT DUCT

- .1 Slope horizontal branch ductwork down towards hoods served. Slope header ducts down toward risers.
- .2 Fit base of riser with 150 mm (6") deep drain sump and 25 mm (1") drain connected, with deep seal trap and valve and discharging to open funnel drain.

3.4 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.

3.5 LEAKAGE TESTS

- .1 Co-ordinate leakage testing with TAB contractor. 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).

3.6 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. **The extent of the cleaning shall be limited to the area immediately surrounding the new connection point.**
- .5 Ensure all systems are clean prior to start up.

3.7 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
- .6 **Provide access doors in kitchen exhaust duct with bolted cover to the requirements of NFPA and authority having jurisdiction.**

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 PREFABRICATED ROOF CURB

- .1 Construction: welded with exposed joints ground flush and smooth.
- .2 Material: 1.3 mm (18 gauge) galvanized steel with raised cant and wood nailer.
- .3 25 mm (1") insulation 3 lb density.
- .4 Acceptable materials:
Greenheck GPR – 600 mm (24") high
Penn

2.7 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
 - Pottorff

2.5 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 ANSI/NFPA 90A, Installation of Air Conditioning and Ventilating Systems.
- .3 CAN/ULC-S112, Standard Method of Fire Test of Fire Damper Assemblies.
- .4 CAN/ULC-S112.1, Standard Method of Fire Test of Ceiling Firestop Flap Assemblies.
- .5 ULC-S505, Fusible Links for Fire Protection Service.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with general requirements.
- .2 Indicate the following:
 - .1 Fire dampers.
 - .2 Operators.
 - .3 Firestop flaps.
 - .4 Fusible links.

1.3 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

1.4 MAINTENANCE MATERIALS

- .1 Provide following:
 - .1 Six (6) fusible links of each type.

1.5 CERTIFICATION OF RATINGS

- .1 Catalogue 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 FIRE DAMPERS (STATIC)

- .1 Fire dampers: arrangement as indicated, listed and bear label of ULC, meet requirements of provincial fire authority and authorities having jurisdiction. Fire damper assemblies to be fire tested in accordance with CAN/ULC-S112.
- .2 Mild steel, factory fabricated for fire rating requirement to maintain integrity of fire wall and/or fire separation.
- .3 Top hinged: offset single damper, round or square; multi-blade hinged or interlocking type; guillotine type; sized to maintain full duct cross section.
- .4 Fusible link actuated, weighted to close and lock in closed position when released or having negator-spring-closing operator for multi-leaf type or roll door type in horizontal position with vertical air flow.
- .5 40 mm x 40 mm x 3 mm (1½" x 1½" x 16ga) retaining angle iron frame, on full perimeter of fire damper, on both sides of fire separation being pierced.
- .6 Acceptable materials:
 - .1 Ruskin
 - .2 Nailor
 - .3 E.H. Price
 - .4 T.A. Morrison
 - .5 Tamco
 - .6 Ventex/Alumavent
 - .7 United Enertech
 - .8 Safeair-Dowco (stainless steel)
 - .9 Greenheck
 - .10 Pottorff

2.2 FIRE DAMPERS (DYNAMIC)

- .1 Multi blade or roll type, fire damper suitable for HVAC system velocities up to 2000 fpm (610 m/mm), dual direction air flow, max 4" wg pressure.
- .2 Mild steel, factory fabricated for fire rating requirement to maintain integrity of fire wall and/or fire separation.
- .3 Top hinged: offset single damper, round or square; multi-blade hinged or interlocking type; guillotine type; sized to maintain full duct cross section.
- .4 Stainless closure spring to positively close damper upon fusible link release, for horizontal or vertical orientations.

- .5 Linkage concealed in frame.
- .6 40 mm x 40 mm x 3 mm (1½" x 1½" x 16ga) retaining angle iron frame, on full perimeter of fire damper, on both sides of fire separation being pierced.
- .7 Fire damper assemblies and type to meet requirements of provincial fire authority and authority having jurisdiction.
- .8 Acceptable materials:
 - .1 Ruskin
 - .2 Nailor
 - .3 E.H. Price
 - .4 T.A. Morrison
 - .5 Tamco
 - .6 Greenheck
 - .7 Ventex/Alumavent
 - .8 Pottorff

2.3 MULTIBLADE DAMPERS (DYNAMIC OR STATIC)

- .1 Provide and install multiblade dampers where roll type fire dampers do not have a ULC listing for the size of the penetration through the assembly.
- .2 Multi blade type fire dampers shall be suitable for HVAC system velocities up to 2000 fpm (610 m/mm), dual direction air flow, max 4" wg pressure.
- .3 Damper shall be labelled for dynamic or static systems as appropriate for the installed location.
- .4 Frame shall be constructed on 16 ga (1.6) steel hat channel with mitered corners reinforced with die-formed corner gussets for strength.
- .5 Damper blades shall be 14 ga (2.0) equivalent steel formed double skin, airfoil design.
- .6 Damper shall be of opposed blade configuration with an interlocking blade design. Blade seals are not acceptable.
- .7 Blade axels shall be double bolted at each end of the blade to provide positive locking connection.
- .8 Bearings shall be sintered stainless steel type.
- .9 Blade linkage shall be zero-maintenance, concealed in frame and out of the air stream.
- .10 Each damper shall be complete with a UL listed fusible link that will cause the damper to close and lock in closed position by means of an over centre/knee lock linkage for assured closure.
- .11 Each damper shall be provided with an internal manual locking quadrant(s) for setting and locking of blades in desired position.
- .12 Provide a steel sleeve of appropriate gauge and length for the assembly being penetrated.

- .13 Provide a 40 mm x 40 mm x 3 mm (1½" x 1½" x 16ga) retaining angle iron frame, on full perimeter of fire damper, on both sides of fire separation being pierced.
- .14 Fire damper assemblies and type to meet requirements of provincial fire authority and authority having jurisdiction.
- .15 Acceptable materials:
 - .1 Ruskin
 - .2 Nailor
 - .3 E.H. Price
 - .4 T.A. Morrison
 - .5 Tamco
 - .6 Greenheck
 - .7 Ventex/Alumavent
 - .8 Pottorff

Part 3 Execution

3.1 INSTALLATION

- .1 Provide where indicated and at all fire rated partitions indicated, on architectural drawing.
- .2 Install in accordance with ANSI/NFPA 90A and in accordance with conditions of ULC listing.
- .3 Maintain integrity of fire separation.
- .4 After completion and prior to concealment obtain approvals of complete installation from authority having jurisdiction.
- .5 Install access door adjacent to each damper.
- .6 Coordinate with installer of firestopping.
- .7 Static fire dampers: Only on transfer air ducts where ductwork is not connected to a fan/blower.
- .8 Dynamic fire dampers: In all duct work where air is moved by a fan/blower.

END OF SECTION

Part 1 General

1.1 CODES AND STANDARDS

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ANSI/NFPA 90A, Installation of Air Conditioning and Ventilating Systems.
- .3 CAN/ULC-S112, Standard Method of Fire Test of Fire Damper Assemblies.
- .4 CAN/ULC-S112.1, Standard Method of Fire Test of Ceiling Firestop Flap Assemblies.
- .5 ULC-S505, Fusible Links for Fire Protection Service.
- .6 CAN/ULC-S524, Installation of Fire Alarm Systems
- .7 CAN/ULC-S1001.11, Integrated Systems Testing of Fire Protection and Life Safety Systems.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with general requirements indicating the following:
 - .1 Damper type
 - .2 Operators
 - .3 Fusible links
 - .4 Smoke detectors
 - .5 Power requirements
 - .6 Size, orientation, construction

1.3 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

1.4 MAINTENANCE MATERIALS

- .1 Provide following:
 - .1 Six (6) fusible links of each type.

1.5 CERTIFICATION OF RATINGS

- .1 Catalogue or published ratings shall be those obtained from tests carried out by the manufacturer or those ordered by him from independent testing agency signifying adherence to codes and standards.

Part 2 Products

2.1 SMOKE DAMPERS

- .1 Provide a complete system, consisting of the damper, damper actuator, smoke detector with duct sample tube, sleeve and all other components necessary for a complete and operable system. **The assembly shall be factory assembled as a single unit.** Field assembly shall be permitted at contractor discretion provided all listings are maintained and the installation follows all manufacturer installation guidelines.
- .2 Damper
 - .1 Damper shall be ULC listed and labelled
 - .2 Both damper and damper actuator to be ULC listed and labelled.
 - .3 Normally closed smoke/seal: folding blade type. Blade edge seals of flexible stainless steel shall provide required constant sealing pressure. Stainless steel negator springs with locking devices shall ensure positive closure for units.
 - .4 Damper shall have Class I leakage rating.
 - .5 Suitable for horizontal or vertical installations.
 - .6 Damper Material: Damper material shall match ductwork it is installed in (i.e., stainless steel in laboratory). Refer to specification section 23 31 13 Metal Ducts.
- .3 Actuator
 - .1 Actuator shall be ULC listed and labelled
 - .2 Motorized actuator: 2-position, spring return, normally open with power on. When power is interrupted damper shall close automatically. Upon return of power, damper shall automatically reset open. Actuators are to be located outside of airstream, unless otherwise specified or shown on drawings.
 - .3 Exterior visualization of damper position.
 - .4 Damper actuator end switches for monitoring damper position by the BAS.
 - .5 Provide modulating actuator where damper is operating as part of a VVT system.
 - .6 Where the FSD is mounted immediately behind a sidewall grille the actuator shall be mounted inside the ductwork to avoid an additional access door beside the grille.
- .4 Factory sleeve.
 - .1 Type and style: matching application.
- .5 Operating Temperature: 0° Celsius to 99° Celsius ambient temperature rating for 300 fpm to 4000 fpm air velocity.

- .6 Smoke Detector:
 - .1 ULC approved photoelectric duct smoke detector;
 - .2 Operates from 300 to 3000 ft/min air velocity (fan system), -4 to 158°F temperature, and 0 to 95% non-condensing humidity;
 - .3 Operates from 100 to 4000 ft/min air velocity, -4 to 158°F temperature and 0 – 95% non-condensing humidity (transfer ducts)
 - .4 test/reset button with LED display;
 - .5 The detector housing shall be ULC listed specifically for use in air handling systems; capable of local testing via magnetic switch and test button; duct mounted smoke detector with sampling tube, housing.
 - .6 The detector shall incorporate separate 2.0A 30VDC Alarm and Supervisory contacts. Alarm contacts shall be normally open (N.O.) in which closed contacts will indicate an alarm condition to the fire alarm panel. Supervisory contacts shall be normally closed (N.C.) in which open contacts will indicate a trouble condition to the fire alarm panel.
 - .7 Where the SD is mounted immediately behind a sidewall grille the smoke detector shall be mounted inside the ductwork to avoid an additional access door beside the grille.
- .7 Damper assembly to operate at 120V with single point power connection.
- .8 Large damper sizes can be provided in multiple sections. Field assembly is acceptable following manufacturer's installation guidelines.
- .9 Size: as indicated on drawings.
- .10 Acceptable materials:
 - E H Price
 - NCA Ltd.
 - Nailor Industries Inc.
 - Ruskin
 - Alumavent
 - United Enertech
 - Safeair-Dowco (stainless steel)
 - Pottorff

2.2 COMBINATION FIRE AND SMOKE DAMPERS

- .1 Provide a complete system, consisting of the damper, damper actuator, smoke detector with duct sampling tube, sleeve and all other components necessary for a complete and operable system. **The assembly shall be factory assembled as a single unit.** Field assembly shall be permitted at contractor discretion provided all listings are maintained and the installation follows all manufacturer installation guidelines.
- .2 Damper
 - .1 Damper shall be ULC listed and labelled
 - .2 Both damper and damper actuator to be ULC listed and labelled.
 - .3 Normally closed smoke/seal: folding blade type. Blade edge seals of flexible stainless steel shall provide required constant sealing pressure. Stainless steel negator springs with locking devices shall ensure positive closure for units.
 - .4 Damper shall have Class I leakage rating.
 - .5 Suitable for horizontal or vertical installations.
 - .6 Damper Material: Damper material shall match ductwork it is installed in (i.e., stainless steel in laboratory). Refer to specification section 23 31 13 Metal Ducts.
- .3 Actuator/Link
 - .1 Actuator shall be ULC listed and labelled
 - .2 Motorized actuator: 2-position, spring return, normally open with power on. When power is interrupted damper shall close automatically. Upon return of power, damper shall automatically reset open. Actuators are to be located outside of airstream, unless otherwise specified or shown on drawings.
 - .3 Exterior visualization of damper position.
 - .4 Damper actuator end switches for monitoring damper position by the BAS.
 - .5 Combined actuator: electrical control system actuated from smoke sensor or smoke detection system and from fusible link.
 - .6 Fusible link, or electric re-settable link (ERL).
 - .7 Electric fire sensor capable of remote openable control is to be provided in place of fusible link where specifically indicated in project documents.
 - .8 Where ERL or electric fire sensor is used in place of fusible link, this device shall fail closed upon power failure.
 - .9 Provide modulating actuator where damper is operating as part of a VVT system.
 - .10 Where the FSD is mounted immediately behind a sidewall grille the actuator shall be mounted inside the ductwork to avoid an additional access door beside the grille.

- .4 Factory sleeve.
 - .1 Type and style: matching application.
- .5 Operating Temperature: 0° Celsius to 99° Celsius ambient temperature rating for 300 fpm to 4000 fpm air velocity.
- .6 Smoke Detector:
 - .1 ULC approved photoelectric duct smoke detector.
 - .2 Operates from 300 to 3000 ft/min air velocity (fan systems), -4 to 158°F temperature, and 0 to 95% non-condensing humidity.
 - .3 Operates from 100 to 4000 ft/min air velocity, -4 to 158°F temperature and 0 – 95% non-condensing humidity (transfer ducts).
 - .4 Test/reset button with LED display.
 - .5 The detector housing shall be ULC listed specifically for use in air handling systems; capable of local testing via magnetic switch and test button; duct mounted smoke detector with sampling tube, housing.
 - .6 The detector shall incorporate separate 2.0A 30VDC Alarm and Supervisory contacts. Alarm contacts shall be normally open (N.O.) in which closed contacts will indicate an alarm condition to the fire alarm panel. Supervisory contacts shall be normally closed (N.C.) in which open contacts will indicate a trouble condition to the fire alarm panel.
 - .7 Where the FSD is mounted immediately behind a sidewall grille the smoke detector shall be mounted inside the ductwork to avoid an additional access door beside the grille.
- .7 Damper assembly to operate at 120V with single point power connection.
- .8 Large damper sizes can be provided in multiple sections. Field assembly is acceptable following manufacturer's installation guidelines.
- .9 Fire rating to match wall assembly i.e. 1 hour/1 ½ hour/2 hour/ 3 hour.
- .10 Size: as indicated on drawings.
- .11 Acceptable materials:
 - E H Price
 - NCA Ltd.
 - Nailor Industries Inc.
 - Ruskin
 - Alumavent
 - United Enertech
 - Pottorff
 - Safeair-Dowco (stainless steel)
 - Pottorff

2.3 NUMBER OF AIR TYPE SMOKE DETECTORS

- .1 Where air velocities are greater than 1.5 m/s (300 feet per second), one air duct type detector shall be installed for every 1.5 meters square (16 square feet) of cross-sectional duct area.
- .2 Where air velocities are less than 1.5 m/s (300 feet per second), one duct type smoke detector shall be installed for every 0.5 meters square (5.3 square feet) or cross-sectional duct area.

2.4 PRESSURE RELIEF DOORS

- .1 Frames shall be Z-shape, 12 gage (2.8) galvanized steel.
- .2 Door shall be 12 gage (2.8) galvanized steel, hinged on one side.
- .3 Seal shall be around the door perimeter allowing no more than 7 cfm/ft² at 1.0 inch w.g..
- .4 Door shall include stainless steel springs to close door upon pressure relief and system shutdown.
- .5 All release mechanisms, springs and parts shall be completely out of airstream.
- .6 Pressure relief settings available from 2" (0.5 kPa) to 10" (2.49 kPa) increments of 1" w.g. (0.25 kPa). Supplier shall examine plans to provide appropriate pressure relief based on associated air handling system.
- .7 Pressure relief mechanism shall be factory calibrated in an AMCA Registered Laboratory.
- .8 Pressure Relief Doors shall be provided as indicated in the execution section.

Part 3 Execution

3.1 INSTALLATION

- .1 Provide smoke dampers where indicated and at all duct penetrations through smoke barrier partitions indicated on architectural drawings.
- .2 Provide combination fire and smoke dampers where indicated and at all duct penetrations through fire rated smoke barrier partitions indicated on architectural drawings. To provide separated fire dampers and smoke dampers, obtain approval from the consultant for the alternate arrangement.
- .3 Provide pressure relief doors (both positive and negative as applicable) as follows:
 - .1 For all systems with a combination fire smoke or smoke damper in the duct main of the system when:
 - .1 The system operates at static pressure of 1.0 inches w.g. or higher; and
 - .2 More than 50% of the system airflow passes through the combination fire/smoke or smoke damper.
 - .2 Where/as indicated on the plans.

- .4 Install in accordance with ANSI/NFPA 90A, in accordance with conditions of ULC listing and manufacturer's recommendation.
- .5 Maintain integrity of smoke separation and fire rating.
- .6 After completion and prior to concealment obtain approvals of complete installation from authority having jurisdiction.
- .7 Install access door adjacent to each damper and smoke detector.
- .8 Front grille access for through wall dampers that terminate in a grille is acceptable.
- .9 Provide proper firestopping and duct seal to fire barrier wall.
- .10 Confirm proper operation and test sheets.
- .11 Should contractor provide separated devices mount smoke detector downstream of damper and within 1.5 m (5 ft) of damper.
- .12 Ensure access doors/panels, fusible links, damper actuators and sensors are easily observed and accessible.

3.2 WIRING

- .1 All fire alarm wiring shall be 1 hour rated and in conduit or as per electrical fire alarm wiring requirement.

3.3 CLEANING

- .1 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools, and equipment.

3.4 INTEGRATED LIFE SAFETY SYSTEMS TESTING

- .1 Prior to the building Integrated Life Safety Systems Testing the mechanical contractor shall commission/verify the operation of all installed smoke dampers.
- .2 Participate in the Integrated Life Safety Systems Testing to confirm proper operation of all operating smoke dampers and associated Life Safety Systems (i.e. fire alarm).
- .3 This contractor shall work with the Integrated Life Safety Contractor and reset all systems back into proper operation.
- .4 Include all costs associated with participation Integrated Life Safety System Testing in the tender value.

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 This section applies to operating dampers not specified in Controls Section.

1.2 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

1.3 PRODUCT DATA

- .1 Submit product data in accordance with general requirements.
- .2 Indicate the following:
 - .1 Performance data.

1.4 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

1.5 CERTIFICATION OF RATINGS

- .1 Catalogue or published ratings shall be those obtained from tests carried out by manufacturer or those ordered by him from independent testing agency.

Part 2 Products

2.1 MOTORIZED DAMPERS

- .1 Opposed blade type.
- .2 Extruded aluminum, interlocking blades, complete with extruded vinyl seals, spring stainless steel side seals, extruded aluminum frame.
- .3 Pressure fit self-lubricated bronze bearings.
- .4 Linkage: plated steel tie rods, brass pivots and plated steel brackets, complete with plated steel control rod.
- .5 Operator: Refer to BAS Section.
- .6 Performance:
 - .1 Leakage: in closed position to be less than 2% of rated air flow at 250 Pa (1" w.c.) differential across damper.
 - .2 Pressure drop: at full open position to be less than 10 Pa (0.04" w.c.) differential across damper.

- .7 Insulated aluminum dampers:
 - .1 Frames: insulated with extruded polystyrene foam with R factor of 5.0.
 - .2 Blades: constructed from aluminum extrusions with internal hollows insulated with polyurethane or polystyrene foam, R factor of 5.0.
 - .3 Use on services to the exterior.
- .8 Acceptable materials:
 - Honeywell
 - Johnson
 - T. A. Morrison
 - E.H. Price
 - Tamco
 - Ruskin
 - Nailor
 - Henderson Industrial
 - Ventex/Alumavent
 - Pottorff

2.2 BACK DRAFT DAMPERS

- .1 Automatic gravity operated, multi leaf, aluminum construction with nylon bearings, centre pivoted or counterweighted, as indicated.
- .2 Acceptable materials:
 - T.A. Morrison
 - Tamco Series 7000
 - Ruskin
 - Nailor
 - E.H. Price
 - Henderson Industrial
 - Ventex/Alumavent
 - Pottorff

Part 3 Execution

3.1 INSTALLATION

- .1 Install where indicated.
- .2 Install in accordance with recommendations of SMACNA and manufacturer's instructions.
- .3 Seal multiple damper modules with silicon sealant.
- .4 Install access door adjacent to each damper. See Duct Accessories Section.
- .5 Insulated dampers on all outside air intake and exhaust damper.
- .6 Non-insulated dampers on all interior motorized dampers not exposed to outside air.

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 –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.

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 C1071 Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material).
- .4 ASTM C916 Standard Specification for Adhesive for Duct Thermal Insulation.
- .5 ANSI/NFPA 90A, Installation of Air Conditioning and Ventilating Systems.
- .6 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 Acoustical duct liner to be fibreglass duct liner meeting or exceeding requirements of ASTM C1071, Type I, Flexible or Type II, Rigid, and NFPA 90A/90B.
 - .2 Bonded with formaldehyde free bio-based binder
 - .3 Mat faced airstream surface
 - .4 Factory applied edge coating
 - .5 Shall not contain formaldehyde, PBDE's, asbestos, mercury, mercury compounds, lead, contain 50% or greater recycled glass content.
 - .6 Thermal conductivity, ASTM C177/C518/C1114 .24BTU (sf•hr•°F) @ 75°F mean temp).
 - .7 Noise Reduction Coefficient (NRC) 1.5 PCF 1" = .70, 1 ½ " = .80, 2" =.95
ASTM C423, Type A mounting.
 - .8 Noise Reduction Coefficient (NRC) 2.0 PCF 1/2" = .50, 1" = .70, 1 ½ " = .85
ASTM C423, Type A mounting
 - .9 Corrosiveness/corrosion, ASTM C665/C1617. Does not accelerate/pass.
 - .10 Mold and mildew growth/fungi resistance, ASTM C1338, ASTM G21/G22, UL2824. Pass/resistant to mold.

- .11 Maximum service temperature, ASTM C411, 250°F (121°C).
- .12 Maximum rate air velocity, ASTM C1071, 6,000 ft./min. (30.5 m/sec.)
- .13 Water vapor sorption, ASTM C1104, less than 3%.
- .14 Surface burning characteristics, ASTM E84, UL 273, CAN/ULC S102, 20/50 flame spread/smoke development.
- .15 Acceptable material:
 - .1 Knauf Atmosphere Duct Liner
 - .2 Manson
 - .3 Johns Manville
 - .4 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: 96 kg/m³ (6 lb/ft²).

2.2 ADHESIVE

- .1 Meet requirements of ASTM C916.
- .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 MAIMA Fibrous Glass Duct Liner Standards (FGDLS) or SMACNA duct liner standards.
- .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.
- .7 ANSI/NFPA 96 – Ventilation Control and Fire Protection of Commercial Cooking Operations.

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: Refer to Schedule on drawing.
- .7 Provide factory mounted speed control for all direct drive motors.

2.2 ROOF EXHAUSTERS

- .1 Centrifugal V belt or direct driven as indicated.
 - .1 Housing: spun aluminum complete with resilient mounted motor and fan.
 - .2 Impeller: aluminum non-overloading.
 - .3 Adjustable motor sheave
 - .4 15 mm (1/2") mesh 2.0 mm (79 mil) diameter aluminum birdscreen.
 - .5 Automatic gasketed aluminum backdraft dampers.
 - .6 Disconnect switch within fan housing.
 - .7 Continuous curb gaskets, cadmium plated securing bolts and screw, and sound insulating.
- .2 Roof curbs; of same manufacturer as fan and built to suit model specified.
- .3 Size, type, and capacity: as indicated
- .4 To NFPA 96 requirements where indicated.

2.3 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.

2.4 DRYER BOOSTER FAN

- .1 Provide a fully automatic dryer booster fan where indicated.
- .2 Provide a Fantech DBLT or equal 100 mm (4") paintable galvanized lint trap complete with removable filter and 15 mm flange for flush mounting.
- .3 Fan shall be inline complete with low profile, self cleaning backward inclined impeller and high efficiency motor suitable for 120/1/60.

- .4 Provide a current sensing relay's in electrical junction box on the power feed to the dryer to operate the dryer booster fan in sequence. Dryer and power relay to be ORTECH Amp Sensor Model as without time delay or equal. Co-ordinate installation with the electrical contractor, providing power to the dryer.
- .5 All wiring shall be by Electrical Division.
- .6 Acceptable material: Refer to Schedule on drawing.

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 them 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:
 - .1 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.
 - .1 Refer to Schedule on Drawings.

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.
 - .1 Refer to Schedule on Drawings.

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.
 - .1 Refer to Schedule on Drawings.

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 GRAVITY ROOF OUTSIDE AIR INTAKES AND RELIEF VENTS

- .1 Factory manufactured louvred penthouse.
 - .1 3 mm (1/8") thick stormproof extruded aluminum louvers with mitred corners. Brace and support louvres at 1500 mm (5') intervals.
 - .2 2 mm (0.081") thick insulated aluminum sheet roof.
 - .3 Constructed of 50 mm x 50 mm x 6 mm (2" x 2" x ¼") aluminum angles for roof support and corner angle.
 - .4 15 mm x 15 mm x 0.063 diameter (½" x ½" x 1.6" diameter) intercrimp aluminum screen on back of all sides.
- .2 Provide roof curb sized to suit penthouse or flat or sloped roof as required or indicated. Curb to place bottom louvre minimum 250 mm (10") above roof.
- .3 Maximum throat velocity 3.3 m/s (11 ft/s) intake.

- .4 Maximum loss through unit: 15 Pa (0.06" in w.c.) static pressure.
- .5 Finish: Powder Coated. Color selected by Consultant.
- .6 Shape and size as indicated.
- .7 Acceptable manufacturers:
Greenheck WRH
Nailor 1720
Carnes GLAB
Penn Barry
Ventex
Pottorff

2.2 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 Frame, head, sill and jamb: 50mm (2") deep, 50mm (2") blade centers deep one piece extruded aluminum, minimum 3 mm (1/8") thick with approved caulking slot, integral to unit.
- .5 Mullions: at 1500 mm (60") maximum centres.
- .6 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.
- .7 Screen: 15 mm (1/2") exhaust 20 mm (3/4") intake mesh, 2 mm (5/64") diameter wire aluminum birdscreen on inside face of louvres in formed U-frame.
- .8 Finish: Kynar 500
Colour: to Consultant's approval.
- .9 Acceptable materials:
United Energetech FL-D-2 series
Greenheck
Construction Specialties
E.H. Price
Krueger
Ruskin
Ventmaster
Ventex
Nailor

2.3 BRICK VENTS (FLANGE FRAME)

- .1 Construction: welded with exposed joints ground flush and smooth.
- .2 Material: extruded aluminum alloy 6063-T5.
- .3 Blade: stormproof pattern.
- .4 Perimeter flange frame, head, sill and jamb: 40 mm (1½") 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: 15 mm (1/2") exhaust 20 mm (3/4") exhaust mesh, 2 mm (5/64") diameter wire aluminum birdscreen on inside face of louvres in formed U-frame.
- .7 Finish: Kynar 500
Colour: to Consultant's approval.
- .8 Options:
 - .1 Straight duct extension.
 - .2 Perimeter flange frame.
- .9 Acceptable materials:
Greenheck Model BVF
Construction Specialties
E.H. Price
Krueger
Ruskin
Ventmaster
Ventex
Nailor

2.4 ALUMINUM WALL CAPS (CLOTHES DRYER)

- .1 Application: Clothes dryer or as noted on drawings.
- .2 0.3 mm (16 gauge) aluminum wall sleeve sized as noted on plans.
- .3 0.3 mm (16 gauge) sloping exterior wall cap with integral sides, base plate, and 25 mm (1") perimeter flange with 4-hole screw fasten. Fasteners at each corner.
- .4 Bottom outlet with removable 15 mm x 15 mm (1/2") x (1/2") aluminum screen.
- .5 Neoprene backdraft damper with aluminum crimp on bottom edge.
- .6 Acceptable materials:
 - .1 Reversomatic
 - .2 Broan
 - .3 Ventex
 - .4 Shop fabricated (submit sample for approval).

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 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ASHRAE 84, Method of Testing Air-to-Air Heat/Energy Exchangers.
- .3 AMCA Standard 210, Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating
- .4 ANSI/UL 1995, Heating and Cooling Equipment
- .5 CAN/CSA C22.2 No 236, Heating and Cooling Equipment
- .6 CAN/CSA 439 Laboratory methods of test for rating the performance of heat/energy-recovery ventilators

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with general requirements.
- .2 Indicate following: performance.

1.3 OPERATION AND MAINTENANCE DATA

- .1 Provide operation and maintenance data for incorporation into manual specified in general requirements.

1.4 MAINTENANCE MATERIALS

- .1 Provide maintenance materials in accordance with general requirements.
- .2 Furnish list of individual manufacturer's recommended spare parts for equipment such as bearings and seals, and addresses of suppliers, together with list of specialized tools necessary for adjusting, repairing or replacing, for placement into operating manual.

1.5 MANUFACTURED ITEMS

- .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 GENERAL

- .1 Comply with ASHRAE.
- .2 The energy recovery ventilator shall comply with OBC 6.2.1.6 minimum ERV efficiency and performance. This manufacturer shall provide testing details as part of shop drawing review. ERV to be certified to CSA-C439, including performance with a Station 1 test temperature of -25°C.

2.2 ENERGY RECOVERY VENTILATOR

- .1 Casing: Double wall, 1" insulation, minimum 22 gauge thick pre-painted steel exterior and minimum 22 gauge galvanized steel interior.
- .2 Outdoor application.
- .3 Vertical duct drop configuration.
- .4 Heat transfer surfaces: Enthalpy Core (**polypropylene**).
- .5 Cross contamination: not permitted.
- .6 Removable or hinged access panels.
- .7 Supply and exhaust fans; two ECM motors thermally protected with insulation type B. Motor suitable for 120/1/60.
- .8 Accessories:
 - .1 Defrost cycle and controls (**exhaust only defrost**).
 - .2 MERV 13 filters
 - .3 Mixed air section.
 - .4 Programmable ERV controller (**hand over to Owner**).
- .9 Performance characteristics: as indicated.
- .10 Co-ordinate with BAS contractor for controls requirements.
- .11 Acceptable materials:
 - .1 Aldes
 - .2 Greenheck
 - .3 Ruskin
 - .4 Cook

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with manufacturers recommendations.
- .2 Support independently of adjacent ductwork with flexible connections.
- .3 Install access doors in accordance with Sections for access to coils and dampers.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ANSI/ARI 210/240, Unitary Air-Conditioning, and Air-Source Heat Pump Equipment.
- .3 ARI 270, Standard for Sound Rating of Outdoor Unitary Equipment.
- .4 CSA B52, Mechanical Refrigeration Code.
- .5 CSA C22.1, Canadian Electrical Code, Part 1.
- .6 ANSI/NFPA 90A, Installation of Air Conditioning and Ventilating Systems.
- .7 ANSI/UL 1995, Central Cooling Air Conditioning.

1.2 SHOP DRAWING SUBMISSION/UNIT DELIEVERY REQUIREMENTS

- .1 Shop drawings shall be submitted to the Consultant within two (2) weeks of Award of Contract.
- .2 Shop drawings shall be reviewed/returned by the Consultant within one (1) week of submission.
- .3 Contractor to order equipment from manufacturer immediately upon returned/approved shop drawings.
- .4 This Contractor shall coordinate with the manufacturer to ensure rooftop units equipment is delivered to site (for installation) by July 2024. Include in tender price for premium costs associated with manufacturer's rush/accelerated deliver.
- .5 Rooftop unit shall be 100% operational prior to end of August 2024.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with general requirements.
- .2 Indicate:
 - .1 Equipment, and connections, together with control assemblies, auxiliaries and hardware, and recommended ancillaries which are mounted, wired, and piped ready for final connection to building system, its size and recommended bypass connections.
 - .2 Piping, valves, fitting shipped loose showing final location in assembly.
 - .3 Control equipment shipped loose, showing final location in assembly.
 - .4 Dimensions, internal and external construction details, recommended method of installation with proposed structural steel support, mounting curb details, sizes, and location of mounting bolt holes; include mass distribution drawings showing point loads.

- .5 Detailed composite wiring diagrams for control systems showing factory installed wiring and equipment on packaged equipment or required for controlling devices or ancillaries, accessories, controllers.
- .6 Details of vibration isolation.
- .7 Estimate of sound levels to be expected across each individual octave band in dB referred to A rating.
- .8 Type of refrigerant used.

1.4 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.
- .2 Indicate:
 - .1 Brief description of unit, indexed, with details of function, operation, control, and service for each component.
- .3 Manufacturer's installation instructions shall govern and unless otherwise noted, operation, maintenance, and service of items. Include names and addresses of spare part suppliers.
- .4 Provide for each unit, manufacturer's name, type, year, number of units, and capacity.

1.5 WARRANTY

- .1 Manufacturer hereby warrants refrigeration compressors in accordance with GC 24, but for 5 years.
- .2 Manufacturer hereby warrants the gas heat sections for a minimum of 10 years.

Part 2 Products

2.1 PACKAGED DUAL FUEL ROOFTOP HVAC EQUIPMENT (ELECTRIC HEATPUMP & GAS)

- .1 General:
 - .1 Roof mounted, self-contained single zone unit with gas burner and DX refrigeration in air source heatpump configuration for heating and cooling, and bear label of CSA, CGA, and ULC.
 - .2 Units to consist of cabinet and frame, supply fan, heat exchanger, burner control, air filter, refrigerant heating/cooling coil, compressor, condenser coil and fans, motorized opposed blade outside air damper, return damper, gravity exhaust damper or power exhaust as indicated.
 - .3 Prefabricated roof curb complete with isolation rails (where indicated) to conform to requirements of National Roofing Contractors Association (NRCA), minimum height as indicated.
 - .4 All units shall be of the same manufacturer.

- .2 Cabinet:
 - .1 Cabinets: weatherproofing tested and certified to AGA and soundproofing tested to ARI 270.
 - .2 Framing and supports: 2 mm (14 gauge) thick welded steel, galvanized after manufacture, with lifting lugs.
 - .3 Outer casing: weathertight galvanized steel, bonderized with baked enamel finish, complete with flashing.
 - .4 Access: hinged access doors with **lockable half or quarter turn handles**.
 - .5 Insulation: neoprene coated glass fiber on all surfaces where conditioned air is handled, 1.6 mm (16 gauge) thick, 2.2 kg/m (1.5 lb/ft) density.
- .3 Fans:
 - .1 Centrifugal, forward curved impellers, statically and dynamically balanced. V-belt drive with adjustable variable pitch motor pulley, isolated hinge mounted motor. Vibration isolators: 95% efficiency.
 - .2 Condenser fan shall be direct drive propeller type with aluminum blades riveted to corrosion resistant steel spiders, be dynamically balanced, and discharge air vertically.
- .4 Air Filters:
 - .1 MERV 13 permanent metal framed, replaceable media standard to unit manufacturer.
 - .2 To meet ANSI/NFPA 90A, air filter requirements.
- .5 Heat Exchangers and Burners:
 - .1 Gas fired, multiple flue passes, with primary heating surface of stainless steel; secondary heating surface, stainless steel tubes.
 - .2 Gas burner: factory mounted, wired and fire tested complete with operating and safety controls.
 - .1 Forced type.
 - .2 Spark ignited pilot with pilot flame safety shut-off.
- .6 Refrigeration:
 - .1 Conform to CSA B52 and ANSI/UL 1995 requirements.
 - .2 Compressor/condenser section:
 - .1 Compressors:
 - .1 Unit shall use one fully hermetic, scroll compressor for each independent refrigerant circuit.
 - .2 Provide two (2) stages on units 7.5 tons and larger.
 - .3 Resiliently mount compressors on rubber mounts for vibration isolation.
 - .4 Compressor motors to be cooled by refrigerant gas passing through motor windings.

- .5 Compressors shall be internally protected from high discharge temperature conditions.
- .6 Compressors shall have internal current and temperature protection.
- .7 Compressors shall be isolated from condenser and evaporator air streams.
- .8 Crank case heaters shall be used on all models to protect compressors with specific refrigerant charges.
- .2 Fans: propeller type with single piece spun venturi outlets and zinc plated guards. Motors shall be sequenced for head pressure control.
- .3 Electrical system shall have operating controls, oil and refrigerant pressure protection, motor overload protection, weatherproof electrical wiring with weatherproof, rain tight disconnect.
- .4 Include refrigerant piping with sight glass, filter, and valves.
- .5 Condenser: staggered copper tube aluminum fin coil assembly with sub-cooling rows.
- .6 Refrigerant metering device shall be thermal expansion valve or fixed orifice for cooling, and fixed orifice for heating.
- .7 Capacity reduction: hot gas bypass and or cylinder unloading.
- .8 Refrigerant: R410A.
- .3 Evaporator:
 - .1 Rated to ANSI/ARI 210/240.
 - .2 Thermal expansion valve, with adjustable super heat and external equalizer.
 - .3 Coil: staggered seamless copper tubes expanded into aluminum fins, and insulated condensation pan.
 - .4 Cooling coil condensate drain pans: designed to avoid any standing water, to be easily cleaned or removable for cleaning. Drain connection to have deep seal trap and be complete with trap seal primer.
- .7 Controls and Safeties:
 - .1 Electronic controller.
 - .2 Network monitoring.
 - .3 Scrolling Marquee display.
 - .4 Unit control with standard suction pressure transducers and condensing temperature thermistors.
 - .5 Provide a 5 F° temperature difference between cooling and heating set points to meet ASHRAE 90.1 Energy Standard.
 - .6 Display a current alarm list and an alarm history list.
 - .7 Automatic compressor redundancy.
 - .8 Service run test capability.
 - .9 Shall accept input from a CO₂ sensor (both indoor and outdoor).

- .10 Configurable alarm lights shall be provided which activates when certain types of alarms occur.
- .11 Compressor minimum run time (3 minutes) and minimum off time (5 minutes).
- .12 Service diagnostic mode.
- .13 Self-contained low-voltage control circuit.
- .14 Solid-state compressor lockout which provides optional reset capability at the space thermostat, should any of the following safety devices trip and shut off compressor:
 - .1 Compressor lockout protection provided for either internal or external overload.
 - .2 Low-pressure protection.
 - .3 Freeze protection (evaporator coil).
 - .4 High-pressure protection (high pressure switch or internal).
 - .5 Compressor reverse rotation protection.
 - .6 Loss of charge protection.
- .15 Supply-air sensor located in the unit and detect both heating and cooling operation.
- .16 Induced draft heating section with the following minimum protections:
 - .1 High-temperature limit switch.
 - .2 Induced-draft motor speed sensor.
 - .3 Flame rollout switch.
 - .4 Flame proving controls.
 - .5 Redundant gas valve.
- .17 All control components shall utilize industry standard input/outputs. (i.e., 0-10vDC). Proprietary voltages, communication languages etc. between components is not acceptable.
- .8 Unit Controls:
 - .1 In addition to combustion safety controls, provide low limit on supply.
 - .2 Zone cooling control:
 - .1 Zone sensor or room thermostat to activate cooling relay in control circuit cycling compressor. Provide safeties and pressure controls. Condenser fans to operate in sequence by BAS.
 - .2 When call for cooling is satisfied, relay is de-energized. On two compressor units provide separate circuits to evaporator and condenser and manual double pole double throw switch for lead-lag unit choice.
 - .3 Zone heating control:
 - .1 Adjustable zone sensor or room thermostat controls burner operation, to maintain room temperature setting by BAS.

- .4 Mixed air control:
 - .1 Motorized outside, return and gravity relief dampers with spring return damper operator and control package to automatically vary outside air quantity. Outside air and exhaust air dampers, normally closed.
 - .2 Tight fitting opposed blade dampers with neoprene or suitable gaskets, synthetic bushings and 1% maximum leakage.
 - .3 Damper operation: 24 V, spring return motor with gear train sealed in oil.
 - .4 Mixed air controls: maintain 14°F (57°F) mixed air temperature, lock out compressor below 10°C (50°F) ambient, restart 15°C (59°F), revert dampers to provide 25% fresh air above 21°C (70°F) adjustable.

2.2 SYSTEM CONTROL

- .1 Equipment control will be by the unit manufacturer and integral economizer controls.
- .2 System controls will be by Building Automation System Contractor.

2.3 CAPACITY

- .1 As indicated.

2.4 ACCESSORIES

- .1 600 mm (24") high roof curb.
- .2 Stainless steel flue gas extension kit.
- .3 Direct drive fans.
- .4 Premium efficiency motors.
- .5 Field installed disconnect and GFI provided by Electrical Division and installed by this contractor.
- .6 Opposed blade economizer dampers.
- .7 Condenser coil hail guard.
- .8 Stainless steel heat exchanger.
- .9 Free cooling economizer/CO2 controlled by BAS system.
- .10 MERV 13 filters.
- .11 Integral vibration isolation.
- .12 Dynamically balanced fans and drives.
- .13 Hinged access doors with lockable half or quarter turn handles. 2" padlock latches provided by Owner and installed by this contractor.

2.5 ELECTRICAL REQUIREMENTS

- .1 As indicated.
- .2 Field installed devices.
 - .1 Provide all field installed wiring required for all units that are equipped with power exhaust. Provide transformers as required.
- .3 Mount all accessories shipped loose onto the units.

2.6 ACCEPTABLE MATERIALS

- .1 Refer to schedule on drawing.

Part 3 Execution

3.1 INSTALLATION

- .1 Install as per manufacturers' instructions on roof curbs provided by manufacturer as indicated. Provide all necessary continuous wolvanized wood blocking to install roof curb level complete with 20 gauge liner to ensure combustible wood blocking is not exposed in the building.
- .2 Manufacturer to certify installation, supervise start-up and commission unit.
- .3 Run drain line from cooling coil condensate drain pan to discharge on roof.

3.2 START-UP/COMMISSIONING

- .1 Unit manufacturer shall perform start-up and commissioning.

3.3 WARRANTY

- .1 Refer to front end documentation.

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 Conform to general provisions for mechanical division in General Requirements section.

1.2 SUBMITTAL

- .1 Submit shop drawings and product data in accordance with general requirements,
.2 Indicate the following: complete specifications, wiring diagrams (showing all interconnections); weight; performance details.
.3 Provide data for inclusion in the Operating and Maintenance manuals in accordance with general requirements,

1.3 SHOP DRAWING SUBMISSION/UNIT DELIVERY REQUIREMENTS

- .1 **Shop drawings shall be submitted to the Consultant within two (2) weeks of Award of Contract.**
.2 **Shop drawings shall be reviewed/returned by the Consultant within one (1) week of submission.**
.3 **Contractor to order equipment from manufacturer immediately upon returned/approved shop drawings.**
.4 **This Contractor shall co-ordinate with the manufacturer to ensure unit ventilator equipment is delivered to site (for installation) by July 2024. Include in tender price for premium costs associated with manufacturer's rush/accelerated delivery.**
.5 **Unit ventilators shall be installed and 100% operational prior to end of August 2024.**

Part 2 Products

2.1 UNIT VENTILATOR

- .1 Exterior cabinet panels shall be constructed of heavy gauge steel. Units shall be constructed such that testing and trouble-shooting can be accomplished in the end pockets of the unit without affecting the normal airflow pattern through the unit.
.2 Floor mounted units shall have an integral pipe tunnel for convenient crossover of piping or electrical wiring in accordance with local and National Electric Codes (NEC). The front surface shall consist of three separate, removable panels. Control compartment must be accessible without removing the entire front panel. Unit discharge grille shall be welded continuous bar type with round edged steel bars placed for a 10° vertical deflection. Adjustable side deflection vanes shall be located beneath the continuous bar grille for easy adjustment by maintenance personnel]. A 6 mm (1/4") painted galvanized mesh screen shall be furnished and located beneath the discharge grille. Unit top surface shall be supplied with a textured paint surface that resists scuffing and hides fingerprints.

Overall unit depth shall be 550 mm (21 7/8").

- .3 Motors shall be direct drive electronically commutated motors (ECM) and be mounted on rubber isolation. Blowers shall be designed specifically for unit ventilator operation. ECM motors shall be programmed to meet the scheduled airflow at the specified external static pressure with additional speed taps for manual adjustment on site during balancing. Motors shall consist of a brushless, permanently lubricated ball bearing construction for maintenance free operation.
- .4 Hydronic coils are to be constructed with copper tubes and mechanically bonded aluminum corrugated plate fins. Water coils shall be furnished with a threaded drain plug at the lowest point. A manual air vent shall be provided at the high point of the coil on all floor mounted units. An auto air vent shall be provided at the high point of the coil on all ceiling mounted units. Direct expansion coils (DX) - all DX coils must be supplied with a factory installed thermal expansion valve. The expansion valve must be sized for the manufacturer's matching remote condensing unit.
- .5 Air Cooled Condensing Units - The unit ventilator manufacturer shall provide remote air cooled condensing units where indicated on plans. The outdoor unit shall be factory precharged and shall be design matched to the indoor unit.

The installing contractor shall provide and install between indoor and outdoor unit the interconnecting refrigerant tubing of the size recommended by the unit manufacturer. The installing contractor shall evacuate the indoor coil and interconnection tubing and charge the system in accordance with manufacturer's instructions.

Condensing unit shall have corrosion resistant cabinet, with hermetically sealed compressor with internal spring isolation, external isolation, permanent split capacitor motor and overload protection, copper tube aluminum fin condenser coil, direct drive propeller fan with permanently lubricated ball bearing single phase motor with internal overload protection.

- .1 Acceptable manufacturers:

Daikin

Trane

Mitsubishi

- .6 Microprocessor-based control for each unit ventilator that must be adaptable to future network system. This control must be pre-engineered, preprogrammed and pretested and shall be factory installed before shipment. The microprocessor-based control shall monitor room conditions and automatically adjust unit operations to maintain these requirements. The control sequence shall be on the basis of [ASHRAE Cycle II. The manufacturer shall provide this DDC controller in each unit ventilator. Control shall modulate remote 3-way heating valve and sequence condensing unit to maintain setpoint.

The direct digital controller shall have the following tenant adjustments as an integral part of the device: room temperature setpoint, minimum percent outdoor air setting, and unoccupied setpoint (offset). Each controller shall be furnished with an LED status/fault indicator on board and a communication port to allow monitoring and adjustment from a portable computer.

- .7 Ecomomizer Operation: The unit shall have the capacity for 100% outdoor air when outdoor conditions allow. Provide power vent operation.
- .8 Separate room air and outdoor air dampers. The room air damper shall be constructed of aluminum and shall be counterbalanced against back pressure. Outdoor air damper shall be two-piece double wall construction with 15 mm (1/2") thick, 1.5 lb. density fiberglass insulation sandwiched between welded 1.0 mm (20 Ga.) galvanized steel blades for rigidity and to inhibit corrosion. Dampers shall be fitted with blended mohair seals along all the sealing edges. Damper bearings shall be made of nylon or other material which does not require lubrication. Dampers shall be factory mounted complete with modulating spring return damper actuator for proportional damper control.
- .9 Integral factory installed face and bypass damper. The face and bypass damper shall be constructed of aluminum and have a dead air space to minimize pickup in the bypass position. The long sealing edges of the damper shall be fitted with silicone rubber impregnated glass cloth seals with blended mohair seals on the ends for long life and positive sealing.
- .10 Drain pan constructed of stainless steel and shall be insulated. A drain outlet shall be provided on both ends of the pan with one outlet capped. The drain hand of connection shall be easily field-reversed by relocating the cap to the opposite end.
- .11 Filters shall be MERV 13.
- .12 External intake louvers will be separately supplied by the mechanical contractor.
Louvers shall have 2" blade centers.
- .13 External decorative aluminum wall grille will be separately supplied by the mechanical contractor. Wall grille shall be of heavy gauge with rectangular holes to match louver blade spacing.
- .14 Unit manufacturer shall provide an external wall louvre for the outdoor air intake. The louvre and frame shall be of heavy gauge aluminum with 45 deg. blades. The blade profile shall be designed to prevent water penetration. The louvre shall have 1/2" birdscreen attached to the inner face and shall have a minimum free area of 1.1 sq. ft. The finish on the louver shall be: mill finish / primer coat / a color as per Architect's instruction.
- .15 Unit manufacturer shall provide a decorative exterior aluminum wall grille constructed of heavy gauge aluminum with rectangular holes to match louvre blade spacing to maximize the air opening. Grille to be secured to wall louvre/ exterior wall. The grille finish shall match the louvre above.
- .16 All internal line voltage wiring shall be by the unit manufacturer.
 - .1 A suitably rated unfused disconnect switch shall be factory installed within the unit.

- .17 Control Components
 - .1 Provide terminal strip (“digital-ready”) for standard electric/mechanical controls per Energy Controls.
- .18 Unit capacity: As indicated.
- .19 Acceptable manufacturers:
 - Daikin
 - Trane
 - Engineered Air

2.2 SYSTEM CONTROL

- .1 Equipment control will be by the BAS system. Coordinate with controls contractor.

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with manufacturer’s instructions.
- .2 Install equipment exposed to finished areas after walls and ceiling are finished and painted. Avoid damage.
- .3 Protection: Provide finished cabinet units with protective covers during balance of construction.
- .4 Unit Ventilators: Locate as indicated, level and shim units, and anchor to structure. Coordinate with existing wall louvre and radiation cabinet. Adjust existing adjacent surfaces as required for a complete finished installation.
- .5 Hydronic Units: Install with shut-off valve on supply and lockshield balancing valve on return piping. If not easily accessible, extend vent to exterior surface of cabinet for easy servicing.
- .6 Connect drain pan to condensate drain. **Provide condensate pump as required to ensure drain termination through wall is above grade.**
- .7 Provide refrigerant piping, refrigerant accessories and refrigerant from condensing unit to DX coil.
- .8 The mechanical contractor shall charge the refrigeration system after installation and ensure that the cooling system is operating correctly.

3.2 START UP AND INSTRUCTION

- .1 Unit Manufacturer shall provide start up and instruction to the owner and the installer.

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with general requirements.
- .2 Indicate:
 - .1 Equipment, capacity, piping, and connections.
 - .2 Dimensions, internal and external construction details, recommended method of installation with proposed structural steel support, sizes and location of mounting bolt holes.
 - .3 Special enclosures.
- .3 Primer coat to be off white.
- .4 All hydronic heating shall be by a single manufacturer.

1.2 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

Part 2 Products

2.1 DAMPERS

- .1 Factory built, internal damper, complete with operator, at enclosure air outlet grille for each convection type heating unit not thermostatically controlled. Refer to schedules on drawings.

2.2 CAPACITY

- .1 As indicated.

2.3 EXISTING WALL FIN AND CABINET RADIATION (H-EX)

- .1 Remove existing cover, vacuum existing fin and components.
- .2 Replace damaged components including but not limited to hangers, wall mounting brackets.
- .3 Replace existing control valve where installed and ensure operation.
- .4 Replace isolating valves as indicated.
- .5 Replace existing cabinet. Provide new filler pieces etc., to match existing cabinet.

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with manufacturer's instructions.
- .2 Install in accordance with piping layout and reviewed shop drawings.
- .3 Provide for pipe movement during normal operation.
- .4 Maintain sufficient clearance to permit performance of service maintenance.
- .5 Check final location with Consultant if different from that indicated prior to installation. Should deviations beyond allowable clearances arise, request and follow Consultant's directive.
- .6 Valves
 - .1 Install valves with stems upright or horizontal unless approved otherwise.
 - .2 Install isolating gate valves on inlet and balancing valves on outlet of each unit.
- .7 Venting:
 - .1 Install screwdriver vent on cabinet convector, terminating flush with surface of cabinet.
 - .2 Install standard air vent with cock on continuous finned tube radiation.
- .8 Clean finned tubes and comb straight.
- .9 Install flexible expansion compensators as indicated.
- .10 Mount wall mounted convectors at 200 mm (8") above finish floor.
- .11 Mount wall mounted radiation at 200 mm (8") above finish floor unless otherwise indicated.
- .12 On units fed from below floor provide factory manufactured piping shrouds on the exposed piping between base of the radiation cabinet and finished floor. Shroud shall be manufactured by the radiation manufacturer. Shroud shall match finish of the radiation cabinet.

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 VVT zone control dampers shall be supplied by this trade but 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 SCOPE OF WORK

- .1 Refer to drawings and specification for complete scope.
- .2 Removing existing Pneumatic controls and replace with new DDC controls in areas of work.
- .3 Provide control for new Package Roof Top unit with VVT system.
- .4 Provide new VVT dampers for existing Library rooftop unit.
- .5 Provide control for new ERV.
- .6 Add single ceiling exhaust fan in Staff Washroom 114, BF Washroom 113, and storage room in Communication Tech.
- .7 Convert existing HVAC Unit 21 from constant volume to VVT serving the library and classroom.
- .8 Provide vertical unit ventilator in Spec Ed Classroom 101 including heating and cooling and free cooling.
- .9 Provide horizontal unit ventilator in Classroom 1307 and 1309 to include heating and cooling and free cooling.

- .10 Provide new NFPA and MUA to Server Kitchen. Converting existing HVAC Unit 23 from constant volume to VVT serving the Kitchen and Cafeteria.
- .11 Provide new ERV, collecting exhaust and return air, and supply new team room and future basement CrossFit Room.
- .12 Provide general exhaust fan serving future basement CrossFit Room.
- .13 Provide general exhaust fan serving Teams Room.
- .14 Provide new HVAC-28 VVT system serving Communication Technology 1306, Elect AV., and office.

1.5 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.

1.6 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 MOTORIZED CONTROL DAMPERS

- .1 Control dampers shall be the parallel or opposed blade type as below or as scheduled on drawings.
 - .1 Outdoor and/or return air mixing dampers and face and bypass (F & BP) dampers shall be parallel blade, arranged to direct air-streams toward each other.
 - .2 Other modulating dampers shall be the opposed blade type.
 - .3 Two-position shutoff dampers may be parallel or opposed blade type with blade and side seals.
- .2 Damper frames shall be 13 gauge galvanized steel channel or 1/8 in. extruded aluminum with reinforced corner bracing.
- .3 Damper blades shall not exceed 20 cm (8 in.) in width or 125 cm (48 in.) in length. Blades are to be suitable for medium velocity performance (10 m/s [2000 fpm]). Blades shall be not less than 16 gauge.
- .4 Damper shaft bearings shall be as recommended by manufacturer for application, oil impregnated sintered bronze or better.
- .5 All blade edges and top and bottom of the frame shall be provided with replaceable butyl rubber or neoprene seals. Side seals shall be spring-loaded stainless steel. The blade seals shall provide for a maximum leakage rate of 50 L/s m² (10 cfm per ft²) at 1000 Pa (4 in. w.g.) differential pressure. Provide air foil blades suitable for a wide-open face velocity of 7.5 m/s (1500 fpm).

- .6 Individual damper sections shall not be larger than 125 cm x 150 cm (48 in. x 60 in.). Provide a minimum of one damper actuator per section.
- .7 Modulating dampers shall provide a linear flow characteristic where possible.
- .8 Dampers shall have exposed linkages.

2.8 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.

2.9 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.

2.10 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 from 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

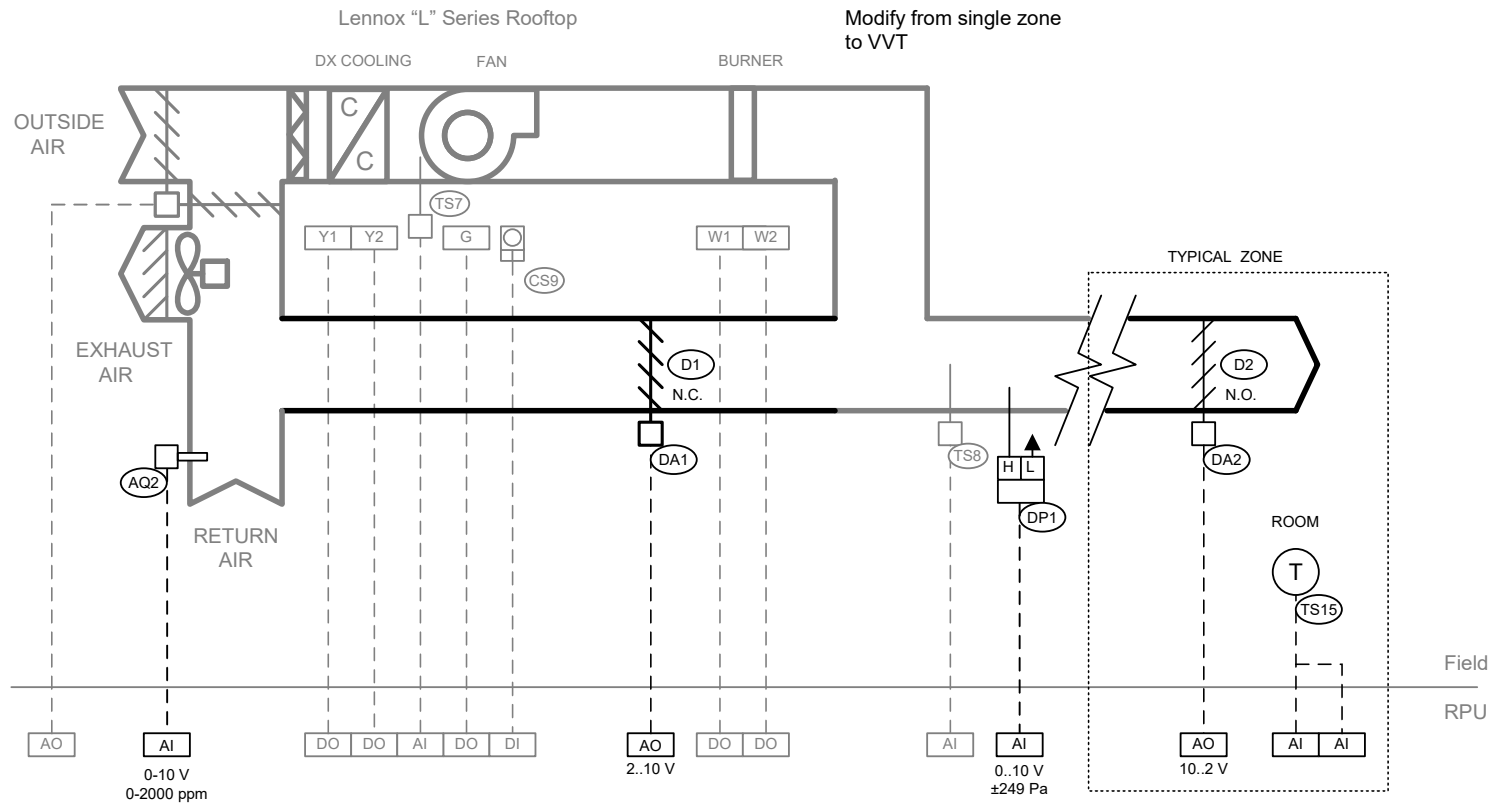
- .1 All setpoints shall be adjustable.
- .2 Outdoor air temperature shall be broadcasted to all controllers.
- .3 Heating mode: Heating is enabled between October 15 and April 15 or if the outdoor air temperature is below 10°C. This heating mode is used in all controllers for the building. Wall fin radiation or convector hydronic heating shall be first source of heating. If space temperature is not satisfied than Unit ventilator hydronic heat or Rooftop Unit gas heat shall be second source of heating.

- .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

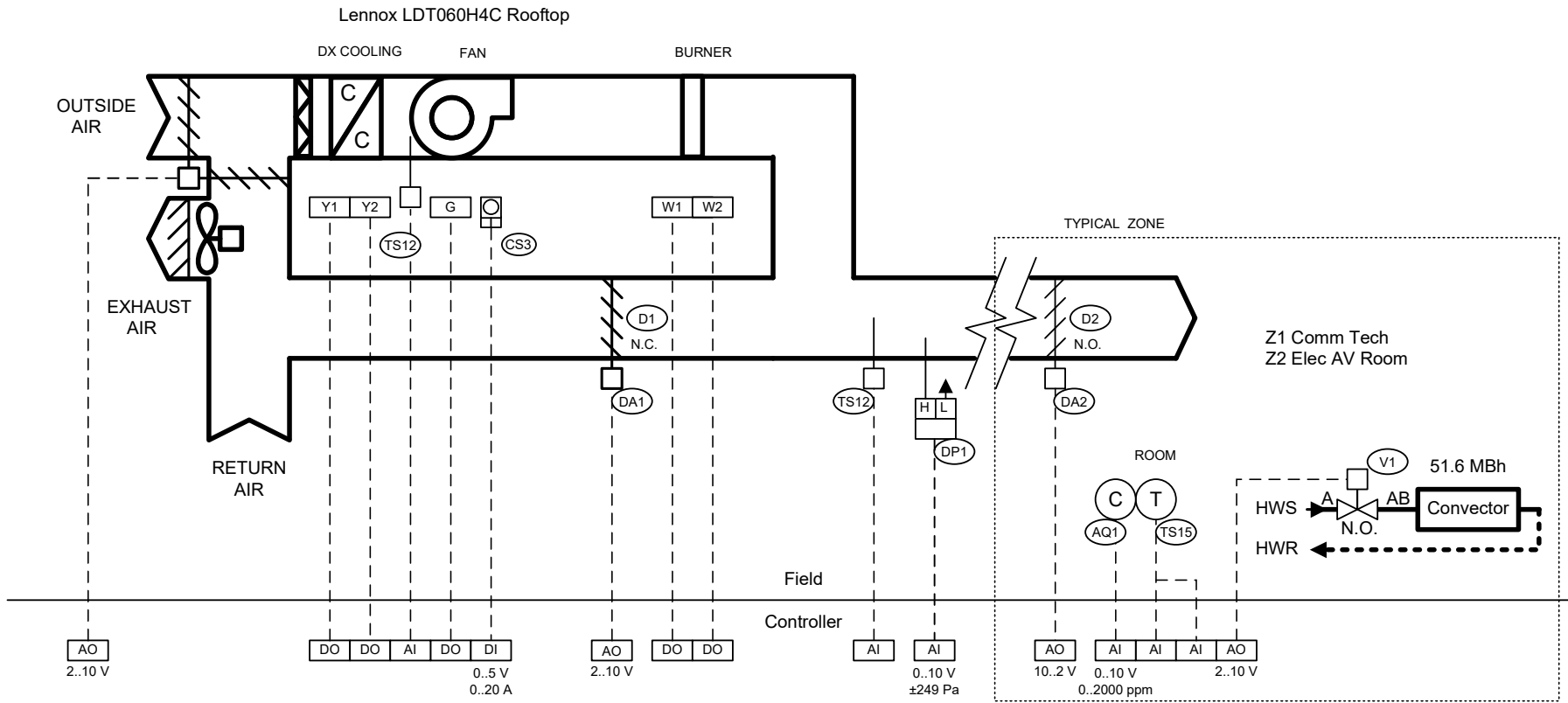
- .1 See the graphical sequence of operations attached (for reference only) to the end of this specification for equipment and systems. Please note that this is not complete representation of all equipment's and system. Control's contractor to review all drawings and specification and provide complete controls and sequence.

END OF SECTION



| UNIT | SERVES | SUPPLY CFM | ZONES | STAGES CLG. | STAGES HEATING | POWER EXHAUST | PERIMETER RAD. | RPU | STATIC SP | NOTES |
|---------|---------|------------|-------|----------------|-------------------|------------------|----------------|-----|-----------|------------------------------------------------------------|
| HVAC-21 | Library | 5000 | 2 | 2 | 2 | Yes | None | 21 | 55/45 Pa | Lib. Office #1 Office 109A Ex. FC14.2? Ex. 19.3 |

| | | | | |
|--------|----------------------------------------------------|-----------|-----------------------------------|---|
| Job #: | Owner: Waterloo Region District School Board | Drawn By: | Title: HVAC-21 Library VVT | 1 |
| | | | | |



| UNIT | SERVES | SUPPLY (cfm) | ZONES | STAGES CLG | STAGES HTG | POWER EXHAUST | PERIMETER RAD. | Controller | STATIC SP | NOTES |
|---------|-----------|-----------------|-------|---------------|---------------|------------------|----------------|------------|-----------|-----------------------------|
| HVAC-28 | Comm Tech | 2700 | 2 | 2 | 2 | Yes | Z1 | TBA | 55/45 Pa | Z1 has a UH near Teams Room |

| | | | | |
|--------|----------------------------------------------------|-----------|--------------------------------------|---|
| Job #: | Owner: Waterloo Region District School Board | Drawn By: | Title: Miscellaneous Controls | 2 |
| | | | | |

SEQUENCE OF OPERATION

UNOCCUPIED MODE

The supply fan is off, the power exhaust fan is off (where applicable), the mixing dampers are in the 0% outside air position, the heating is off and the cooling is off. The bypass damper is in the 100% open position. The zone dampers are in the 50% open position. The system cycles on a call for unoccupied heating, with the supply air static pressure setpoint increased by 20%. If the override pushbutton is pressed, the system will switch to the occupied mode for 2 hours (adjustable).

OCCUPIED MODE

Fan Operation

The supply fan operates continuously. An optimized start routine is provided for heating and cooling.

Zone Damper

The room sensor modulates the zone damper between min. and max. settings to maintain setpoint. The setpoint is adjustable +/-1°C at the sensor. The control is reverse acting when the supply air temperature is more than 1°C above room temperature and direct acting when the supply air temperature is more than 1°C below room temperature. If the system mode is different from the zone mode (e.g. system is in heating mode but zone requires cooling), the zone damper closes to a reduced minimum position to minimize overheating/overcooling.

System Heating/Cooling Decision Process

The rad valves, where equipped, are modulated as the first stage of heat. The system mode is determined by the number of zones that deviate from their respective zone heating/cooling setpoints. If the total number of zones requesting heating outnumber (or are equal to) the total number of zones requesting cooling, the system will go to heating mode. If the total number of zones requesting cooling outnumber the total number of zones requesting heating, the system will go to cooling mode. Once in the heating or cooling mode, the reference zone becomes the zone with the greatest call. The system will lock-in the selected mode until all zones are satisfied. If any zone is deprived of ventilation air for more than 20 minutes, the system will "unlock", go into forced ventilation mode for 5 minutes, and then reselect the required mode of operation. Zones designated as "slave zones" (typically corridors) cannot request heating or cooling, but will utilize heating/cooling when it is available.

Ventilation Mode

The system operates in ventilation mode (no heating or cooling) under the following conditions:

- 1) No zones are calling for heating or cooling.
- 2) System is switching between heating and cooling (system operates in ventilation mode for 5 minutes).
- 3) One or more zones have been operating at a reduced min. position for more than 20 minutes (system operates in forced ventilation mode for 5 minutes).

System Heating Control

Stage 1 and stage 2 heating are controlled from the reference zone as follows:

Reference Zone Call for Heat

| | |
|-------------|-------|
| Stage 1 On | 1.0°C |
| Stage 1 Off | 0.5°C |
| Stage 2 On | 1.5°C |
| Stage 2 Off | 1.0°C |

System Cooling Control

Stage 1 and stage 2 cooling are controlled from the reference zone as follows:

Reference Zone Call for Cooling

| | |
|-------------|-------|
| Stage 1 On | 1.2°C |
| Stage 1 Off | 0.5°C |
| Stage 2 On | 1.5°C |
| Stage 2 Off | 0.9°C |

| | | | | | |
|--|---------------------------------------------|------------------------------------------|------------------------------------|-----------------------------------------------------------|---|
| | Job #: | Owner: | Drawn By: | Title: HVAC-21 Sequence of Operation (Part 1 of 2) | 3 |
| | Job Name: Elmira D.S.S. 2024 Renovations | Waterloo Region District School Board | Revision Date: January 22, 2024 | | |

SEQUENCE OF OPERATION (CONTINUED)

Economizer Operation

Economizer operation will be substituted for first stage cooling when the outside air temperature is suitable. For units with power exhaust, the exhaust fan runs when the outside air damper is more than 50% open. The CO₂ sensor acts as a high limit and will increase the amount of minimum outside air as the CO₂ level increases from 1000 ppm to 1200 ppm. During morning warm-up or cool-down the outside air minimum position is set to zero.

Bypass Operation

The supply air static pressure sensor modulates the bypass damper between minimum and maximum settings to maintain setpoint.

Limits & Safeties (VVT ver. 3)

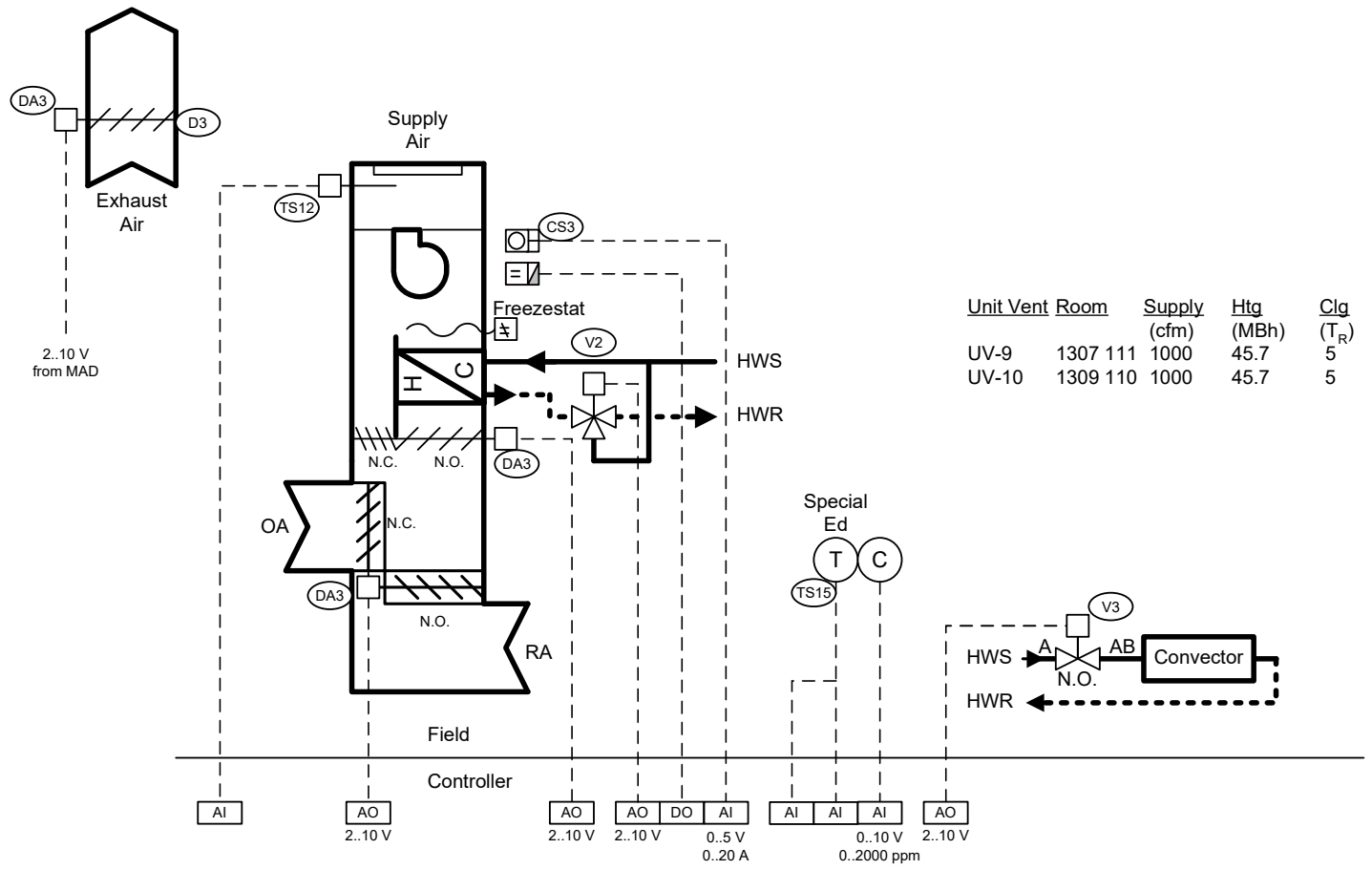
- 1) If the outside air temperature exceeds the average zone temperature, the mixing dampers return to minimum outside air position.
- 2) The maximum amount of outside air is limited based on the outside air temperature to prevent excessively low supply air temperatures during startup.
- 3) The mixed air temperature sensor acts as a low limit to ensure temperature does not fall below setpoint. In applications where the mixed air sensor is located after the DX coil, the setpoint is reduced when DX cooling is enabled.
- 4) The supply air temp. sensor acts as a high limit for heating (70/55°C, 60/45°C) and a low limit for cooling (5/10°C, 8/13°C).
- 5) The supply air temperature sensor acts as a software freezestat (1/5°C, 3 min. delay, auto reset after 5 min. delay).
- 6) The supply fan has a delay-off time of 90 seconds.
- 7) DX cooling has a minimum-off time of 5 minutes.
- 8) DX cooling is disabled when the outside air temp. is below the global DX disable setpoint or when the fan is off.
- 9) Gas heating is disabled when the outside air temp. is above the global heating disable setpoint or when the fan is off.
- 10) Stage 1 gas heating has a minimum run time of 3 minutes.
- 11) During ventilation mode, if the supply air temperature falls below 15°C for more than two minutes, stage 1 heating will turn on until the temperature exceeds 25°C (to improve comfort).
- 12) The default zone setpoint is increased by 1°C when mechanical cooling is enabled (providing heating is disabled).
- 13) When the ventilation lockout switch is engaged, the outside air dampers close, and the system switches to unoccupied mode of operation.
- 14) Minimum outside air is set to zero when the global ventilation schedule is off (stand-by occupancy).

Alarms

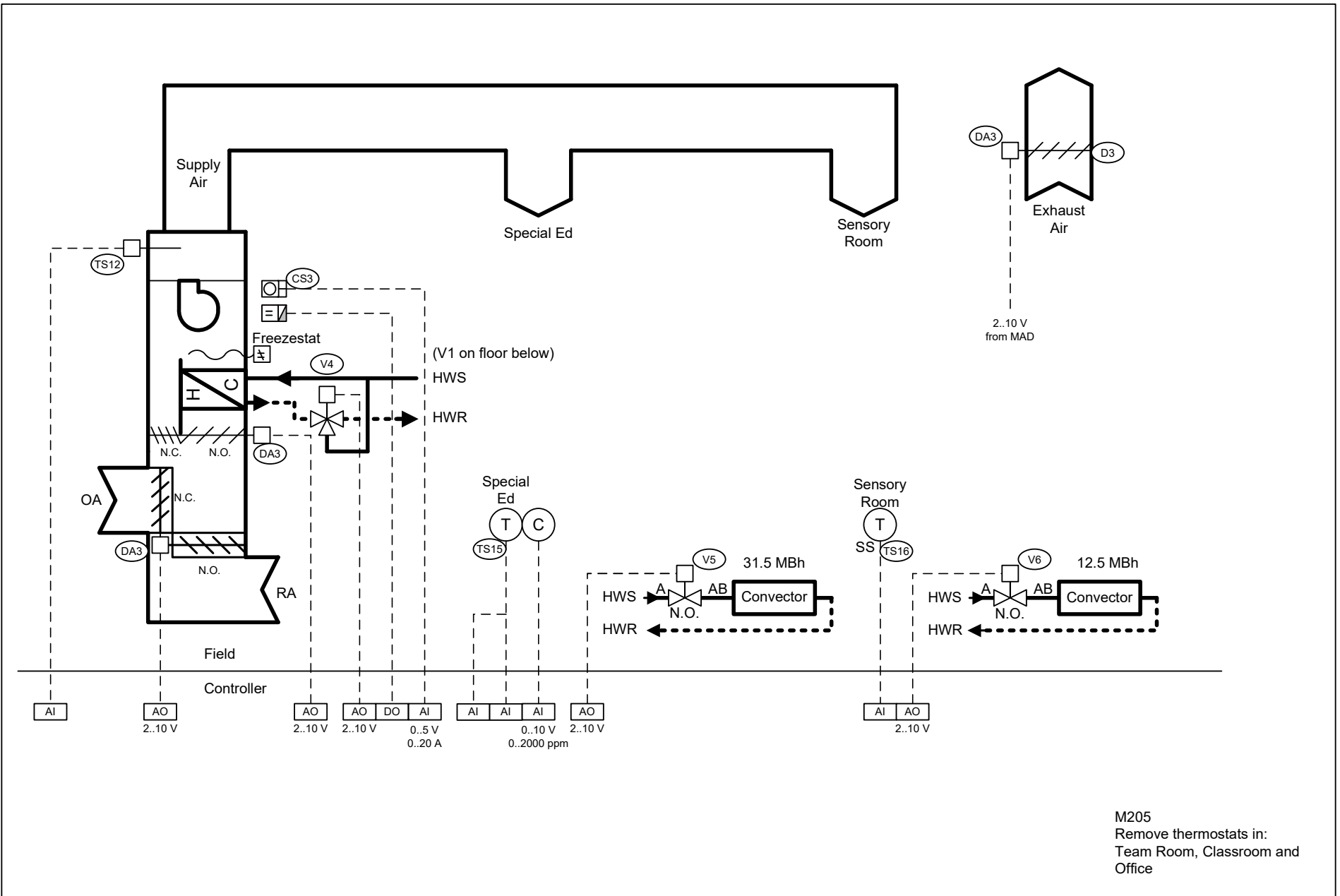
An alarm will be generated upon the following conditions:

- 1) Fan status does not match start/stop signal.
- 2) Mixed air temperature too high (50/48°C) or too low (5/7°C).
- 3) Supply air temperature too high (65/60°C) or too low (5/7°C).
- 4) Space temperature too high (42/40°C) or too low (14/15°C).
- 5) Supply air static pressure too low (10/15 Pa) or too high (240/220 Pa).
- 6) Weekly fan runtime limit exceeded.
- 7) Return air CO₂ too high (1700/1600 ppm) or too low (250/300 ppm).
- 8) Software freezestat tripped.

| | | | | | |
|--|---------------------------------------------|------------------------------------------|------------------------------------|-----------------------------------------------------------|---|
| | Job #: | Owner: | Drawn By: | Title: HVAC-21 Sequence of Operation (Part 2 of 2) | 4 |
| | Job Name: Elmira D.S.S. 2024 Renovations | Waterloo Region District School Board | Revision Date: January 22, 2024 | | |



| | | | | |
|------------------------------------------|----------------------------------------------|---------------------------------|-----------------------------------------|---|
| Job #: | Owner: Waterloo Region District School Board | Drawn By: | Title: Unit Vents UV-9 and UV-10 | 5 |
| Job Name: Elmira D.S.S. 2024 Renovations | | Revision Date: January 22, 2024 | | |



| | | | | | |
|--|-------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|-----------------------------------------------------------------|---|
| | Job #: Job Name: Elmira D.S.S. 2024 Renovations | Owner: Waterloo Region District School Board | Drawn By: Revision Date: January 22, 2024 | Title: Unit Vent UV-11 Special Ed Class 101 | 6 |
|--|-------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|-----------------------------------------------------------------|---|

Sequence of Operation

Unoccupied Mode

The fan is off, the mixing dampers are in the 100% recirculation position and the face & bypass damper is in the face position. The rad valves modulate and as second stage, the fan cycles with heating to maintain the night setback setpoint. If the pushbutton on the room temperature sensor is pressed, the system will revert to occupied mode for a period of two hours.

Occupied Mode

An optimized start routine for heating calculates the system start time. The fan runs continuously. Fan status is monitored by a current switch. The room temperature sensor controls the mixing dampers (for free cooling), the DX cooling, the rad valves and face and bypass dampers (for heating) in sequence to maintain setpoint. The setpoint can be adjusted +/-2°C at the room sensor.

Limits and Safeties

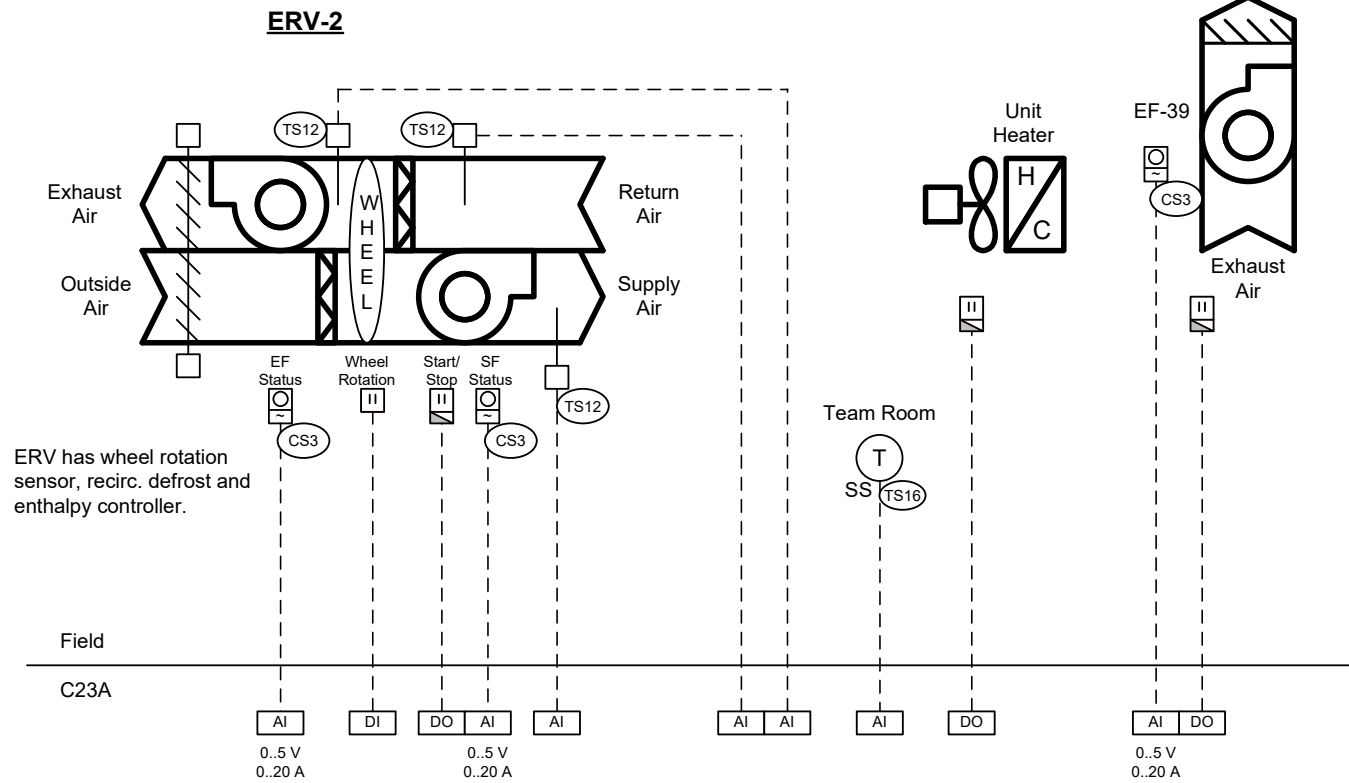
- 1) The supply air temperature sensor acts as a low limit to open the face and by-pass damper as required to maintain setpoint that is reset from outside air temperature.
- 2) The mixed air damper minimum position control is provided during occupied periods.
- 3) If the outside air temperature exceeds the space temperature, the mixing dampers return to minimum position.
- 4) The supply air temperature sensor acts as a low limit for mixing dampers to ensure temperature does not fall below setpoint.
- 5) If the supply fan is off, the mixing dampers return to the 100% recirculation position.
- 6) If the hot water heating supply water temperature is below 40°C, and the outside air temperature is below 4°C, the UV turns off.
- 7) The supply air temperature sensor acts as a software freezestat, and will shut down the system if the temperature falls below 2°C for more than 30 seconds (5 minute delay on auto-reset).

Alarms

An alarm is indicated at the operator's terminal if any of the following occur:

- 1) Fan status does not match fan start/stop signal.
- 2) Low room temperature (14/16°C or high room temperature (36/34°C).
- 3) Low supply air temperature (8/10°C) or high supply air temperature (65/55°C).
- 4) Software freezestat tripped.

| | | | | | |
|--|---------------------------------------------|------------------------------------------|------------------------------------|----------------------------------------------------|---|
| | Job #: | Owner: | Drawn By: | Title: Unit Vents Sequence of Operation | 7 |
| | Job Name: Elmira D.S.S. 2024 Renovations | Waterloo Region District School Board | Revision Date: January 22, 2024 | | |



| UNIT | Air Flow (cfm) | Aldes | RPU | Notes |
|-------|-------------------|-------|-----|--------------------|
| ERV-2 | 1200 | PW30 | TBA | Team Rm & Crossfit |

| | | | | |
|---------------------------------------------|----------------------------------------------------|------------------------------------|-------------------------------|---|
| Job #: | Owner: Waterloo Region District School Board | Drawn By: | Title: Team Room 2 106 | 8 |
| Job Name: Elmira D.S.S. 2024 Renovations | | Revision Date: January 22, 2024 | | |

SEQUENCE OF OPERATION

Unoccupied Mode

The ERV exhaust fan is off, supply fan is off, heat wheel is off and the dampers are closed. The Unit heater is cycled to maintain the unoccupied heating setpoint and the exhaust fan EF-39 is off.

Occupied Mode

The ERV supply and exhaust fans run continuously when the ventilation time schedule is on. The heat wheel operates from internal controls. The Unit heater is cycled to maintain the occupied heating setpoint and the exhaust fan EF-39 is cycled to maintain the cooling setpoint which is 2°C higher than the heating setpoint.

Limits & Safeties

- 1) The ERV has internal frost controls (exhaust fan stops, supply fan recirculates air) and enthalpy controller.
- 2) The supply air temperature sensor acts as a software freezestat (-1/5°C, 3 minute delay, auto reset after 5 minute delay).
- 3) The fans stop on a fire alarm condition.
- 4) The ERV cycles off for 5 minutes if the room temperature falls below 17°C.

Alarms

An alarm will be generated upon the following conditions:

- 1) ERV supply fan or exhaust fan in incorrect state.
- 2) ERV supply air temperature too high (35/33°C) or too low (1/3°C).
- 3) ERV return air temperature too high (40/38°C) or too low (14/16°C).
- 4) ERV exhaust air temperature too high (40/38°C) or too low (-5/-3°C)..
- 5) Fan runtime exceeded weekly setpoint.
- 6) Wheel rotation in incorrect state.
- 7) Room temperature too high (38/36°C) or too low (14/16°C).

| | | | | | |
|--|---------------------------------------------|------------------------------------------|------------------------------------|---------------------------------------------------------|---|
| | Job #: | Owner: | Drawn By: | Title: Team Room 2 106 Sequence of Operation | 9 |
| | Job Name: Elmira D.S.S. 2024 Renovations | Waterloo Region District School Board | Revision Date: January 22, 2024 | | |

24-7517-RFT - Elmira District Secondary School Special Education and HVAC Upgrades

Opening Date: March 1, 2024 3:00 PM

Closing Date: March 21, 2024 2:00 PM

Schedule of Prices

* Denotes a "MANDATORY" field

Do not enter \$0.00 dollars unless you are providing the line item at zero dollars to the Board.

Bid Price Form

The amounts stipulated on the Bid Price Form(s) are intended to cover the cost of the complete Work as described in this Procurement and must remain fixed and firm for the term of the Contract unless otherwise specified in this Procurement.

All prices shall be in Canadian Funds, Free On Board (FOB) Destination, and Freight Prepaid (Board locations). and shall be exclusive of Harmonized Sales Tax (HST) but shall include all materials, labour, equipment, disbursements, expenses, insurance, bonding, customs charges, freight, shipping and handling costs, travel costs and all other charges of every kind attributable to the Work and Services provided.

Bid Price includes Cash Allowance

| Line Item | Description | Unit of Measure | Quantity | Bid Price * | Total |
|-----------|------------------------------------------------------------------------------------------------------|-----------------|----------|-------------|-------|
| 1 | Elmira District Secondary School Special Education Relocation and HVAC Upgrade as per scope of works | Lump Sum | 1 | | |
| Subtotal: | | | | | |

Summary Table

| Bid Form | Amount |
|------------------------|---------|
| Bid Price Form | |
| HST (13%) | \$ 0.00 |
| Total Contract Amount: | |

Bid Questions

The Board will require General Contractors on the approved Roster List to have their IHSA - Certificate of Recognition (COR®) by January 2026. Although not mandatory for this bid opportunity, the Board requests bidders to respond to the question below YES or NO. By responding NO, you acknowledge the deadline requirement above. Does your company have a current IHSA - Certificate of Recognition (COR®)? - YES or NO

Bill S-211 - This enactment enacts the Fighting Against Forced Labour and Child Labour in Supply Chains Act, which imposes an obligation on certain government institutions entities to ensure measures are taken to prevent and reduce the risk that forced labour or child labour is used by suppliers or in their supply chains. The Board principles align with Bill S-211. Please confirm that your organization will comply with this Act. YES or NO. If no, please explain.

Specifications

Bidder's Contact Information

A Site Supervisor and Project Manager, assigned to manage and supervise the Work, must be named in this form. Personnel will be subject to approval by the Board and cannot be changed without prior written approval from the Board.

A dedicated Site Supervisor is required full-time for this project. If your company is awarded more than one project/contract, a different Site Supervisor is required for each project. In the event of this situation, you have the option to name and include a resume for an alternative Site Supervisor at this time.

If providing an alternative Site Supervisor with your submission, it is understood, that the alternative Site Supervisor will only be reviewed if the first Site Supervisor has already been accepted and working on another WRDSB project.

Note: resumes are required to be uploaded in the document section. Optional for alternative Site Supervisor

| Title | Name * | E-mail * | Cell Phone Number * | |
|----------------------------------------------------------------------------------------------------------------------------|--------|----------|---------------------|---|
| Project Manager | | | | * |
| Site Supervisor | | | | * |
| Optional - Alternative Site Supervisor in the event the Site Supervisor listed above is assigned to another WRDSB Project. | | | | |

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.

Upload a resume for each person named in the Specification section.

- Project Manager - Resume * (mandatory)
- Site Supervisor - Resume * (mandatory)
- Optional - Alternative Site Supervisor - Resume (only if Site Supervisor #1 is assigned to another project prior to this award) (optional)

BONDING UPLOAD SECTION

Refer to the Bonding Requirements Section of the Terms and Conditions.

Bonding is required if the project is equal to or greater than \$200,000.00. Note: The Bidding System has flagged these fields as mandatory. If your bid is less than \$200,000.00, please upload a pdf document stating: Not Applicable.

Bidders shall upload their electronically verifiable and enforceable (e-Bond) format for Bid Deposit Bond and Agreement to Bond separately in this section. If both Bonds are in the same pdf file, please upload it in both fields and indicate one is a "duplicate"

The date on the Bonds must be the Closing Date

Tender # and Project Title must be included on the Bonds

- 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.